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Master Thesis

Strategic Expansion of Mobile Technology for Community Health: An Inclusive Approach to Maternal Healthcare in Rural Ghana

by

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DECLARATION OF AUTHORSHIP

I, **Farah van den Berg**, declare that this thesis titled, **Strategic Expansion of Mobile Technology for Community Health: An Inclusive Approach to Maternal Healthcare in Rural Ghana** and the work presented in it are my own. I confirm that:

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- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
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ABSTRACT

Context. According to the World Health Organization (WHO), maternal mortality in Africa continues to be of major concern, particularly in rural areas. This is true for this study's target region, rural Ghana. Recently mobile technologies to access healthcare have been introduced and this is showing promising results. However, the providers of mobile healthcare facilities target exclusively conventional healthcare, overlooking the critical role that traditional healthcare plays in maternal health in African countries.

Goal. In this study we propose to extend the existing mobile technology health infrastructure to bridge the gap and allow collaboration between conventional and traditional maternal healthcare.

Method. This research project consisted of an intensive phase of context analysis of the local situation, and needs assessment with stakeholders in Ghana, in order to understand the problem. This was done through interviews with stakeholders. An extensive literature study was done to explore the state of the art of the subject. The methodology consists of different step while ensuring participants' ethical protection. Stakeholder demands were assessed to offer strategies to enhance the current Mobile Technology for Community Health (MoTeCH) infrastructure while balancing technology capabilities with cultural practices by means of a user-centered and context-aware framework.

Results. The study identified six major operational goals to improve the current mobile health technology services: enhanced communication between end-users, access to information, reminder and appointment management, patient records management, accessibility and inclusivity, and training and assistance. While the current MoTeCH architecture partially meets some requirements, substantial modifications are required to fully achieve all of the goals. In addition to the operational goals and requirements, three strategic goals with associated requirements were also identified: community engagement and trust, healthcare education and awareness, and collaboration and coordination.

Conclusion. The study finds that expanding the MoTeCH infrastructure to facilitate collaboration between TBAs and SBAs can dramatically improve maternal health in Ghana. The suggested collaboration approach encourages a more integrated strategy to healthcare, making better use of limited resources and strengthening collaboration between Traditional Birth Attendants (TBAs) and Skilled Birth Attendants (SBAs). By implementing these ideas, MoTeCH can significantly enhance maternal healthcare and serve as a model for similar initiatives around the world.

1 INTRODUCTION

1.1 Motivation

In 2015, the United Nations established an agenda for sustainable development by 2030 [84]. This agenda contains 17 Sustainable Development Goals (SDGs) and 169 associated targets [84]. These goals and targets in this agenda build on the Millennium Agenda, which ended in 2015 [84]. The goals and objectives are designed to drive action over the next 15 years starting in 2015 in areas of critical importance to humanity and the planet [84]. SDG 3 is about ensuring healthy lives and promoting well-being for everyone at every age [83]. This SDG includes 13 targets, 4 of which are directly related to maternal and child health [83]. According to the WHO [2024], maternal health refers to the health of women during pregnancy, childbirth and the postnatal period.

In addition to the relevance given to maternal health by the United Nations, several researchers argue that maternal health matters. Buse and Hawkes [2015] and Filippi et al. [2006] indicate that maternal health is important because it directly impacts the functioning of both current and upcoming generations. Although significant progress has been made over the past two decades, approximately 287,000 women died during and after pregnancy and childbirth in 2020 [91]. This number is unacceptably high, according to the WHO [2024].

Despite the progress, incorporating traditional African healthcare methods into the mainstream medical system remains a difficult topic [1, 9]. Traditional African healthcare is profoundly based in cultural ideas and practices, and it frequently offers vital health services in rural places when standard healthcare is unavailable [1]. As shown in Figure 1, many regions in Ghana still lack access to standard care. In all regions coloured red, pregnant and newly delivered women made significantly too few visits to a conventional healthcare site in 2017 [29]. This is one of the reasons why traditional care is widely used in these regions [29]. However, professional medical circles, including those of the WHO, are skeptical and resistant to these traditional treatments [66]. This skepticism derives from worries about the safety, efficacy, and scientific validity of traditional approaches [66]. As a result, discussions will be needed to tackle these concerns and to investigate how traditional healthcare can supplement current medical practices to improve maternal health outcomes, particularly in rural areas where conventional healthcare is insufficient.

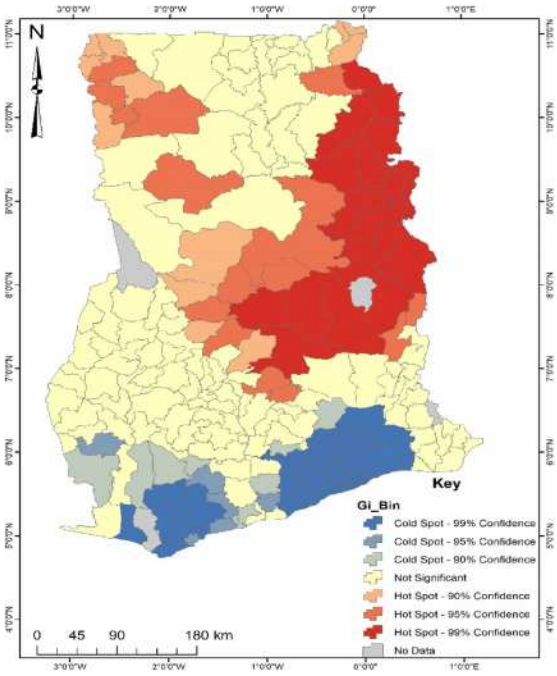


Figure 1: Hotspot analysis of Antenatal care (ANC) in Ghana (2017) adopted from Dickson et al. [2023]

1.2 Problem definition

In 2017, 66% of all maternal deaths were in Sub-Saharan Africa (SSA) [24]. The maternal mortality ratio (MMR) in SSA was 542 deaths per 100,000 live births, compared to a global ratio of 216 deaths per 100,000 live births in 2017 [24]. According to the eleventh revision of the International Statistical Classification of Diseases and Related Health Problems [90] maternal mortality refers to a woman's death during or within 42 days of pregnancy termination, from any cause related to or aggravated by pregnancy or how it is handled, regardless of the place of birth or duration of the pregnancy. Countries in the SSA have different strategies to reduce the MMR.

One example of such a strategy is the deployment of mobile health technology for maternal and child health. According to Nuhu et al. [2023], using mobile technology in healthcare can increase access to health services. This will reduce the delay to healthcare access [62]. The "Mobile Technology for Community Health" initiative (MoTeCH) is an example of such a technology. This project focuses on making the best use of simple mobile phone technologies to improve the healthcare of pregnant women and young children in the upper east region of Ghana [11, 55]. Section 2.2 deeper discusses what MoTeCH is and what is already known about it.

Another widely implemented strategy to reduce the MMR is the increasing rates of skilled birth attendance and facility-based childbirth. Although global skilled birth attendance rates have increased in recent years, one-third of women in SSA give birth without a Skilled Birth Attendant (SBA) [28, 81]. Women who do not give birth under the supervision of an SBA often do so under the supervision of a Traditional Birth Attendant (TBA). TBAs are women who assist the mother during pregnancy, in labor, and with initial care after delivery [4, 89]. Section 2.1 provides more details about what a TBA is and does.

Leveraging the services of SBAs to reduce the MMR is also an indicator for SDG 3's target 3.1, which is "Reduce global maternal mortality to less than 70 per 100,000 live births by 2030." This target's indicator is the proportion of births attended by skilled medical professionals [83]. Because of this aim, the Ghana Health Service (GHS) and WHO have decided that TBAs will no longer be permitted to provide maternal healthcare services [41]. However, they get trained to provide information on antenatal care, assist with family planning, and to educate newly pregnant women on the need of frequently attending health facilities [26]. Despite the restriction, around 30% of women in northern Ghana continue to give birth at home with a TBA [28, 81].

According to the research of Tabong et al. [2021] and Haruna et al. [2019], there are various reasons why one-third of women do not seek professional medical care during pregnancy, and delivery. According to the survey of Haruna et al. [2019], more than 40% of women who gave birth during the previous year involved TBAs services for their most recent delivery. The reasons highlighted by Tabong et al. [2021] and Haruna et al. [2019] are about positive relationships, comforting practices, post-birth care, easy access to materials, a preference for vaginal delivery, frustration with medical services, and untrained midwives. Cultural factors, financial considerations, faith in TBAs' experience, and perceived safety also influence women's decisions [41, 81] (see Section 2.1.2 for a more detailed explanation).

Aside from the fact that some women prefer to give birth with a TBA over professional healthcare, there is also a shortage of skilled healthcare staff, particularly in rural areas [8, 10, 31, 41, 68]. In such circumstances, TBAs have been used to fill this gap [41].

So, although the GHS prohibits assistance from TBAs, TBAs continue to assist women in giving delivery regularly. According to Haruna et al. [2019], the coordination between TBAs and SBAs is of low quality. The conflicts between the two parties originate from differing ideas of legitimacy held by both SBAs and TBAs regarding each other's mandate to offer maternal healthcare, as well as a perceived intrusion on each other's positions within the rural community [22, 41, 70].

According to Byrne and Morgan [2011], integrating both TBAs and SBAs into a formal healthcare system can improve healthcare. This integration is critical for closing the healthcare gap in rural areas and improving maternal health services. To make this successful, Haruna et al. [2019] propose a partnership approach. This approach consists of three strategies: A re-evaluation of TBA training, Partnership, and Task Shifting. Haruna et al. [2019] conclude that TBAs can perform well if appropriately trained, supported, and incorporated into a well-functioning healthcare system. This partnership approach is further discussed in Section 2.3.

The WHO's Six Building Blocks Framework provides a framework that identifies essential elements for a well-functioning health system, including health service delivery, health workers, health information, access to essential medicines, health financing, and leadership and governance [92]. Section 2.4 discusses these building blocks and explains which building block is most relevant to this study.

While addressing the need for collaboration between TBAs and SBAs is critical, it is also vital to acknowledge that government and policy-level difficulties have a substantial impact on the effectiveness of such programs

[20]. The complicated landscape of healthcare policy can impede the introduction of novel solutions such as the partnership method. Thus, starting the discussion is essential but it is insufficient to fix the underlying difficulties. To address these policy-level difficulties, comprehensive methods and multi-level interventions are required, which are outside the scope of this study. Effective policy advocacy and reform are required to foster a favorable climate for the successful integration of traditional and mainstream healthcare systems [20].

1.3 Research questions

To reduce the MMR, the emphasis is on both expanding the use of information and communication systems and increasing the number of pregnancies supported by SBAs. To continue using TBA services during this transitional phase, MoTeCH, a promising information and communication system, must be developed to incorporate the recommendations from the partnership approach of Haruna et al. [2019]. The overarching goal of the research is to contribute to the improvement of maternal mortality rates in SSA, with a specific focus on Ghana. The research aims to achieve this goal by enhancing collaboration between TBAs and SBAs through the adaptation or expansion of the existing MoTeCH infrastructure. This focus aligns with SDG 3, emphasizing the importance of effective collaboration, maternal care, and the reduction of maternal mortality in the region.

This research is in line with the idea of design science research of Wieringa [2014]. According to Wieringa [2014], a design science research goal can be divided into a design goal with associated design problem and design question(s) and a knowledge goal with associated knowledge question(s). In this particular study, the focus is on the design goal: improve maternal health in Ghana by expanding the existing MoTeCH infrastructure that satisfies the need for a partnership approach between TBAs and SBAs to enhance collaboration, reduce maternal mortality, and provide effective maternal care in alignment with SDG 3. To achieve this goal, the following design question must be answered: *"How can the existing MoTeCH (Mobile Technology for Community Health) infrastructure be expanded to facilitate a partnership approach between traditional birth attendants (TBAs) and skilled birth attendants (SBAs) in Ghana?"* Achieving this design goal will assist in achieving the larger research goal.

1.3.1 Sub-questions. Five sub-questions must be addressed in multiple research steps to address this design question.

(1) What is the present status of mobile health solutions, health technology, and the role and relationship between TBAs and SBAs?
(2) Which important stakeholders are there in this context and need to be part of the design process?
(3) What are the ideas, needs, and expectations of the selected stakeholders?
(4) How can various points of view be characterized to comprehend the MoTeCH infrastructure from the standpoint of all the stakeholders?
(5) What are the differences between the suggested extension and the existing MoTeCH design, and how can these be reconciled to satisfy the requirements of all stakeholders?

The answers to the several sub-questions complement one another and together address the design question. Section 3 discusses how these sub-questions will be addressed and how the design goal will be achieved.

1.4 Scientific and practical contribution

Answering the overarching design question will provide a scientific and practical contribution.

1.4.1 Scientific contribution. The scientific significance of this study emerges from its pioneering approach to healthcare technology, which extends the MoTeCH infrastructure to encourage collaboration between TBAs and SBAs. This strategy reflects the progress of health technology and could serve as a model for similar initiatives around the world.

So far, great progress has been made in the development and deployment of mobile health technologies, which aim to improve health outcomes in countries with low incomes. Studies have mostly focused on the use of mobile devices for data gathering, patient care, and health information dissemination. However, the integration of

traditional and conventional healthcare, particularly in the context of mobile health, remains a mostly unexplored study area.

This research focuses on this underexplored integration, investigating novel ways to promote collaboration between TBAs and SBAs using the MoTeCH infrastructure. This study provides new insights into the feasibility, acceptance, and impact of an integrated approach, which have not been thoroughly investigated in earlier studies.

This study's interdisciplinarity, which draws on elements from healthcare, technology, and cultural studies, helps us comprehend the challenges and methods to maternal care. This study promotes a more scientific approach to healthcare innovation by using a comprehensive perspective [23, 63].

Although the MoTeCH infrastructure and partnership approach have been investigated at a basic level [11, 20, 41, 45, 55, 62, 94], a more in-depth follow-up study is needed to provide more detailed findings and insights in how to integrate both the conventional and the traditional maternal healthcare. The absence of follow-up research now hinders the capacity to draw precise findings and make practical recommendations for MoTeCH's effective integration into the partnership approach framework. This more extensive investigation is required to precisely assess the feasibility, acceptability, and impact of this method, which will help policymakers and health authorities implement such changes [87].

1.4.2 Practical contribution. Answering the overarching design question is also socially essential, which will lead to a practical contribution. As previously stated, United Nations estimates show that in 2017, SSA accounted for up to 66% of all maternal fatalities worldwide, with an alarmingly high mortality rate [24]. These distressing results highlight the critical need for new approaches to improving the health of pregnant women in the region.

In Ghana, one particular concern is a lack of access to professional medical treatment, particularly in rural areas where competent healthcare providers scarcity exist [8, 10, 31, 41, 68]. This study acknowledges this fact and aims to solve it by incorporating TBAs into the formal healthcare system via the current MoTeCH infrastructure. This initiative is strongly aligned with SDG 3, which aims to ensure healthy lifestyles and promote well-being for people of all ages [83].

The incorporation of indigenous African healthcare methods into the mainstream medical paradigm remains a sensitive and frequently contentious issue [1, 9]. However, in rural areas where conventional healthcare is sparse, traditional practices play an important role in providing essential health services [1]. This study promotes positive communication and collaboration between conventional and traditional healthcare practitioners in order to address these challenges and to discover workable solutions to improve maternal health outcomes.

The research approach integrates current health technology with respect for cultural traditions, with the objective of not just improving individual women's lives but also contributing to the achievement of global health goals. According to Nazzar et al. [1995], the cultural context is essential for maternal health research in rural Ghana because it helps researchers understand fertility decisions and programming challenges that traditional communities encounter. The premise that an integrated, culturally sensitive approach is the key to long-term gains in maternal healthcare is essential, not only in Ghana but all over the world as well [46, 65, 69].

This study provides essential insights and recommendations to stakeholders, including traditional healthcare providers, conventional healthcare providers, and patients, to help enhance maternity healthcare in rural areas. This study will not directly help the position of women, but it will bring greater attention to the issue. Steps toward improved collaboration and more effective healthcare solutions can be taken by starting a conversation about integrating TBAs into the formal healthcare system, both inside and outside of Ghana. Furthermore, given that participants in this study know that collaboration between SBAs and TBAs is perceived positively from several viewpoints, they are more likely to be encouraged to work on it.

2 THEORETICAL BACKGROUND

Concerning the research question given, a number of models and theories should be discussed. In this section, the role of TBAs, the reasons why TBAs remain in operation, the infrastructure of MoTeCH, the partnership approach, and the six building blocks framework will be investigated in greater detail.

2.1 Traditional Bed Attendants

TBAs are women who assist the mother during pregnancy, in labor, and with initial care after delivery [4, 89]. TBAs have learned their knowledge and skills through experience or by learning from an older TBA [4, 13]. Often these are passed down from generation to generation [4, 78]. According to Lefeber and Voorhoever [1997] and Aziato and Omenyo [2018], the knowledge the TBAs have and the advice they give are heavily influenced by the traditions and culture of the particular community. Many TBAs rely on culturally inherited herbal treatments and spiritual practices to help women prepare for, during, and after childbirth [13, 44, 60, 64]. Some TBAs integrate these spiritual practices into the care they provide, claiming that pregnant women are at risk for spiritual attacks that may block beneficial outcomes [3, 25].

2.1.1 History. The role of TBAs is deeply rooted in the history and culture of many communities around the world. In many traditional societies, TBAs were the primary healthcare providers for pregnant women long before formal medical systems were introduced [13]. Their knowledge of childbirth practices is often based on age-old traditions and experiential learning within their community [13].

In many SSA communities during the pre-colonial era (until about 1880), TBAs served as the primary midwives. These TBAs were in charge of birthing as well as other reproductive health-related services, such as prenatal care and postnatal support [51]. Because of the advent of Western medical procedures and the colonial authorities' creation of institutional healthcare systems, the function of TBAs began to shift throughout the colonial era (1880–1960) [34]. The status and application of TBAs declined as a result of these new systems, which frequently attempted to replace customary practices with Western approaches [34]. However, TBAs remained crucial in many rural locations, particularly since most residents of these villages had limited access to Western healthcare [34].

TBAs continued to be a significant source of obstetric care in Sub-Saharan Africa during the post-colonial era (1960–present), particularly in rural regions with limited access to professional healthcare [77]. However, during this time, the necessity of bridging the gap between conventional and modern healthcare started to become increasingly apparent. Numerous nations initiated initiatives to train and include TBAs into the official healthcare system [77]. These initiatives aimed to preserve TBAs' traditional knowledge and community acceptance while enhancing their abilities and guaranteeing safe childbirth practices [77]. In many regions of Sub-Saharan Africa today, TBAs continue to play a crucial role in healthcare; however, the nature and degree of their involvement change depending on the nation and community [95]. In rural areas especially, improved maternal and newborn outcomes have been demonstrated to be largely dependent on collaboration between TBAs and formal health providers [95]. There is increasing agreement that TBAs, given the right support and training, may be a useful complement to the traditional healthcare system [34, 95].

2.1.2 Reasons for TBAs' continuing practice. It is quite clear that although TBAs have generally become less important and even banned by the GHS, they still play a crucial role within maternal healthcare in rural Ghana. Several studies have been conducted on why TBAs continue to operate. The reasons of Tabong et al. [2021] can be summarized as six major factors:

To begin with, a considerable proportion of women prefer TBAs' aid over professional medical treatment due to the positive interpersonal relationships and practices provided by TBAs. TBAs' services are appealing because they provide comfort and open conversation during birthing.

Secondly, TBAs' post-delivery care, which includes special infant baths, massages, and the provision of special foods, is regarded as an important component in women's decision to seek TBA assistance. This inclination is mostly motivated by the assumption that these behaviors improve the newborn's strength and well-being.

Thirdly, some women's difficulty in obtaining the goods required for work in healthcare facilities emerges as another reason. The extensive list of goods needed during ANC can serve as a barrier, driving women to prefer TBAs when labor begins, where they believe obtaining the needs is more doable.

Furthermore, there is a desire for vaginal delivery and apprehension about unneeded procedures such as cesarean sections in hospitals. Women are concerned about potential labor delays that could lead to cesarean sections in professional medical institutions, and they believe that TBAs can help with vaginal delivery using a variety of methods, including herbal medicines.

Another important element is the perception of inadequate services at medical institutions and untrained midwives. Women are dissatisfied with the quality of care at medical facilities, citing delays, contempt, and insensitivity to psycho-social requirements. TBAs, on the other hand, are viewed as experienced professionals who provide superior and more timely service.

Finally, unfavorable experiences with antenatal care and facility delivery influence women's decisions to use TBAs. Some women describe being mistreated, having long waits for care, and even being neglected during labor, prompting them to avoid professional healthcare facilities and seek the help of TBAs.

Haruna et al. [2019] also investigated the causes of the continued use of TBAs. First of all, TBAs were seen as "culturally prescribed midwives" in rural or traditional areas. They were also noted for being frequently available and flexible, frequently living in the same areas as their clients. Financial reasons were also important, as TBA services were frequently very affordable or even free when compared to clinics that needed payment. Some women said TBAs received appreciation in different forms such as agricultural supplies or food.

The great trust they felt in the local setting was an important component in their decision to engage with TBAs. This trust was founded on TBAs' extensive experience and the fact that they had not lost a single woman during childbirth in all of those years. Many women felt safer giving birth with the assistance of TBAs and valued the fact that they could share their private information with these trusted individuals.

Besides these reasons, Aziato and Omenyo [2018] emphasize that TBAs are still in control in rural Ghana due to their traditional and spiritual traditions, which may endanger clients; however, with proper initiation and training, they can become useful.

According to Allou [2018], TBA services are used a lot because they are less expensive, more culturally acceptable, closer to pregnant women's homes, more caring than traditional health personnel, and the only maternity care they know in rural Ghana.

2.2 Mobile Technology for Community Health

MoTeCH (Mobile Technology for Community Health) is a project initiated in 2009 by Ghana Health Service, Columbia University, and the Grameen Foundation. MoTeCH aims to employ mobile phone technologies to improve maternal and child health. This is accomplished by enabling health staff to document patient care on mobile devices and receive notifications when a patient skips an appointment or treatment via ICT. MoTeCH was originally introduced in Ghana, where it provided considerable support to the Mobile Midwife program. This program delivered health information to pregnant women and new mothers via voice messages and SMS, tailored to their unique stage of pregnancy or postpartum. The effort included numerous districts and included training for community health workers and health-care system integration [35, 53] In India, the National MOTECH System (NMS) was expanded to improve mother and child health. This implementation includes a variety of tools and applications, including Mobile Academy, Mobile Kunji, and Kilkari, which aimed to train health workers and offer health information to mothers via voice messages [5]. MoTeCH has also been used in several other countries as part of larger health and nutrition initiatives. These countries are Burundi, Indonesia, Niger, Sierra Leone, Sri Lanka, Uganda, and Zambia. These implementations often involve tailoring the MoTeCH suite to local needs, providing frontline health workers with job tools, and reinforcing health intervention practices [30].

2.2.1 Technological basis and system design. MoTeCH reacts to two concurrent trends: the enormous expansion of health workers in African and Asian populations, and the global advancement of mobile technology [55]. At

Figure 2: Data management sequence adopted from MacLeod et al. [2012]

the core of MoTeCH's system design is the integration of existing software programmes for interactive voice response (IVR), electronic medical records, and mobile data collection: a system that is designed to provide the best possible service for each client [55]. This allows healthcare workers to create a care plan for each client and notify users when aid is required. Besides that, MoTeCH automates the gathering of data on health services and status for regular reporting [11, 55]. The entire MoTeCH system is based on GSM technology. Simple GSM phones are utilized in this project to enable accessibility in remote areas where smartphones may be unavailable or hardly used. MoTeCH's solutions are GSM-compatible, making them widely useful even in places with poor internet connectivity. Figure 2 shows how data can be entered into the MoTeCH system.

2.2.2 Software components and architecture. Using software that had already been well tested was a deliberate choice that marked the beginning of MoTeCH development [55]. The foundation of the mobile data collection is openXData, an open-source software program with a minimal memory footprint on mobile devices that implements a large portion of the W3C xForm standard [55, 75]. This made it possible to give nurses reasonably priced phones and enabled the development team to create and execute data entry forms fast. The OpenMRS medical registry software tracks health information for women and children [55, 86]. Its extendable capabilities allowed for the rapid development of an appropriate data model. IntelliIVR, an application created by a Ugandan company with experience in adjusting to Ghana's telecom environment, was utilized to transmit voice messages to patients [11, 55].

Every woman's and child's electronic medical record is a key element of the MoTeCH architecture. The health status and care given, including the date of the pregnancy, clinic visits, anti-malarial medications, and child immunizations, are detailed in this file [11, 55]. MoTeCH can generate care plans and notify clients and responsible healthcare providers based on these individual health records [11, 55]. Furthermore, aggregate health statistics and reports are produced using individual-level data, which eliminates the need for nurses to manually calculate health status and care delivery by age group and gender on a monthly basis [11, 55].

In Figure 3 the architecture of the original MoTeCH system is displayed as described and displayed by MacLeod et al. [2012]. MoTeCH utilizes the Apach Tomcat web server. This server provides support for the system's web-based components as well as web request processing and delivery. This web server contains inbound and outbound message processors. These process inbound and outbound communications, respectively, and incorporate them into the MoTeCH system. The SMS gateway or the IVR system can process both inbound and outbound messages, with the former producing SMS text messages and the latter processing or producing voice alerts, reminders, and calls. Nurses can enter patient data using MoTeCH mForms (see Figure 2), which is then sent to

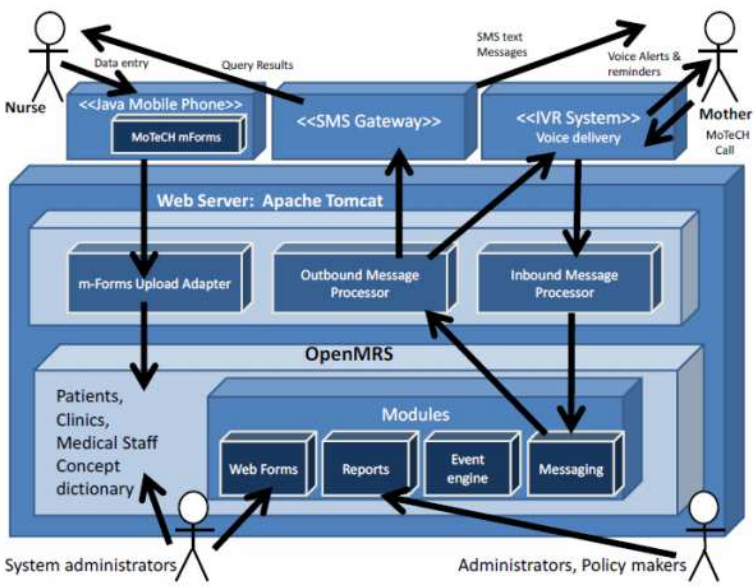


Figure 3: MoTeCH architecture adopted from MacLeod et al. [2012]

the server by the openMRS's m-Forms upload adapter, where it is parsed, validated for consistency, and changed as needed. This is then inputted into Open Medical Record System (OpenMRS). OpenMRS includes a concept dictionary, which is a central repository for established definitions of medical terminology, ensuring uniformity and clarity in data administration. OpenMRS additionally has four modules. The first module, Web forms, allows health data to be entered and maintained through web forms. There is also a reporting module that generates administrative and operational reports from the entered health data. The third module is the event engine, which is a calculating process that generates and updates a schedule of future care tasks for each patient in response to new data input. The final module is the messaging module, which uses logic to send messages to patients and healthcare professionals based on the care calendar, preferences, and message schedules. This module interacts with the inbound message processor and the outbound message processor [55].

2.2.3 Partnerships and funding. Ghana Health Service, Columbia University, and the Grameen Foundation formed a partnership to launch the first versions of MoTeCH. These collaborations demonstrate that MoTeCH is being developed and implemented in collaboration with local government entities, international academics, and non-governmental organizations. It is critical to note that such projects frequently rely on international funding and alliances to work and be sustainable. MoTeCH is meant to be free for end users, including health professionals and patients. The majority of funding comes from collaborative organisations and international contributors. The system's long-term viability is dependent on continued funding and support from these partners, as well as potential contributions from the government and other stakeholders.

While MoTeCH has had considerable success in improving mother and child health using mobile technology, it is crucial to note that the current developers have primarily concentrated on integrating modern healthcare practices and technology. This focus has resulted in reduced participation of traditional healthcare practices, making TBA inclusion less meaningful to their immediate objectives. The major goal was to improve care delivery, documentation, and patient interaction through digital solutions rather than integrating traditional healthcare providers like TBAs.

2.2.4 Comparison with other health information systems. MoTeCH distinguishes itself from other health information systems by emphasizing mobile technology and community-based healthcare. MoTeCH focuses more on direct

engagement and intervention at the community level, whereas systems like DHIS2 (District Health Information Software 2) concentrate primarily on the aggregation and analysis of health data at the national and regional level [48]. The combination of IVR and SMS reminders, which is crucial in areas with poor literacy rates, sets MoTeCH apart from other systems like OpenMRS and RapidSMS [47].

OpenMRS is an open-source electronic medical records system (EMRS) designed for use in developing countries [86]. It provides broad data analysis capabilities, interaction with several health modules, and support for patient record management [86]. Whereas MoTeCH is designed for community health contexts and leverages mobile technology to enhance patient involvement and healthcare access at the community level, OpenMRS is focused on clinical settings and offers complete EMR solutions.

UNICEF has developed RapidSMS, an SMS-based platform for collecting and communicating data on health programs [58]. It works especially well for collecting and analyzing data in real time, enabling rapid response to medical emergencies and tracking health indicators [58]. RapidSMS uses simple cell phones and, like MoTeCH, is easy to use and accessible in places with poor internet access [58]. MoTeCH, on the other hand, uses more advanced technologies and offers more options than just communication via text messaging.

CommCare is another system that is comparable with MoTeCH. SBAs use the smartphone application CommCare, developed by Dimagi, for case management and data collecting [80]. With the help of features like workflow support and mobile forms, offline data can be gathered and synchronized when connectivity is restored [80]. CommCare is distinguished by its strong case management features, which let SBAs maintain longitudinal health records and track patient data over time [80]. CommCare prioritizes thorough data gathering in the field and case tracking, giving SBAs a more complete toolkit than MoTeCH, which focuses mostly on sending health reminders and instructional messages to patients.

2.2.5 Impact and future. According to Willcox et al. [2010], implementing MoTeCH could potentially save about 60,000 lives in Ghana in 10 years' time. In addition, it would save $32 million according to Willcox et al. [2010]. However, the study they conducted is one of the first, so further research needs to be done to validate the assumptions and find more concrete evidence of the benefits of MoTeCH.

2.3 Partnership Approach

Researchers like Haruna et al. [2019] have created a cooperative strategy to get around the difficulties that come with incorporating TBAs into the official healthcare system, particularly in maternity care. This strategy acknowledges the importance of TBAs in communities and aims to strengthen their function via task-shifting and cooperation. The three main initiatives of the partnership method are to increase TBAs' skills, redistribute duties, and improve communication between TBAs and official healthcare providers. The partnership approach framework of Haruna et al. [2019] is based on a collaborative strategy with multiple stakeholders. The three primary strategies offered are as follows:

According to Haruna et al. [2019], the framework's first strategy emphasizes the importance of a new training method that respects and builds on TBAs' current knowledge and skills. It employs the concept of a "horizontal learning approach," presenting a participating training philosophy. Here, TBAs' knowledge and experience impact the training process. The goal is to increase TBAs' skills while retaining their previous knowledge and including them into the integration process.

The second strategy of Haruna et al. [2019] highlights the need to increase collaborations between TBAs and SBAs. It advises that TBAs and health professionals collaborate through cooperation, collaboration, and the development of productive working relationships. Efforts should be taken to address the lack of trust and mutual respect between TBAs and SBAs, including a proposed incentive-based referral system to encourage TBA collaboration.

Conforming to the third strategy of Haruna et al. [2019], a task-shifting program is needed, which involves transferring particular responsibilities from healthcare professionals to TBAs. This includes incorporating TBAs to assist or attend deliveries at health facilities, encouraging TBAs to take on expanded responsibilities in community-based health education, and promoting their participation in different facets of maternal and child health. The

idea is to use TBAs' skills in areas where they can make a meaningful contribution while also ensuring that their participation is recognized and valued.

2.4 Six Building Blocks Framework

The WHO's Six Building Blocks Framework offers a thorough framework for enhancing healthcare systems. The WHO created this framework, which outlines six crucial elements that work together to create a robust and efficient health system. These building blocks are: health service delivery, health workforce, health information, access to essential medicines, health financing, and leadership and governance [92].

The health service delivery is the first building block. The delivery of health services is the foundation of any health system. It consists of the structural and administrative framework needed to provide curative, palliative, rehabilitative, and preventive care. The provision of high-quality, patient-centered, ongoing, and easily accessible health services is essential. The aim is to offer a wide range of services that satisfy the requirements of the general public without needless obstacles like cost or location [92].

The second building block is the health workforce. The core of each health system is its workforce. The distribution, quantity, and skill sets of health workers are the main topics of this component. Having a large enough and competent pool of health workers is necessary to deliver high-quality care. In order for health professionals to adapt to the rapidly evolving needs and technologies in healthcare, it also includes the requirement for continual training and professional development [92].

Health information systems serve as the third building block. For the purpose of gathering, evaluating, and utilizing data for planning, policy-making, and assessment, health information systems are essential. Data on disease outbreaks, health indicators, and the effectiveness of the health system are rapidly and reliably provided by an information system that is operating well. This facilitates the discovery of service delivery gaps and enhances decision-making across the board. The information system is not only essential for monitoring and evaluation, but also serves broader purposes, such as providing an alert and early warning capability, supporting patient and health facility management, enabling planning, underpinning and stimulating research, enabling analysis of health status and trends, guiding global reporting, and enhancing communication of health challenges to diverse users [92].

The fourth building block is access to essential medicines. Having access to the required medication is vital for both maintaining and treating health. This covers the accessibility and cost of high-grade medications and immunizations. Essential medications are always accessible and reasonably priced for the general public at all healthcare facilities thanks to an efficient system [92].

Health systems financing is the fifth building block. The mobilization, distribution, and utilization of financial resources for health are all aspects of health financing. The objective is to lower financial risks for people while producing enough cash to deliver basic healthcare services. To guarantee that healthcare is affordable, this entails developing risk-sharing and solidarity systems like public finance and health insurance [92].

The sixth building block consists of leadership and governance. These are related to the strategic planning and management of the healthcare system. This part covers the creation of regulations, policy, and activity coordination within the health system. Establishing responsive and resilient health systems requires transparent, accountable, and stakeholder-involved decision-making procedures, all of which are ensured by effective leadership [92].

In the context of this research, the third building block of the WHO Six Building Blocks Framework - health information systems - is the underpinning. This building block is crucial for building a resilient and flexible health system that can meet routine medical needs as well as unforeseen medical emergencies [92]. However, some of the objectives of this building block will not be achieved because of the specific context in which the research is conducted and its limited scope.

3 RESEARCH STRATEGIES AND RESEARCH METHODS

This study approached the expansion of the MoTeCH infrastructure to promote a partnership approach between TBAs and SBAs in Ghana. The methodology included a thorough literature review, stakeholder analysis, in-depth interviews, coding, and stakeholder profiling. Different viewpoints were defined, views were created, compared to the existing MoTeCH architecture, and the design question was answered. This structured approach provided insights and practical recommendations for technology expansion. The different steps answered different sub-questions, thus answering the overarching design question. Figure 4 shows the research questions and method steps schematically, with the colors of the research questions corresponding to the method steps that helped answer the corresponding question. As can be seen in Figure 4, different kinds of steps are part of the method. The following subsections further explain the steps, describe how ethics were handled in this study and how validity, reliability and generalizability were strengthened. Finally, the final subsection elaborates on the characteristics of this study.

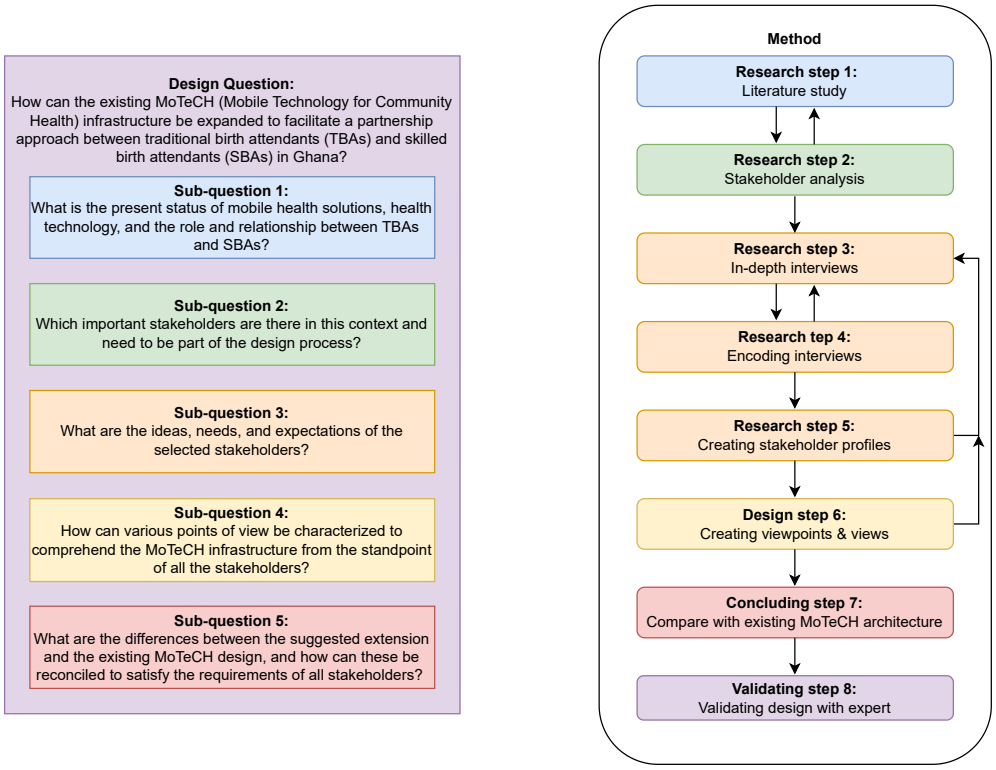


Figure 4: Schematic Method

3.1 Literature study

A thorough literature review was conducted to gain an in-depth understanding of the context. This study focused on relevant literature related to healthcare technology, mobile health solutions, and the role of TBAs and SBAs in the context of rural Ghana. This type of literature review is essential for understanding the research context according to Knopf [2006] and Hart [2018]. It provided insight into existing knowledge, identified gaps, and formed the basis for an informed research approach, enabling effective contributions to existing discussions and driving innovations. In particular, the literature found was used to formulate the introduction and theoretical background, but also to support the methodology and extend several results with scientific evidence.

The literature selection process used several key criteria to ensure that high-quality and relevant sources were included:

- *Relevance:* Only studies that directly addressed healthcare technology, mobile health solutions, maternal health, TBAs and SBAs in Sub-Saharan Africa, especially Ghana, were considered with some major exception of the literature used for the methodology. This included academic sources not directly related to the domain of this study, but rather to the method steps.
- *Recentness:* Reasonably recent publications (from 2010 onwards) were preferred to ensure that the most recent research findings and technological developments were included. This thesis ended up using 96 sources, of which 73 were published in or after 2010. The sources from before 2010 were selected because of their high relevance or on the recommendation of the context expert from Ghana. The older sources were often selected primarily for their relevant contributions to methodological foundations rather than for theoretical background and context understanding.
- *Credibility:* Peer-reviewed journal articles, reputable conference papers and authoritative reports from recognised health organisations (e.g. WHO) were prioritised to maintain academic rigour. There were exceptions to this, however, due to the limited number of sources available.
- *Diversity of sources:* Diverse sources were used in the literature review to cover various aspects of the research context. This encompassed empirical investigations, theoretical papers, systematic reviews, and case studies. The majority of the research was conducted through peer-reviewed academic journal publications that included empirical data and theoretical discussions on healthcare mobile solutions, as well as the roles of TBAs and SBAs. Governments literature on healthcare technology and maternal health in developing countries were also used to give fundamental knowledge and theoretical frameworks. International health organizations such as WHO and the GHS provided statistics data and policy ideas. In addition, graduate theses and dissertations were examined for in-depth research and novel approaches of incorporating TBAs into formal healthcare systems. Finally, grey literature such as policy papers, working papers, and technical reports from non-governmental organizations (NGOs) were evaluated to better understand practical issues and implementation solutions.

The literature search was conducted in several stages, starting with reviewing the recommendations of the context expert. An initial search was then conducted in databases such as Google Scholar with keywords such as 'mobile health technology', 'maternal health', 'traditional birth attendants', 'skilled birth attendants' and 'rural Ghana'. Titles and abstracts were screened for relevance and studies that did not meet the criteria were excluded. In addition, backward snowballing was used to identify further relevant studies from the references of the selected articles. The full texts of the remaining studies were then reviewed to collect relevant information on methodologies, findings and implications.

3.2 Conducting stakeholder analysis

Selecting the appropriate stakeholders was essential for this research. The stakeholder analysis considered the interests, expectations, and concerns of the relevant parties and determined how the proposed MoTeCH expansion will affect their work. This approach, which is based on Freeman [2010] and has the backing of Ayuso et al. [2014], raises acceptability, interest, and ownership — all of which are critical for the effective execution of the suggested expansion in the healthcare system [16, 82, 88].

	Low Power	High Power
High Interest	***Subjects***	***Players***
Low Interest	***Crowd***	***Context setters***

Table 1: Power-interest-grid adaptation of the original figure from Ackermann and Eden [2011]

In this research, the power-interest-grid method was applied to identify stakeholders and understand their level of involvement in the development of MoTeCH infrastructure in Ghana. The hierarchy, first described by Freeman and Phillips [2002] and later refined by Ackermann and Eden [2011], divides stakeholders into four quadrants according to their power and interests (Table 1). It is determined how powerful and interested those individuals are.

In line with Ackermann and Eden [2011]'s assertion, it is imperative to evaluate the identified stakeholders based on their power and interest. Based on this assessment, each stakeholder is placed in one of the power-interest grid's quadrants. Every quadrant has distinctive characteristics. The "crowd" refers to the stakeholders who have little power and little interest. Rather than being actual stakeholders, these stakeholders are potential stakeholders [2]. Although their interest and/or power may increase, it is usually not worth the time and effort to involve this group in the design process. The term "subjects" refers to the stakeholders who have a great deal of interest but have limited power. These stakeholders typically do not have a direct impact on the design process, but they are good to include when majority support or innovative input is required [2]. The term "context setters" refers to the powerful yet disinterested stakeholders. In order to increase their awareness and make sure the design stays within the context, it is crucial to incorporate these stakeholders later in the design process as they establish the overarching context [2]. Lastly, the "players" are the stakeholders who hold significant power and interest. Because the design and its future implementation rely on the opinions of these various stakeholders, these stakeholders need to be heavily included in the design process [2]. High-power and high-interest stakeholders were thus seen to be essential for active participation in the process of designing the extension of the MoTeCH infrastructure.

3.3 In-depth interviews

For this research, the contact person in Ghana was Gideon Ali. He and his colleagues conducted interviews with carefully selected Ghanaian stakeholders in order to thoroughly grasp their perspectives on the collaboration between SBAs and TBAs. These interviews, which focused on experiences, desires, and goals, were important because of regional dialects and the need to prevent issues brought on by illiteracy.

To ensure that the discussion stayed on topic and addressed all pertinent issues, lists of questions were provided for each group of stakeholders, following Baarda et al. [2007]'s advice. According to Busetto et al. [2020], it is important to conduct interviews to be able to complete stakeholder profiles. This kind of qualitative research is defined by its openness and flexibility.

On-site interviews were done in order to better grasp the situation. All collected data was carefully documented and, when required, translated to facilitate comprehensive examination. The establishment of the collaboration framework between TBAs and SBAs inside the MoTeCH infrastructure depends on the thorough and correct integration of stakeholders' perspectives, which was made possible by this technique.

A number of interview questions were created for Ghanaian participants based on the stakeholders that had been identified. Appendix 2 (Section 7.2) contains these interview questions. Gideon attempted to conduct these interviews, but they turned out to be too difficult. New questions were designed in response to this feedback (Appendix 3, Section 7.3). Because of Gideon's constrained schedule, it was not feasible to use these questions for many different interviews. In the end, only the new SBA questions were used. Nonetheless, as this thesis is a component of a bigger research, Gideon and his colleagues had already conducted other interviews on the same subject. So, these previously conducted interviews formed the basis for this study. Some recently completed interviews that focused more on the MoTeCH infrastructure were added to these for a complete view. I transcribed the interviews when the audio was in English; otherwise, Gideon translated and transcribed the audio fragments. This offered a comprehensive and in-depth set of data that was necessary for integrating and analyzing the various stakeholder viewpoints inside the MoTeCH project.

In the end, the subsequent steps in this study covered the analysis of 12 interviews with SBAs, 11 patient interviews, 4 TBA interviews, and 6 doctor interviews. To obtain a deeper understanding of the situation, interviews with the GHS and an NGO were made available in addition to these stakeholder interviews. These interviews were used primarily to learn more about the issue in question, rather than with the intention of creating stakeholder profiles. This is in line with their role in the power-interest-grid as completed in the previous research step.

3.4 Encoding interviews

The collected interview data was carefully coded using a systematic approach that incorporates steps of the Grounded Theory method as described by Strauss and Corbin [1990]. Open coding was the first step of the process, where data was evaluated without predefined classifications. Following this, during axial coding, related concepts were grouped into categories. Patterns and themes were revealed by continuously comparing and improving notions. Since many of the interviews analysed were not conducted specifically for this thesis, the coding process focused on the parts that were relevant to answering the design question and related sub-questions. This method is based on the coding techniques described by Saldana [2021]. A careful review of the information gathered from the interviews was encouraged by this systematic approach. This combined method is based on the Grounded Theory approach of Strauss and Corbin [1990] and the ideas of Saldana [2021].

From all the codes found, a critical selection was made of what is important for answering the sub-questions and thus the design question. Based on the relevant codes, several overviews were made in the form of a table and a conceptual map.

3.5 Creating stakeholder profiles

For every stakeholder group identified by the stakeholder analysis as being significant, thorough stakeholder profiles were created based on the systematic coding of the interviews. Regarding the planned partnership between TBAs and SBAs through the MoTeCH architecture in Ghana, each profile offers a thorough overview of the particular group, including their expectations, concerns, and (business) goals. To give the most complete picture of the stakeholders and their significance, these stakeholder profiles also incorporate the characteristics identified in the stakeholder analysis.

Based on the presented profiles and the coded interviews goal and requirement overviews were created. These overviews of requirements consists of everything that is crucial to the success of the proposed development. Here, the theoretical framework of Bass et al. [2003] is applied, in which architecture is recognized as a critical element in facilitating the targeted (business) goals of each relevant group. Through the integration of this approach, architectural decisions were made that are sensitive to the needs of each stakeholder group. One overview of operational goals and requirements and one overview of strategic goals and requirements were created. This, consequently, will contribute to an efficient implementation of the established collaboration between TBAs and SBAs within the framework of Ghana's MoTeCH infrastructure.

The proposed MoTeCH expansion will have its architecture precisely aligned with the needs and expectations of all significant stakeholders because of this methodical creation of comprehensive stakeholder profiles combined with goals and requirement overviews based on the coded interviews. This thorough strategy immediately addresses the according research sub-question by enabling a thorough grasp of the ideas, needs, and expectations of each stakeholder group. The customized design choices that come from this process not only make the suggested cooperation more relevant and responsive, but they also make it easier for it to be implemented successfully, which guarantees that stakeholder concerns and corporate objectives are successfully addressed.

3.6 Creating viewpoints and views

Various viewpoints and views were defined in this study to understand and communicate the architecture of the proposed infrastructure from different stakeholder perspectives. In this process, the viewpoints are a kind of reader's guide that helps with understanding the views [15]. This approach ensured that the final architecture meets the most significant needs of all stakeholders [15].

A viewpoint represents specific interests [15]. Each viewpoint shows which goals and requirements are involved, which stakeholders are affected by this viewpoint, what the notation of the corresponding view is and how the notation elements can interact with each other using a metamodel. The metamodel is visualised as a UML class diagram. In accordance with Levendovszky et al. [2002], UML class diagrams serve as the metamodel language, enabling the reuse of models defined in a particular domain-specific modeling language in a complementary domain.

This decision to use class diagrams as metamodels was made because UML class diagrams' formal structure and standardized syntax offer precise explanations of the relationships and constraints inside the metamodel.

The views represents concrete representations of the architecture reflecting the identified components from the viewpoint. These views are visualised as view in the form of a UML use case diagram, UML activity diagrams and a UI component overview. Because a UML use case diagram clearly illustrates the potential use cases for which the system is designed, it is the preferred tool for visualizing system functionality [74]. Instead of going into specifics about how the system will be implemented, including data structures or algorithms, this kind of graphic captures the functional requirements of the system. The use case diagram makes it clear who will actually utilize the system by representing which actor interacts with which capability [74]. Because it closely matches the needs of the client and represents their goals for the system, this is very helpful during the analysis and design phase [74]. Use case diagrams serve as an important tool for recording system functionality and identifying which users are authorized to access which features since they serve as a high-level abstraction of the future system's purpose [74].

The choice to employ UML activity diagrams was made because of their emphasis on procedural processing. They are an excellent option for illustrating certain system operations [74]. These visualizations efficiently outline the data and/or control flow between various steps needed to carry out an operation [74]. Because of this, they are especially helpful for outlining the flow of data and the order in which actions occur within a system. It is essential to have a precise and comprehensive visual representation of the various workflows and processes during the design phase [38]. By simulating the flow between actions and guaranteeing that every procedural step is precisely described and understood, activity diagrams offer this.

An overview of the UI components is additionally included. Despite not being an official modeling technique like UML, this overview is still quite important. In this manner, the interface's functionality and design can be efficiently documented and shared.

3.7 Comparison with existing MoTeCH architecture

A detailed comparison between the current MoTeCH architecture and its intended expansion is conducted. The areas where the current architecture has to be modified to accommodate the various demands and specifications of stakeholders are identified by this step. The views and viewpoints generated are important instruments in this assessment. By combining these techniques, a solid understanding emerged of how the suggested expansion could improve the current architecture in a complementary way to guarantee desired functionality and meet the needs of the different stakeholders.

For the comparison, the three most important scientific articles discussing (the functionalities of) MoTeCH in combination with a description of MoTeCH's security model were used [11, 39, 53, 55]. To facilitate the comparison, a table is made that addresses each requirement identified at an earlier stage of the study, explains whether the current MoTeCH architecture satisfies the requirement or not, and suggests ways to implement or enhance it in accordance with the developed viewpoints. Besides that, the schematic view of the current MoTeCH architecture (Figure 2.2.2) is supplemented with the needed components.

3.8 Validating design with an expert

The validation step, which involved expert assessments to confirm the robustness and dependability of the suggested design, was completed at the study's final phase. Making sure the design is workable and aligned with the requirements and expectations of the relevant stakeholders requires taking this crucial step [56].

The goal of the expert evaluation is to get a professional opinion on the viability and efficacy of the suggested design to expand the MoTeCH architecture. Potential flaws can be found and suggestions for changes based on real-world experience and in-depth subject knowledge can be made by consulting experts in the industry [56]. This has motivated further research and provided nuance to the study findings.

The validation step consisted of discussions with Anna Bon, ICT4D expert, Gideon Ali, contact person from Ghana and context expert, and Doctor Rena, a doctor working in a clinic in Ghana and thus a context expert.

3.9 Ethics

This research integrated ethical considerations at all stages, with specific attention to human subjects during the stakeholder interviews. Strict standards were adhered to in compliance with ethical guidelines. Participants were informed of the purpose and their ability to withdraw at any moment to acquire informed consent. Strict confidentiality measures are used, and anonymized data protects individual responses. Both the methods and the questions are infused with cultural sensitivity. With helpful, open findings, the research aims to cause benefit rather than harm. Access to the data is restricted and the data is stored securely. The process was open and respected the independence of the participants. The research maintained integrity, trust, and respect thanks to this ethical method, which also made a useful and responsible contribution to research.

3.10 Validity, reliability and generalizability

Several steps were taken in this research to guarantee the findings' validity, reliability, and generalizability. The strategies used to guarantee these elements are covered in this section.

3.10.1 Validity. The degree to which research instruments and procedures truly measure the things they are supposed to measure is known as validity [42]. A number of steps were taken to guarantee this study's validity.

Firstly, triangulation was utilized; an effort was made to obtain a comprehensive and accurate image of the study setting by employing a variety of data sources and methodologies (literature review, stakeholder analysis, various interviews, coding, and profile construction). By incorporating several viewpoints and data, triangulation of methods increases both internal and external validity. This diminishes the possibility of biases and provides a more balanced impression.

A total of 35 interviews with various stakeholders were done throughout the project. Internal validity has been addressed by using standardized interview questions and procedures. External validity was improved by including a wide range of stakeholders and evaluating and contrasting their points of view. The research's construct validity was enhanced by the application of standardized questionnaires and methodical interview data coding. In practice, this guarantees that the metrics are coherent and accurately measure the ideas under investigation, including the goals, concerns, and targets of the stakeholders.

External validity was further assured by comparing goals and requirements with the current MoTeCH design. The validation in the form of expert reviews provided additional support for the external validity. It was confirmed whether the design and expansions correspond to the norms and procedures in the study setting by submitting the generated design to experts. In addition to the conclusive validating expert reviews, there was regular contact with the experts during the research to keep an eye on whether the research was in line with the (cultural) context and to make adjustments in time. It's crucial to confirm this, particularly when the researcher's living environment and the research context are different. Speaking with experts also gave insightful commentary on the viability and efficiency of the suggested design. By expanding the reliability and robustness of the results, this enhances the conclusion's validity.

3.10.2 Reliability. The degree of consistency and repeatability in the study's results is referred to as its reliability [42]. Several steps were taken to guarantee the study's reliability in order to guarantee the truthfulness of the conclusions and the reliability of the findings.

First, the reliability of the employed techniques was taken into consideration. The various stages of research have been subjected to procedural standardization. This reduces the chance of bias and unpredictability by ensuring that every stage of the investigation was conducted consistently. To make sure that every study participant received the same questions and treatment, standardized questionnaires were also employed.

The reliability of the conclusions was also taken into consideration. Results from the study have been presented consistently in all of its sections, including evaluations of related literature, stakeholder analyses, and platform comparisons with the current MoTeCH architecture. To put the results in context, the study's possible limitations were also noted and addressed.

3.10.3 Generalizability. The degree to which a study's conclusions, findings, or outcomes can be extended to circumstances, groups, or environments other than those under investigation is known as generalizability [21]. Aiming for generalizability is essential to guaranteeing that research findings are applicable and valuable outside of the study's particular setting.

The study's findings' generalizability needs to be interpreted in light of the circumstances surrounding its execution. The results and conclusions may still be applicable in comparable situations, although being particular to the MoTeCH infrastructure scenario and the cooperation between TBAs and SBAs in rural Ghana. It is imperative to acknowledge that the extrapolation of these discoveries beyond the boundaries of the particular research setting requires careful assessment and investigation.

The study's context-specific design highlights how the conclusions are based on Ghana's particular conditions, cultural norms, and medical institutions. This suggests that it is not easy to directly apply the findings to different countries or settings. Rather, the results ought to be seen as recommendations or guidelines that, when applied carefully and critically, can be modified for comparable situations.

However, generalizability has been given attention during the execution of this research. For instance, representative samples were taken for the interviews as much as possible. Furthermore, care was taken to ensure that the study's data and conclusions were generated accurately and transparently. An open and repeatable study methodology that promotes the generalizability of the results has been ensured by offering comprehensive details on the procedures and methodologies used.

3.11 Type of research

As shown in Figure 4 and described in Sections 3.1 to 3.8, this study consists of several types of steps. These include research steps, a design step, a concluding step and a validating step. This is in line with the idea of design science research as discussed in Section 1.3. For this research, a design question was drawn up and therefore a design science approach was adopted because this research has a practical purpose and there is a need for actionable knowledge rather than just an analysis of the context. This is also why there are design and validation steps integrated into the research design.

This study is a multidisciplinary effort that incorporates components from several research paradigms. To determine the context and important stakeholders, the exploratory phase entailed an in-depth body of research and analysis of stakeholders. Stakeholder profiles were generated at a descriptive level, encapsulating goals, concerns, and expectations. In attempting to comprehend how the MoTeCH infrastructure may be extended to facilitate cooperation between TBAs and SBAs, the research also assumed an explanatory character. By contrasting the suggested extension with the current MoTeCH architecture, it also looked for ways to improve it. All things considered, the goal of this project is to maximize the use of technology to enhance healthcare in Ghana utilizing a dynamic interplay between exploring, describing, explaining, and improving.

This study's technique is balanced by combining deductive and inductive methods. The literature review and stakeholder analysis, which gathered data to find trends, both exhibit the inductive methodology. In addition, the study used deductive reasoning to address the research topic and compare suggested additions to the current MoTeCH architecture. This combined strategy seeks to offer a thorough comprehension and focused recommendations.

This research stresses comprehending complicated human relationships, perceptions, and cultural contexts, which tends to lead it toward a primarily interpretive approach. The emphasis on in-depth comprehension and contextual complexities highlights the interpretive character of the used methodology.

4 STUDY EXECUTION

As discussed in the methodology section (Section 3 and Figure 4), this research consists of several components that iteratively followed one another. In this results section, the parts of the research with concrete results will be discussed. The parts without concrete results have mostly served as the basis of the other phases or results.

4.1 Stakeholder analysis

The higher goal of the stakeholder analysis was to identify interested stakeholders. By applying the power-interest grid, as proposed by Ackermann and Eden [2011], the stakeholders were categorized based on their degree of power and interest. The stakeholder roles are based on the previous literature review and orientation interviews with experts. Table 2 shows how the stakeholders were categorized. Non-governmental organizations (NGOs) are defined as subjects because their power is quite low. While individual NGOs may have limited policy influence, they do influence the implementation level and can form coalitions. However, NGOs have a deep interest in promoting effective and inclusive healthcare projects, including technology expansions such as MoTeCH. This is why there was an interview conducted with this stakeholder group. GHS is classified as a context setter stakeholder because this organisation has significant power due to its responsibility for formulating and implementing health policies. Their decisions influence the structure and operation of healthcare, including the role of MoTeCH. Because GHS is an overarching authority, their direct interest in specific technology implementations may be lower. However, they are interested in improving overall healthcare in Ghana. That is why there was a context setting interview with this stakeholder.

	Low Power	**High Power**
High Interest	***Subjects*** NGOs	***Players*** Patients (S1), TBAs (S2), SBAs (S3), Doctors (S4)
Low Interest	***Crowd***	***Context setters*** GHS

Table 2: Stakeholder power-interest-grid

The current stakeholder study has identified the key stakeholders, which include patients, TBAs, SBAs, and doctors. However, several major stakeholder groups have not been explicitly included in this research. These groups consist of, among others, developers, system administrators, managers, policymakers, and administrators. Developers and system administrators are more concerned with constructing and maintaining the infrastructure and software than with the system's day-to-day operational use by medical professionals or patients. While the assistance of developers and system administrators is beneficial, Schmidt and Buxmann [2011] recommend focusing primarily on direct users during the early design phase. Managers and policymakers have a significant impact on the strategic direction and execution of healthcare programs like MoTeCH. However, they are more concerned with higher-level decision-making and policy development than with the practical use of technology [57]. Because this stakeholder analysis focuses on operational and direct user experiences, decision-makers and managers have been omitted in order to focus on day-to-day interactions with the system [36]. Administrators are responsible for support and data management, rather than direct engagement with the system's features [71]. When creating and assessing user interfaces and experiences, the emphasis is frequently on end users who are directly involved in all the interactions [61].

The current stakeholder analysis focused thus on the stakeholder groups having direct influence and involvement in MoTeCH's key user applications: patients, TBAs, SBAs, and doctors. This is a conscious decision to keep the analysis modest and focused, as the viability of including technical and policy stakeholders in the design research is limited. Section 4.2 elaborates the stakeholder profiles where the high interest and high power are identified for each "player" stakeholder.

4.2 Stakeholder profiles

The stakeholder profiles are based on knowledge gathered from the literature study and for the most part on the interviews analyzed. All coded anonymized interviews can be found in Appendix 4 (Section 7.4). Based on these coded interviews, several overviews were made. The interview results visualized in a conceptual map can be seen in Figure 5. This figure shows that there are two main branches, collaboration and ICT-platform. The collaboration branch is divided into requirements and training. Those concepts are all mentioned in several interviews. The ICT-platform branch is divided into requirements, challenges, and functionalities. Some of the challenges are also broken down into subchallenges. The functionalities branche consists of 6 main required functionalities for the system, which all have their own requirements. A more detailed overview of which stakeholder has said what can be found in appendix 5 (Section 7.5) and in the coded transcriptions (Section 7.4). Sections 4.2.1 till 4.2.4 shows the concrete stakeholder overviews with each a description of the stakeholder, the relevance of the stakeholder, why those stakeholder is selected based on their interest and power, and their expectations, wishes, worries, and demands for the ICT-platform. All those expectations, wishes, worries, and demands can be found in the analyzed interview transcriptions and the corresponding overviews.

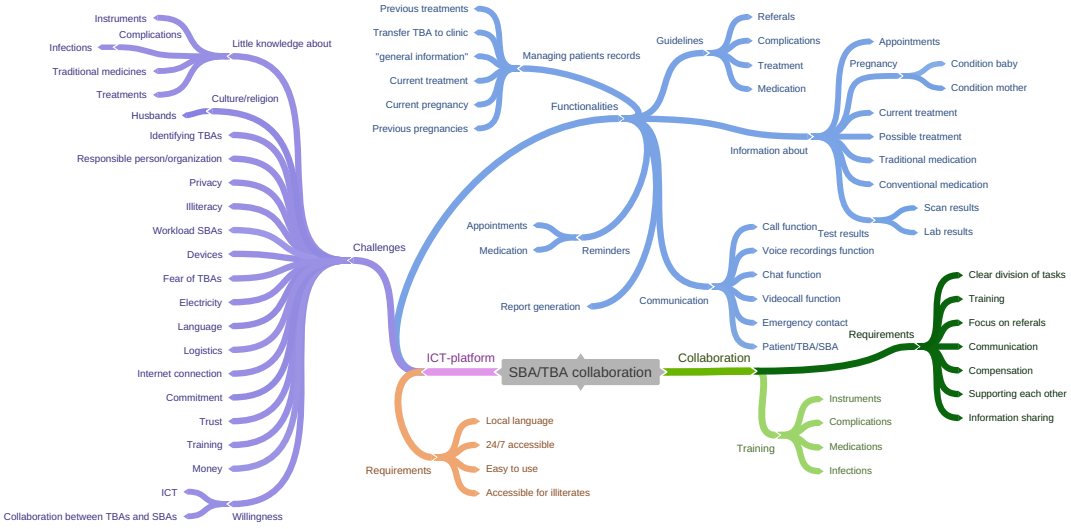


Figure 5: Interview results mindmap

4.2.1 Stakeholder 1: Patients (S1). Patients are actively involved in receiving care from TBAs or SBAs and are at the center of the care process. All people who use maternity care services in the community and are pregnant or recently gave birth are included in this stakeholder group. This encompasses both conventional and traditional care services.

This stakeholder group may offer important insights into how the ICT platform impacts their experiences receiving maternal care, as they are directly impacted by its deployment. To make sure that the ICT platform fits their needs, expectations, and cultural context, it is essential to consider their point of view. Their participation in the development, application, and community acceptance of the platform can improve the technology's efficacy and acceptability.

Relevance: Patients, including pregnant women and those who have recently given birth, are the direct beneficiaries of maternal care. Their health and experiences are at the heart of the healthcare system, and it is essential to provide tailored care.

Interest: *High.* Since they are directly involved in pregnancy, childbirth, and the postpartum period, patients have a high interest in the quality and accessibility of obstetric care. Their recent experiences with the healthcare system give them considerable interest in improvements and innovations, such as the proposed MoTeCH expansion.

Power: *High.* Although patients may have limited influence on health policy, their collective influence as a significant portion of the population grants them substantial power. They are one of the main users of the system.

Expectations / wishes / worries / demands: Regarding the features and cooperation required of the healthcare system, patients have varying expectations, wishes, worries, and demands. Restricted internet connectivity is a major problem for patients, particularly in rural locations. Additionally, while patients often speak the local language Dagbani, not all the SBAs do speak Dagbani. This creates a language barrier. Furthermore, not all patients are able to read and write, so illiteracy plays a big role. The application of digital health solutions is restricted by these challenges.

In terms of operations, patients largely demand options for effective communication and access to important information regarding their appointments, pregnancy, treatments and medication. This includes communication with and between SBAs and TBAs. In addition, patients wish for reminders for appointments and medication. Patients also claim that digitized patient records are necessary for integrated and ongoing care delivery. In line with the concerns, patients anticipate that the platform is expected to be inclusive and effective, and that it will be accessible to those who lack literacy or only speak the local language. Finally, patients anticipate receiving sufficient training to get familiar with the usage of the digital health solution. This training is vital to guarantee that patients have the necessary abilities to use technology effectively and to increase their involvement in their own (maternal) health.

4.2.2 Stakeholder 2: TBAs (S2). Traditional Bed Attendants (TBAs) are community-based healthcare providers who are vital to the provision of maternal care. Pregnant women and their families often regard and trust them because of their extensive understanding of traditional birthing methods. TBAs are capable of carrying out a variety of tasks, including antenatal care, assistance with deliveries, and postnatal care. In distant and rural places where access to professional healthcare services may be restricted, they play a significant role in giving care to women due to their extensive grasp of the local culture, traditions, and rituals surrounding pregnancy and delivery.

The development and application of an ICT platform for maternal care should benefit from the distinct perspectives and experiences that TBAs have to offer. Their participation in the process can guarantee the community's acceptability, efficacy, and cultural relevance of these solutions. In order to guarantee that the ICT platform fulfills the requirements and expectations of these healthcare providers and that care is seamlessly in line with their traditions and values, it is crucial to make use of their knowledge and insights.

Relevance: TBAs have high relevance because they have in-depth knowledge of local birth care traditions and practices. Their involvement is crucial to developing culturally respectful and effective solutions. Besides that, these healthcare providers are responsible for a substantial part of the maternal healthcare.

Interest: *High.* TBAs are strongly involved in birth care and have a deep interest in the effectiveness and adoption of new health technologies in their practice.

Power: *High.* As essential healthcare providers within local communities, TBAs have a significant influence on pregnancy and childbirth care. Their experience and knowledge make them powerful figures within the community.

Expectations / wishes / worries / demands: Regarding the ICT platform, TBAs have distinct expectations, wishes, worries, and demands. First and foremost, TBAs want a platform that considers the traditional, religious, and cultural characteristics of the community they serve. The platform should therefore be adaptable and able to take into account traditions and views that are specific to the community.

The issue of low literacy among TBAs and the communities they serve is one of their primary worries. They therefore demand that the platform be user-friendly and easy to understand, especially for those with low literacy levels. The information given within the platform should be accessible for everyone through translations and recordings.

Effective communication is yet another important component of the ICT platform. TBAs want to be able to conveniently exchange information about visits, medications, and treatments with patients and qualified healthcare providers. TBAs also emphasize the significance of support and training about the platform. They require in-depth instruction in order to become competent with the platform.

Training is a crucial need for collaboration. TBAs would like to have access to training programs designed to increase their expertise in providing maternity care. This involves instruction in handling crises, identifying complications, and effectively interacting with various healthcare professionals. TBAs can improve the collaboration with SBAs through collaborative training sessions. The TBAs emphasize the value of helping each other out. They are looking for a helping atmosphere where they can work together and share knowledge. This entails exchanging insights and firsthand information, offering SBAs help when needed, and cooperating to resolve complicated care problems. TBAs can create a cohesive and efficient care team that gives expectant mothers and women the best care possible by cooperating and supporting one another.

A clear division of duties and responsibilities is another prerequisite for cooperation. TBAs seek agreements that are unambiguous regarding their responsibilities within the care collaboration and who is in charge of which tasks. This promotes clear communication and seamless collaboration amongst various healthcare providers.

Communication is also vital for collaboration. TBAs want to have effective communication channels to communicate quickly and easily with skilled healthcare providers. This includes sharing important patient information, coordinating care plans and responding quickly to emergencies. Open and transparent communication allows TBAs to collaborate efficiently with other members of the healthcare team and improve the quality of care.

4.2.3 Stakeholder 3: SBAs (S3). Skilled Birth Attendants (SBAs) are licensed healthcare professionals with training in modern obstetric and medical procedures. They play a crucial role in providing professional maternal care to pregnant women and women who have recently given birth. They frequently offer guidance in family planning and child welfare services as well. SBAs have received thorough medical training and are qualified to perform antenatal check-ups, supervise deliveries, treat complications during pregnancy and childbirth, and provide postnatal care. They work in clinics, health centres or hospitals. Location-specific differences exist in access to (modern) medical equipment.

SBAs have expertise in modern healthcare procedures and are well-informed about the newest guidelines and protocols relating to maternal care. They serve as the first line of medical treatment for many expectant mothers and are crucial in risk assessment, education and support, and care coordination before, during, and after delivery. Their input is crucial to ensuring that these solutions satisfy the requirements of these healthcare professionals and raise the standard and accessibility of maternal care during the development and deployment of the maternity care ICT platform.

Relevance: SBAs are of high relevance because they represent modern healthcare and are essential for successfully integrating technology solutions.

Interest: *High.* SBAs have a deep interest in improvements in maternal care and can benefit from more efficient collaboration with TBAs.

Power: *High.* As healthcare professionals, SBAs significantly influence healthcare practice and policy.

Expectations / wishes / worries / demands: Regarding the use of the ICT platform and working with other healthcare workers like TBAs, SBAs have varying expectations, wishes, worries, and demands. The willingness of patients, TBAs, and other healthcare professionals to accept and utilize the ICT platform is a major worry. However, the SBAs are also concerned about the willingness of the TBAs in relation to their fear of conventional care. The SBAs are therefore worried about the commitment of the TBAs; they will also have to gain trust for this collaboration. This includes worries about how cultural, religious, and traditional factors can influence the willingness to participate, for instance. Financial limitations are another issue, since SBAs worry that given that TBAs get paid by counseling patients, they would be less cooperative. The SBAs worry that the TBAs value their money over the patients' well-being.

Furthermore, SBAs emphasize the value of assistance and training when implementing the ICT platform. In order for them to effectively utilize the features and develop confidence in the technology, they want to be guaranteed effective training. Electricity, devices, and reliable access to the internet are also essential since they impact platform accessibility. It is important to get the logistics of this right. There are also concerns about the differences in knowledge between the different stakeholder groups. For example, TBAs generally have less knowledge about complications and SBAs have less knowledge about traditional medicines.

A further issue is the language barrier, since many local languages are prevalent in rural locations and SBAs, TBAs, and patients may speak different languages. This might hinder clear communication and the exchange of information. Illiteracy of patients and TBAs is also a concern for the SBAs. The system should also be accessible to them to achieve optimal usage. SBAs also worry about patient privacy and the accountability for system and data management. The workload of SBAs and other healthcare staff is already very high. They themselves have no capacity to maintain and manage the system.

SBAs emphasize the necessity for efficient lines of communication, quick access to important details about appointments, treatments, and medications, as well as the capacity to digitally maintain patient data and produce reports on them, in terms of the functions of the ICT platform. In order to improve patient involvement, they also want to be able to send reminders for visits and medications to their patients and ask for evaluations after the appointments.

The SBAs wish the system to be available 24/7 as they also operate these times. In addition, they hope the system will also be accessible and available to patients and other users who are (digitally) illiterate or only competent in the local language.

SBAs emphasize that in order to successfully collaborate with TBAs, there must be a clear division of responsibilities, training for both sides, good communication, and mutual support. In order to offer patients integrated care, they expect information to be easily exchanged throughout the birth attendants, both traditional and skilled. The information to be shared is: treatment so far, condition of the mother and baby, medication given and pregnancy details.

Although SBAs are very willing to collaborate with TBAs, they do have a desire to focus as much as possible on referring patients from communities to conventional health centres. To encourage the TBAs to do this, they believe that compensation should be made available for the TBAs who refer pregnant women and participate properly in the collaboration.

4.2.4 Stakeholder 4: Doctors (S4). In the process of providing care for expectant mothers and recently delivered babies, doctors are essential. They are in charge of identifying, treating, and overseeing the prenatal, delivery, and postnatal care of mothers and their children. This care involves keeping an eye on mothers' and babies' health, writing prescriptions for medications, doing exams and testing, providing counseling, and, if necessary, referring patients to specialists. Like the SBAs, they are important stakeholders in the development of this ICT platform.

Relevance: Doctors play a crucial role in providing maternal medical care. Their expertise and involvement are essential in ensuring the health and well-being of mothers and newborns. Moreover, doctors are often involved in policy-making and guideline development in the field of maternal and neonatal care, thus playing an important role in shaping the healthcare infrastructure.

Interest: *High.* As primary healthcare providers for patients, doctors strive for high-quality obstetric care and innovations that improve efficiency. They are also actively involved in professional development and are interested in new approaches and practices.

Power: *High.* Doctors generally have considerable power in the healthcare sector, both at the individual level and through professional organisations and medical associations. Their expertise and authority give them influence over policy decisions, clinical practices and the direction of medical research.

Expectations / wishes / worries / demands: Doctors' expectations, wishes, worries, and demands vary when it comes to the ICT platform that is utilized to care for expectant mothers and new mothers. Being willing to embracing and utilizing new technologies is one of the biggest issues facing healthcare providers. This could be the

result of TBAs' mistrust of regular medical treatment as well as cultural, religious, or traditional factors. While the doctors are concerned about their own willingness, they are equally concerned about the willingness and commitment of TBAs and patients.

The requirement for assistance and training when utilizing the ICT platform is another issue. In order to successfully handle patient data and become acquainted with the platform's functions, doctors must receive training. Additionally, they aim to guarantee that the platform is user-friendly and tailored to the local language and cultural environment.

Doctors are also worried about privacy concerns associated with the management of patient data on the ICT platform and the assignment of duties and obligations among various healthcare providers. To effectively collaborate and communicate information with other healthcare providers, including SBAs and TBAs, they require well-defined guidelines and routes of contact.

Doctors anticipate that the ICT platform will help them exchange important details with TBAs, including test results, medication usage, and pregnancy data. It will also allow them to consult and interact with TBAs regarding treatment recommendations, medication guidelines, and referral processes. They want the platform to let them efficiently handle patient records and remind patients of appointments and medications. Doctors believe it is important that TBAs have access to training and information on infections and complications during pregnancy and delivery.

4.3 Goals and requirements

Some of the expectations, wishes, worries, and demands as outlined into the stakeholder profiles, which are based on the coded interviews, are translatable in goals and requirements for the ICT-platform in the form of an expansion of the MoTeCH platform. Sections 4.3.2 till 4.3.7 show all the operational goals and requirements mentioned by the stakeholders. Besides those goals and requirements, there are several goals which cannot be directly implemented in the suggested MoTeCH expansion, but have more to do with the implementation, for example. Those strategic goals and requirements are shown in Sections 4.3.9 till 4.3.11. Since the design of the expanded MoTeCH system is the main goal of this research and these goals and requirements are not affecting this design, those have not been included in the rest of the elaboration of this research.

4.3.1 Operational goals. All the operational prerequisites identified in the previous steps are categorized in 6 main operational goals and in total 24 operational requirements. These goals are the higher layer criteria the platform must satisfy. The requirements per goal indicate how this can be achieved. In Sections 4.3.2 till 4.3.7, all the operational goals are elaborated with a description, which stakeholders are involved and what the priority of this goal is. A description and priority is likewise shown for the requirements.

Six overarching operational goals were identified: enhanced communication between end-users (G1), Access to information (G2), Reminder and appointment management (G3), Patient records management (G4), Accessibility and inclusivity (G5), and Training and assistance (G6).

4.3.2 Goal 1: Enhanced communication between end-users (G1). The first goal is identified because communication was mentioned in 23 interviews as a necessary functionality. For example in the interview with patient 8, the patient said: *"they should have phone numbers exchanged so that they can always be able to reach each other to exchange communication"* when asked how she envisions cooperation between TBAs and SBAs. When this idea was mentioned in the interview with TBA 1, she answered with: *"I only know how to receive and make calls, no education so if I can call and explain my problem and the clinic receive it and do follow up that will be nice. And I can also tell them from my experience what I have observed about the patient. When the patient gets the best are all happy"*. SBA 7 responded *"So I think that we here would be glad that it's incorporated, and if you are doing the electronic system, you have something like that, so that the patients are able to call for any information, be it sickness or whatever, they just need to know in their pregnancy period"* when there was a conversation about communication between patients and the conventional health facility.

Improved communication is a goal shared by every stakeholder involved. Establishing efficient channels of communication is one way to facilitate the sharing of information about appointments, medications, treatments, and other pertinent health-related details. The objective is to establish a transparent and accessible communication atmosphere that facilitates the exchange of questions, experiences, and concerns, ultimately enhancing the quality of care and satisfaction among patients.

The platform should provide various communication channels through which the stakeholders can easily communicate with each other (R1.1). Secondly, the platform should provide real-time and interactive communication options so that stakeholders can get quick answers to their questions and respond immediately to urgent situations (R1.2). Thirdly, stakeholders need to be confident that their communications with each other are secure and private. The platform should therefore feature security measures to ensure data confidentiality (R1.3). Finally, voice messages must be automatically translated into written text on the platform and kept in patient records (R1.4). Since doctors and SBAs in the healthcare industry frequently deal with heavy workloads, these text messages will allow them to work more productively. Since written language is simpler to access and comprehend than spoken words, it facilitates better patient-provider communication. Written text also makes information more accessible by facilitating quick translation and sharing of messages .

Goal 1:	**Enhanced communication between end-users**	**High priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 1.1	Various communication channels (R1.1)	High priority
Requirement 1.2	Real-time and interactive communication options (R1.2)	Medium priority
Requirement 1.3	Secure communication (R1.3)	High priority
Requirement 1.4	Transcription of Voice Messages (R1.4)	Medium priority

Table 3: Requirements for operational goal 1

4.3.3 Goal 2: Access to information (G2). The second goal, access to information, was mentioned in 15 interviews. For example, patient 2 said: *"I think maybe there can be a common platform created for such purposes. And there is this, I don't know, but it has to do with more, should I say, like when there is this app which when you are pregnant, they update you on steps, like what you eat, how old your baby is, the size of your baby, and stuff. So I think if there is a common, maybe an app generated for such [...] I think that would help"*. In the interview with patient 5 something similar came up: *"I asked if it is okay for them to have any ICT platform here or a communication channel that she could call in for information or any other information she needs at home without necessarily coming physically. And she said, yes, that would have been very helpful because as a business woman or someone resourceful, she's always very busy and that would have really saved time for her and then get her the information that she needs without coming here physically"*. SBA 11 added *"I'm sure we'll be able to have a platform where we can play certain educational videos or even send text messages to our clients that we receive. Like follow-up messages, giving tips [...]"*.

Easy access to crucial information on pregnancies, appointments, treatments, medication, and potential complications is wanted by all stakeholders involved. Patients expect more information regarding the care they receive and their current state of health. In order to perform their duties as healthcare providers efficiently, TBAs, SBAs, and doctors need to be able to access information regarding medications, treatments, and possible complications.

The platform should enable patients to easily access comprehensive information about their pregnancy, scheduled appointments, prescribed treatments, medication and possible complications. Traditional and conventional healthcare workers should be able to access information about treatments, medications, complications and their clients. All this information should be presented clearly and understandably (R2.1). Secondly, the platform should be able to personalize information based on each stakeholder's specific needs and situation. This includes displaying relevant information based on stage of pregnancy, medical history and previous treatments. Personalisation could also include the set (local) language or automatic read-aloud of information (R2.2). Thirdly, to ensure the privacy

of stakeholders data, the platform should provide secure access methods, such as authentication and encryption of data (R2.3). Only authorised users, such as the patient themselves and their healthcare providers, should have access to personal health information.

Goal 2:	Access to information	High priority
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 2.1	Access to comprehensive information (R2.1)	High priority
Requirement 2.2	Personalisation of information (R2.2)	Medium priority
Requirement 2.3	Secured access (R2.3)	High priority

Table 4: Requirements for operational goal 2

4.3.4 Goal 3: Reminder and appointment management (G3). The third goal, reminder and appointment management, was mentioned in 7 interviews. SBA 1 mentioned the following as a requirement for the ICT-platform: *"You should have a way of alerting and giving us an indication that somebody needs, an alert system or a notification system based on an information given. These are their conditions and then a reminder for some people, do need care at certain time"*.

In order to make sure that crucial appointments are kept and that medication is taken on schedule, patients ask to be reminded of their appointments and to take their medications. Medical professionals want to know about medications taken and reminders received.

The platform should be able to send automatic reminders to patients for scheduled appointments (R3.1). Besides that, the platform should be able to remind patients to take their medication according to the prescribed schedule (R3.2). Thirdly, patients should be able to adjust the frequency and timing of reminders according to their individual needs and preferences. They should be able to set reminders for specific times and days, as well as the option to turn reminders off if needed (R3.3). Lastly, the platform should offer integrated appointment management, allowing patients and healthcare providers to schedule, change and cancel appointments (R3.4).

Goal 3:	Reminder and appointment management	Medium priority
Involved stakeholders:	Patients (S1), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 3.1	Automatic appointment reminders (R3.1)	High priority
Requirement 3.2	Automatic medication reminders (R3.2)	High priority
Requirement 3.3	Flexible reminder settings (R3.3)	Medium priority
Requirement 3.4	Integrated appointment management (R3.4)	Low priority

Table 5: Requirements for operational goal 3

4.3.5 Goal 4: Patient records management (G4). The fourth goal, patient records management, was mentioned in 24 interviews. SBA 2 said: *"It should contain the information of the patient, that is her name, age, family background, the history of the client, the history of the pregnancy and then if can contain the previous history of the children so it can help you in the present to be able to advice the client, also it should contain the treatment that is being given to the client"* when the conversation was about patient information in the ICT-platform. When asked what is the biggest problem in the current work, doctor x replied *"They can't even keep data. This patient came to see me, this was the symptoms the patient had. What is different about this patient to this particular patient, the number of females that came to me, the number of males that came to me. Patient records management, it's a problem"*.

In order to provide easy access to medical information for patients and healthcare providers, all parties involved are dedicated to ensuring that medical records are managed digitally. This entails gathering, keeping, and updating precise information about the patient's medical background, the care they've had, and other pertinent details. In

addition, the system ought to be capable of producing reports using this data, offering an understanding of the patient's condition and the efficiency of the treatment given, in addition to the functioning of the specific medical institution.

The platform should provide a secure and reliable way to store patients' medical data. This includes personal information such as medical history, treatments, medication, laboratory results and so on. The data should be stored according to international standards for data protection and privacy (R4.1). Secondly, Patients should be able to access their personal medical records digitally through the platform. This allows them to check their health information, receive updates on their treatments and results, and correct any errors or inaccuracies (R4.2). Thirdly, the platform should provide features that allow patients to share medical data with their healthcare providers when needed. This can be done, for example, through secure electronic exchange systems or by sharing a specific access link for selected information (R4.3). Fourthly, the platform should provide audit trails and version control functionality to keep a complete history of changes to medical records. This ensures transparency and traceability of changes, which is essential for data accuracy and integrity (R4.4). Finally, based on the medical data gathered, the platform needs to be able to automatically generate reports that highlight important facets of the patient's health status and point out patterns in care (R4.5).

Goal 4:	**Patient records management**	**High priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 4.1	Secure storage of medical data (R4.1)	High priority
Requirement 4.2	Access to personal medical records (R4.2)	High priority
Requirement 4.3	Data sharing with healthcare providers (R4.3)	High priority
Requirement 4.4	Audit trails and version control (R4.4)	Low priority
Requirement 4.5	Automatic report generation (R4.5)	Medium priority

Table 6: Requirements for operational goal 4

4.3.6 Goal 5: Accessibility and inclusivity (G5). The fifth goal, accessibility and inclusivity, was mentioned directly in some interviews and indirectly in some other interviews. TBA 3 said: *"If only I can use it but if it is the internet things that you people use now am not sure I can use it"* and SBA 7 said: *"I think the voice method would be perfect for the uneducated ones. Because currently, looking at my village situation, I think those around that do the home deliveries, they are not educated, but they can record. So if there is that part of the system that can give them the opportunity to record, that would be very helpful. Because the background of the TBAs are not really that. The educational background is not to understand, they can write or probably give some reports. So the voice will do"*.

The aim is to guarantee that any user, regardless of background or ability, can access the platform. This entails providing access for those with restricted literacy, limited access to smart devices, limited internet access, and a variety of language and cultural backgrounds. The goal is to develop an inclusive platform that offers equal opportunity for healthcare engagement and acknowledges and meets the demands of all user groups.

The system should be user-friendly, so that users can easily navigate, find information and perform relevant actions, such as updating data, receiving reminders, finding information, and communicating (R5.1). Secondly, the platform should be accessible to users with limited access to the internet. This can be achieved by providing offline functionality or by minimising the amount of data required to use the platform (R5.2). Furthermore, the platform should be designed with illiterate users in mind. This may include making the interface simple and intuitive, with visual elements and icons that are easy to understand. In addition, voice-activated functions should be available to execute commands and receive information without having to read or write (R5.3). Fourthly, the platform should take into account cultural and linguistic diversity to effectively serve all patients. This includes providing multilingual support for the interface and content so that users can communicate and receive information in their preferred language. In addition, the platform should include culturally sensitive approaches that take into

account the values, beliefs and practices of different communities (R5.4). Finally, the platform should be accessible to users with different types of disabilities, including visual, hearing, motor and cognitive impairments. This can be achieved by implementing accessibility features such as screen reader support, subtitles for videos, and colour schemes, and alternative input methods such as voice commands (R5.5).

Goal 5:	**Accessibility and inclusivity**	**High priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 5.1	User-friendly interface (R5.1)	High priority
Requirement 5.2	Accessibility for users with limited internet access (R5.2)	High priority
Requirement 5.3	Accessibility for users with limited literacy (R5.3)	High priority
Requirement 5.4	Support for cultural and linguistic diversity (R5.4)	High priority
Requirement 5.5	Accessibility for users with disabilities (R5.5)	Medium priority

Table 7: Requirements for operational goal 5

4.3.7 Goal 6: Training and assistance (G6). The last operational goal, training and assistance, was mentioned in 15 interviews. SBA 7 indicated that she sees a limitation to the use of an ICT platform: *"What I think would be the limitation would be that most nurses here haven't gone through that kind of system before. So in case we are presented with that system, it would be something new to us. So I think that there will be a challenge if we have not gone through pre-education or we haven't taken through the system, like through education and what to do or not"*, so training and assistance is definitely needed.

Every stakeholder wants sufficient assistance and training to use the ICT platform efficiently. They want to actively participate in their own healthcare/duties and to feel competent using the technology. The goal is to establish a helpful atmosphere where users may get the information and abilities they need to utilize the platform to its fullest. Help and training should be customized to meet the requirements of various user groups.

Firstly, the platform should provide access to online training materials, such as manuals, video tutorials and FAQ sections. These materials should be available to users at any time, allowing them to learn at their own pace and consult reference material when needed (R6.1). Secondly, the platform should have a dedicated customer support team to help users with any problems, queries or technical difficulties they may encounter while using the platform. This can be offered through various channels such as phone, email, live chat or an online support portal (R6.2). Thirdly, the platform should include mechanisms for collecting feedback from users on their experiences and suggestions for improvement. This feedback can be used to improve training offerings, develop new features and improve overall user satisfaction (R6.3).

Goal 6:	**Training and assistance**	**Medium priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 6.1	Online training materials (R6.1)	Medium priority
Requirement 6.2	Customer support (R6.2)	Medium priority
Requirement 6.3	User feedback and evaluation (R6.3)	Medium priority

Table 8: Requirements for operational goal 6

4.3.8 Strategic goals. All the strategic prerequisites identified in the previous steps are categorized into 3 main strategic goals and in total 9 strategic requirements. These goals are the higher layer criteria that must be satisfied when implementing and using the platform. The requirements per goal indicate how this can be achieved. In Sections 4.3.9 till 4.3.11, all the strategic goals are elaborated with a description, which stakeholders are involved and what the priority of this goal is. A description and priority is likewise shown for the requirements. Three overarching strategic goals were identified: Community engagement and trust (G7), Healthcare education and awareness (G8), and Collaboration and coordination (G9).

4.3.9 Goal 7: Community engagement and trust (G7). The first strategic goal, community engagement and trust, is identified because 15 interviewees talked about willingness, trust, and fear. Doctor 6 mentioned the following: *"If we have platforms like that and if the SBAs or healthcare providers are able to earn the trust of the traditional birth attendant and they don't feel like they are being intimidated, yes, it will make the communication very easy. Because some of these birth attendants are actually seen as doctors or surgeons to their people around. So if there's someone who has a certificate to operate on a larger scale or in a higher institution, comes and is now beginning to direct your ways and all of that, they feel intimidated. So we need to be able to ensure that they have won their trust. Then we can put them up on a platform and make communication easy for them".* Among other things, this indicates the need to increase engagement and trust.

It is needed to foster a sense of trust and engagement among the community, ensuring that all stakeholders feel valued and involved in the healthcare process. The interviews revealed that some patients are afraid to be honest about their previous treatments by TBAs in a conventional health setting because it is perceived as a taboo. In addition, it appears that TBAs are regularly afraid of interacting with SBAs/doctors because they have had bad experiences with them or feel that they cannot act well enough.

Firstly, it is needed to implement initiatives that encourage community involvement in the development and ongoing use of the ICT platform and the collaboration between conventional and traditional healthcare (R7.1). These initiatives are important to increase trust and engagement between stakeholders. Secondly, it is needed to develop and provide culturally sensitive training programs for all stakeholders to ensure they understand the value of the ICT platform and how to use it effectively. In addition, efforts should be made to provide training for SBAs and doctors to educate them about different cultures so that there is a smaller gap to traditional healthcare. TBAs should receive training on what within maternal healthcare cannot/should not be treated/performed according to their culture but in the conventional way (R7.2). Thirdly, it is needed to organize trust-building activities, such as workshops and collaborative sessions, to strengthen the relationship between TBAs, SBAs and, doctors (R7.3).

Goal 7:	**Community engagement and trust**	**High priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 7.1	Community involvement initiatives (R7.1)	Medium priority
Requirement 7.2	Culturally sensitive training programs (R7.2)	High priority
Requirement 7.3	Trust-building activities (R7.3)	Medium priority

Table 9: Requirements for strategic goal 7

4.3.10 Goal 8: Healthcare education and awareness (G8). The second strategic goal, healthcare education and awareness, is created because education is mentioned 15 times as a requirement for the collaboration. SBA 7 said in this regard: *"The first thing I think they should be educated on is how to deliver a baby without the woman getting infections. [...] So, I think that they should be educated on things to use for those deliveries, the right instruments to use for the deliveries. And they should also be educated that once you conduct a delivery and the woman has lost some amount of blood or some quantity of blood, she should be referred to the nearest health facility for continuous check-up. Basically, those are the things. Just how to conduct the delivery very well and be educated on what to do when things don't go well".*

It is essential to improve the overall healthcare knowledge and awareness among patients and healthcare providers. Several interviews mentioned that some stakeholder groups lack knowledge. For instance, TBAs have too little knowledge about conventional treatments and drugs, SBAs and doctors too little knowledge about traditional treatments and drugs, and patients too little knowledge about different treatments which best suit their religion or culture. There must educational campaigns focusing on maternal health, treatments, drugs, the benefits of the ICT platform, and how to effectively use it be launched (R8.1).

Goal 8:	**Healthcare education and awareness**	**High priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 8.1	Educational campaigns (R8.1)	High priority

Table 10: Requirements for strategic goal 8

4.3.11 Goal 9: Collaboration and coordination (G9). The last strategic goal, collaboration and coordination, is formed because in 6 interviews this was directly mentioned as a requirement. In the interview with SBA 7, she said: *"There will be a challenge. It will be very challenging for us. And then with the number, if such a system is introduced, meaning you would require a very competent person who would always be behind it. Meaning the person has to be dedicated to doing this. So you would have to get that dedicated person"*, which makes it clear that a strong collaboration and coordination is needed.

The implementation should focus on improving the collaboration and coordination between TBAs, SBAs, and doctors to ensure seamless and integrated care. Without this focus, the ICT platform will not be sufficiently successful. There should be one responsible party for the maintenance of the platform and the collaboration. This approach ensures the system is efficiently managed and maintained without adding to the workload of SBAs, who already face high work pressure. An independent manager will help maintain trust among all stakeholders, as they can operate without any perceived bias or conflict of interest. This will contribute to the long-term success and sustainability of the system, fostering a collaborative and trustworthy environment for TBAs, SBAs, and doctors.

First of all, it is needed to organize regular coordination meetings between TBAs, SBAs, and doctors to discuss patient care, share updates, and resolve any issues. This will also contribute to willingness and trust (R9.1). Besides that, there should be a clear division of labour about which stakeholder gets which role in the cooperation, who performs which tasks and when a task is passed on to another stakeholder (R9.2). Thirdly, it is needed to implement a compensation system for TBAs who refer patients at the appropriate time and actively participate in the collaboration efforts. This will encourage TBAs to engage in the referral process and ensure timely and coordinated maternal healthcare (R9.3). Lastly, there should be an independent individual or team responsible for the overall implementation, maintenance, and oversight of the system be appointed (R9.4). This party should then be responsible for the operational management of the system and the functioning of the stakeholders within the collaboration.

Goal 9:	**Collaboration and coordination**	**High priority**
Involved stakeholders:	Patients (S1), TBAs (S2), SBAs (S3) & Doctors (S4)	
Requirements:		
Requirement 9.1	Regular coordination meetings (R9.1)	High priority
Requirement 9.2	Clear division of tasks (R9.2)	High priority
Requirement 9.3	Compensation for TBAs (R9.3)	Medium priority
Requirement 9.4	Appointment of an independent system manager (R9.4)	High priority

Table 11: Requirements for strategic goal 9

Both the operational (G1 up to and including G6) and the strategic (G7 up to and including G9) goals correspond fairly closely to the functionalities in Figure 5 and, where possible, have been supplemented in the requirements with the challenges identified and shown in Figure 5. An overview of what every stakeholder mentioned can be found in Appendix 5 (Section 7.5). The interviews were the basis for all goals and requirements discussed in this section.

4.4 Viewpoints and views

In this section all the views and corresponding viewpoints will be shown and discussed. All goals and requirements as discussed in the previous section are addressed in one or more view(point)s. Each view in this section shows a piece of the proposed architecture or the activities that should be executable in a particular part of the system. Figure 6 shows a very simplified view of what interaction with the MoTeCH looks like. Patients interact with the system and the other users via a GSM or a smartphone, conventional healthcare providers interact with a smartphone and traditional healthcare providers interact through the use of a GSM.

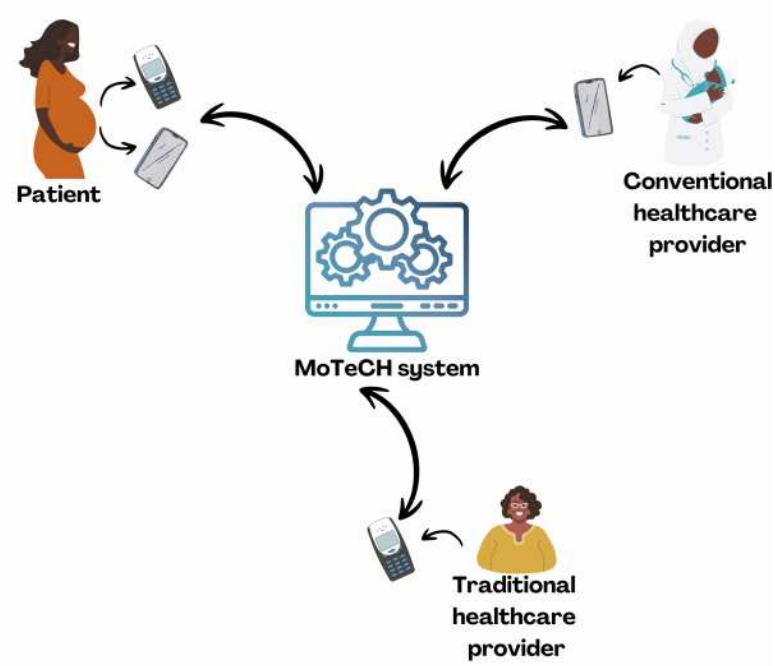


Figure 6: Simplified view of interaction with MoTeCH

4.4.1 Viewpoint 1: Usage (VP1). Viewpoint 1 (VP1) focuses on user behavior. During the interviews, significant attention was given to the needs of stakeholders, who are also the users of the system. Consequently, many requirements are directed towards the system's functionalities:

- R1.1: Various communication channels
- R1.2: Real-time and interactive communication options
- R1.4: Transcription of Voice Messages
- R2.1: Access to comprehensive information
- R2.2: Personalisation of information
- G3: Reminder and appointment management
- R4.1: Secure storage of medical data
- R4.3: Data sharing with healthcare providers
- R4.4: Audit trails and version control
- R4.5: Automatic report generation
- R5.4: Support for cultural and linguistic diversity
- R6.1: Online training materials
- R6.2: Customer support
- R6.3: User feedback and evaluation

As these functionalities affect all users, every stakeholder is involved in this viewpoint. The main focus of Viewpoint 1 is thus the user perspective, emphasizing the needs and goals of end users, such as patients, SBAs, TBAs, and doctors. This viewpoint ensures that users and the ICT platform engage in constructive and beneficial interactions. It illustrates how stakeholders' requirements and expectations are implemented and how these interactions align with the system's architecture.

In order to represent these goals and requirements, a Use case diagram was chosen that shows which use cases must be executed by which actors. The use cases in this diagram were extracted directly from the coded interviews and the identified goals and requirements. The notation and metamodel (Table 12) are based on the UML standards [32, 74].

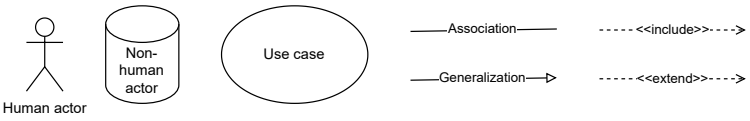
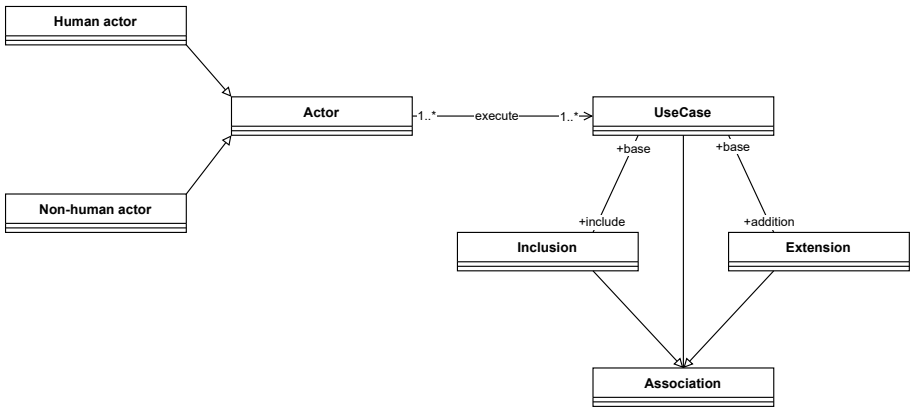
	Use case diagram
Notation	 • Actor: A role played by an external entity that interacts with the system. • Use case: A specific interaction between an actor and the system to achieve a goal. • Association: A line representing a relationship between an actor and a use case. • «include»: A dotted line with «include» stereotype, indicating a mandatory relationship between two use cases. • «extend»: A dotted line with «extend» stereotype, indicating an optional relationship between two use cases.
Metamodel	

Figure 7: Metamodel Use case diagram: simplified adaptation of the original figure from El Hog et al. [2011], complemented with information from Seidl et al. [2015].

Table 12: Notation Use case diagram

Figure 8 shows the corresponding Use case diagram. Specifically, what is noticeable about this figure is that there are several actors that have multiple subactors under them. That is, there are multiple actors that can do the same thing. However, the healthcare providers must be able to execute more use cases than patients can; this is why not all use cases are connected only to the user actor. In addition, the conventional healthcare providers should also be able to perform more use cases than the traditional healthcare providers can. These additional actionable use cases can be recognized because they are directly connected to the conventional healthcare provider actor which means that only this actor can execute this use case. The include and extend relationships indicate that certain use cases need other use cases or can be extended to other use cases.

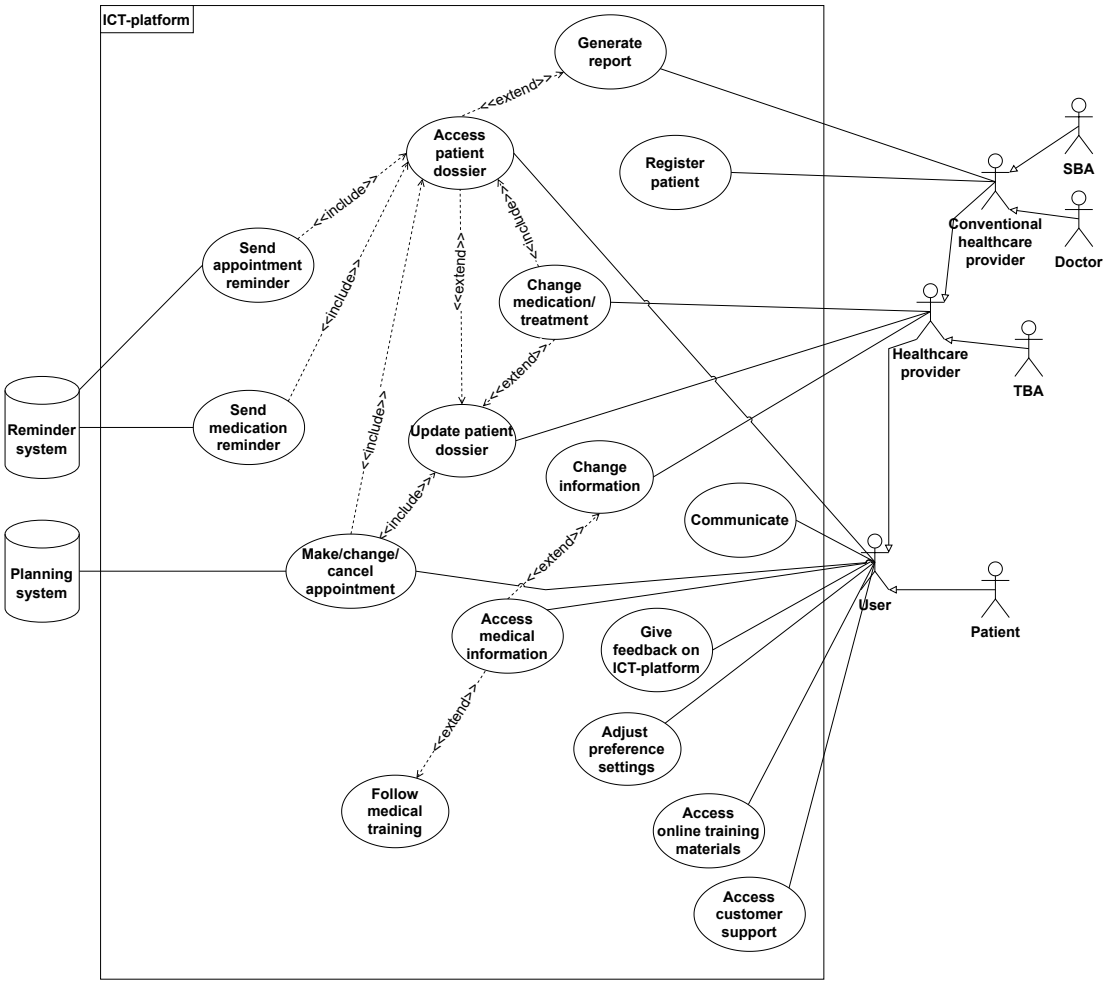


Figure 8: View 1: Use case diagram

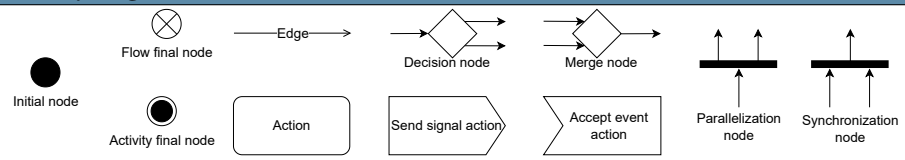
4.4.2 Viewpoint 2: Security (VP2). In the second viewpoint (VP2), security is the central point. Several interview transcripts revealed security of the system. SBAs 3, 5, 6 and 7 and Doctor 4 mentioned security and/or privacy during the interview. Although only some SBAs and one doctor mentioned it, this viewpoint is relevant to all stakeholders.

From a security perspective, the primary objective is to make sure that the ICT platform satisfies all security criteria in order to protect private medical communications and data. Based on the claims made in the interviews, three requirements toward security were identified:

- R1.3: Secure communication
- R2.3: Secured access
- R4.1: Secure storage of medical data

This viewpoint discusses how the platform can guarantee secure access, secure communication channels, and secure medical data storage. The accompanying Activity diagrams for End-to-End Encryption (E2EE) and Two-Factor Authentication (2FA) show how these objectives are accomplished.

For every requirement in this viewpoint, a partial view was made because it cannot be represented in a single view. Since Activity diagrams effectively depict the data and/or control flow between distinct steps required to complete an action, all partial views are Activity diagrams. In contrast to view 1, the coded interviews are not the primary source of input for the interpretation of view 2's diagrams. The notation and metamodel (Table 13) are based on the UML standards described by Zdun et al. [2007] and Seidl et al. [2015].

<table>
<tr><th></th><th>Activity diagram</th></tr>
<tr><td>Notation</td><td>


Activity: A structured set of actions carried out to achieve a particular goal.
Action node: A fundamental unit of work performed within an activity.
Control node: A node that manages the flow of activity. This includes:

Initial node: The starting point of an activity.
Activity final node:A node that terminates the entire activity as soon as it is reached.
Flow final node: A node that terminates the current flow but does not affect other parallel flows in the activity.
Decision node: A branch point where the flow can split based on a condition.
Merge node: A point where multiple alternative flows converge.
Parallelization node: A point where the current is split into multiple parallel currents.
Synchronization node: A point where multiple parallel streams are synchronised to a single stream.

Activity edge: A line that defines the order of actions.

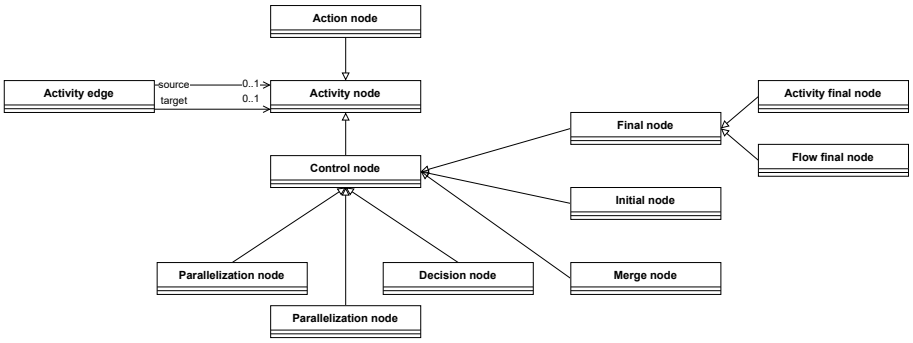
</td></tr>
<tr><td>Metamodel</td><td>


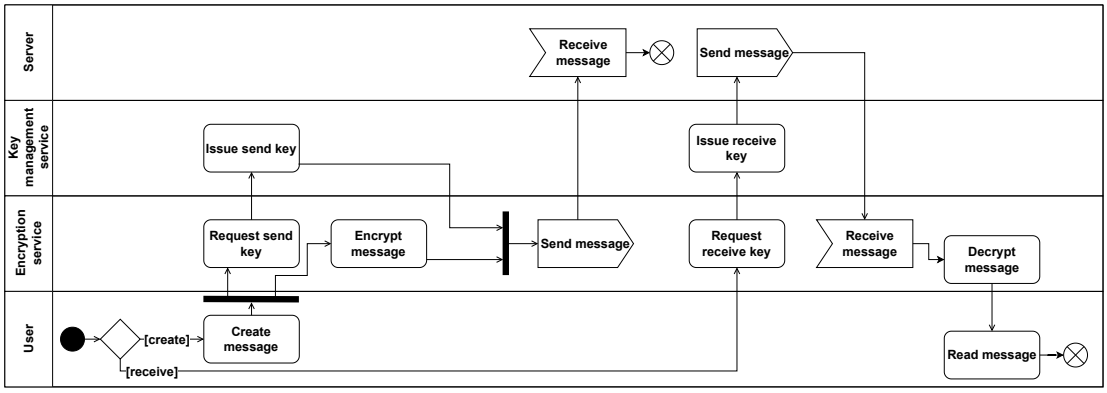
Figure 9: Metamodel Activity diagram: simplified adaptation of the original figure from Zdun et al. [2007], complemented with information from Seidl et al. [2015].
</td></tr>
</table>

Table 13: Notation Activity diagram

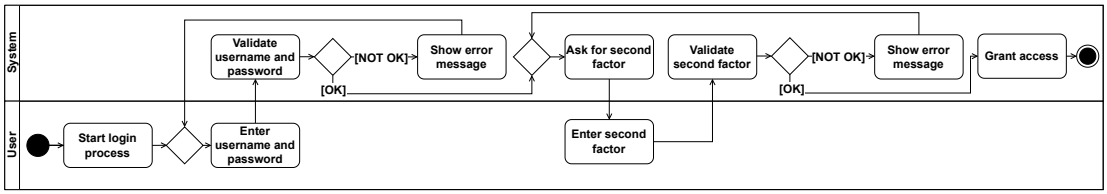
View 2a (Figure 10a) reflects R1.3, the secure communication requirement. To ensure secure communication, it was chosen to apply End-to-end encryption (E2EE) to all communication that takes place. This was done based on the theory of Vehkaoja [2017]. E2EE is the best choice here because it can protect sensitive messages and online chats without depending on outside sources like centralized infrastructure or internet services [6, 85]. Besides that, it provides an efficient, lightweight mechanism that minimizes power consumption, prevents known attacks, and ensures minimal computational cost in real-time systems [76]. This makes E2EE the best choice for a platform in this (rural) context. The main message of Figure 10a is that every message is encrypted and the other user cannot see the message until it is decrypted based on permissions and a provided key. This ensures that without the proper permissions and key, a user cannot see the message. This ensures secure communication.

View 2b (Figure 10b) reflects R2.3, the secured access requirement. To ensure that only users with the appropriate permissions have access to the system, Two-Factor Authentication (2FA) should be used. The implementation of this is shown in the Activity diagram and is based on the theory of Huseynov and Seigneur [2015]. Two-factor authentication requires the prover to provide two distinct factors to the verifier. In two-factor authentication, the verifier will not accept a prover that provides only one factor; both must be provided [17, 27, 43]. There are many benefits associated with employing 2FA for account security. Improved security is the key advantage because 2FA provides a layer of security on top of the conventional password. This increases the difficulty a great deal for attackers to access accounts, even in cases when the password has been stolen [17, 27, 43, 50]. This is because an attacker requires both the second authentication factor and the password. 2FA thus offers good defense against phishing attempts [17, 27, 43, 50]. Moreover, 2FA can be effectively used in rural areas where internet connectivity may be unstable [67]. Many 2FA methods do not rely on continuous internet access; SMS-based 2FA can be a viable option as it leverages the more widespread availability of mobile networks compared to internet access in these areas [67]. SMS-based 2FA can also be used on simple GSMs, making this method of security ideally suited for extending MoTeCH [67].

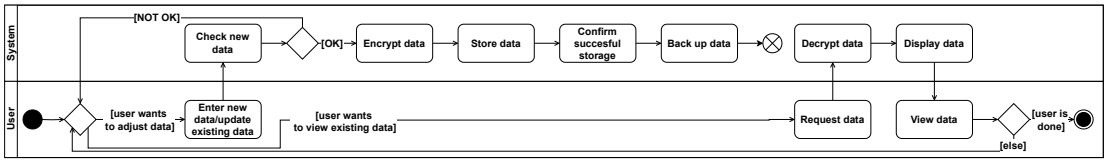
View 2c (Figure 10c) reflects R4.1, the secure data storage requirement. The implementation resembles that of R1.3. Again, encryption is used, but in this case it involves medical data rather than messages. The principle is the same and ensures secure storage of medical data in this case.



(a) View 2a: Simplified E2EE Activity diagram based on the original theory from Vehkaoja [2017]



(b) View 2b: Activity diagram 2FA based on Huseynov and Seigneur [2015]



(c) View 2c: Simplified data storage Activity diagram

Figure 10: View 2: Activity diagrams security

4.4.3 Viewpoint 3: Communication (VP3). Viewpoint 3 (VP3) is centered around communication. Improved communication between end-users is one of the main goals of MoTeCH's expansion. In 23 of the stakeholder interviews, improved communication was mentioned as a goal. This goal is divided into several requirements. R1.3 is addressed in VP2, the other three requirements are shown in VP3:

- R1.1: Various communication channels
- R1.2: Real-time and interactive communication options
- R1.4: Transcription of Voice Messages

These three requirements are combined in an Activity diagram in view 3 (Figure 11). Among other things, this Activity diagram shows how users can communicate with each other and what happens if a connection cannot be made. Since not all users are literate, it is important to have a capability for voice messages. For other users it may be more comfortable to read; for this the transcription capability is needed. A speech-to-text algorithm can be used for this. In order to satisfy the communication needs of the stakeholders and guarantee the efficacy and efficiency of communication, the goal is to visualise the processes and interactions between the users and the ICT-platform. All stakeholders should be able to communicate with the platform, so they are all involved. Because the method of modeling here is the same as in VP2, the notation and metamodel are reused (Table 13).

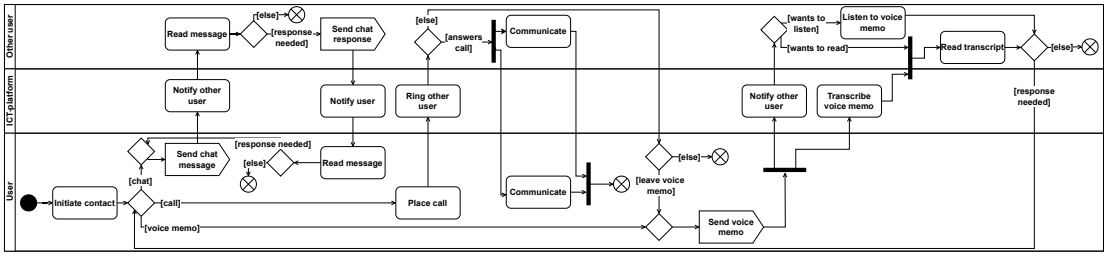


Figure 11: View 3: Activity diagram communication

4.4.4 Viewpoint 4: Access to information (VP4). Viewpoint 4 (VP4) revolves around access to information. This is also an important goal to address because this is mentioned by seven patients, six SBAs and five doctors. In addition to directly naming the need for information, four other SBAs said that there is currently too little knowledge to work well together and provide good care. The following requirements are related to this viewpoint:

- R2.1: Access to comprehensive information
- R2.2: Personalisation of information

Because all stakeholders should be able to access this information, they are involved in this viewpoint. The objective of this viewpoint is to provide a visual representation of the procedures and exchanges that guarantee all parties involved have access to detailed and customized information. This involves giving clear and intelligible information about pregnancy, appointments, treatments, medication, and any potential complications. To comply with this it is important that the users can access comprehensive information and that the information can be personalised. Personalised in this context means that, for example, women who are pregnant for the first time receive different information than women who have given birth before. The activities that must be involved in this are shown in the corresponding view (Figure 12). The view is quite simple, but important to display the systems compliance with the corresponding requirements. The method of modeling here is the same as in VP2 and VP3 (Table 13).

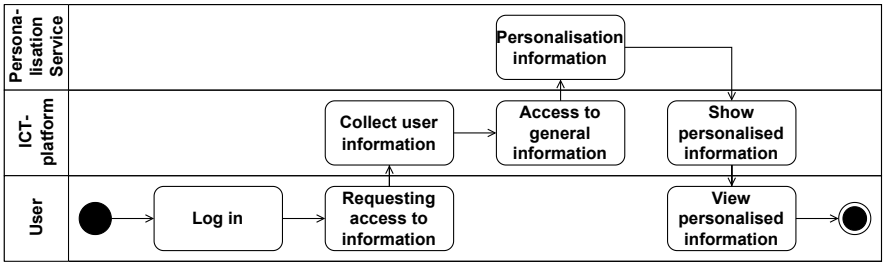


Figure 12: View 4: Activity diagram access to information

4.4.5 Viewpoint 5: Accessibility (VP5). The last viewpoint, viewpoint 5 (VP5), considers the accessibility of the ICT platform. The primary objective of this viewpoint is to provide insight into the accessibility for all users, with a particular focus on individuals with disabilities, including those with restricted internet access, low literacy, and physical or cognitive impairments. The goal is to create an interface that is easy to use, inclusive of all user groups, and serves the needs of all stakeholders. This viewpoint influences the experiences of all stakeholders. All requirements of G5 and R1.4 are addressed in this viewpoint:

- R1.4: Transcription of Voice Messages
- R5.1: User-friendly interface
- R5.2: Accessibility for users with limited internet access
- R5.3: Accessibility for users with limited literacy
- R5.4: Support for cultural and linguistic diversity
- R5.5: Accessibility for users with disabilities

A component of accessibility was named in 15 interviews. Some parts are quite important according to stakeholders, but others are somewhat less essential (see the priorities in Section 4.3). High accessibility is to be found mainly in the user interface, which is why it is shown in view 5 (Figure 13) with the necessary components for the highest possible accessibility. This model has no official notation and thus no metamodel. The model is quite straightforward to understand.

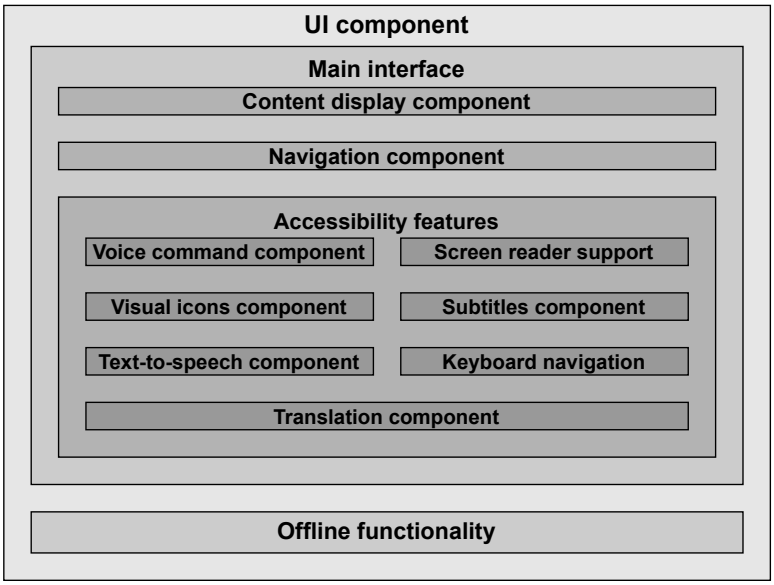


Figure 13: View 5: Accessibility UI component

4.5 Comparison with existing MoTeCH architecture

Table 14 shows the comparison between the current MoTeCH architecture and the requirements found. Each requirement is evaluated to determine whether it is currently implemented in MoTeCH and, if not, how it can be included in the extended implementation using the created viewpoints. The architecture as described in Section 2.2.2 based on the article of MacLeod et al. [2012] has been taken as a basis. The articles of Awoonor-Williams [2013] and LeFevre et al. [2017] and the security model [39] have been used as additional references for this comparison.

The requirements belonging to G1 have not yet been fully implemented. Currently, MoTeCH does not have direct communication channels between stakeholders. The enhanced implementation suggests new communication routes to bridge this gap. In addition, there are no transcription possibilities in the existing system. The proposed

extension does incorporate these features to meet stakeholder criteria. MoTeCH's existing architecture does allow secure communication using, for example, hashed passwords and role-based permissions. However, this can still be extended with the techniques mentioned in VP3.

The current MoTeCH architecture now covers the G2-specific requirements. Patients receive SMS or automated voice communications regarding healthcare and their personal health information. However, this can be expanded by VP1 and VP4. Aside from that, the MoTeCH security model supports secure access and user role management. This can be enhanced further, as demonstrated in VP2.

The requirements for G3 have been partially realized in the current architecture. The existing system delivers notifications about scheduled care appointments. Medication reminders are sent, but only immunization reminders. The expanded implementation (VP1) includes additional medicines. MoTeCH supports client decisions for language and call times, but VP1 offers additional features. There is no integrated appointment management in MoTeCH. This can be done as shown in VP1.

Not all requirements appropriate to G4 are fulfilled either. Data is saved securely using Simplified Registers. The VP2 features can help boost security. Personal medical records are kept but are not available to patients or traditional healthcare workers. VP1 offers solutions for better accessibility. The current MoTeCH architecture does not support audit trails or version control, but reports are generated automatically based on the data entered.

The G5 requirements are partially fulfilled. MoTeCH is developed for and compatible with simple mobile phones, which contributes to its user-friendly interface. The present system uses SMS and IVR, which do not require internet access. Although the current design provides speech messaging, illiterates cannot access all of the application's content. Users can select their preferred (local) language for use in the system. However, there are no other tools available for persons with disabilities. VP5 demonstrates how existing functionalities can be extended and/or supplemented.

MoTeCH's current architecture does not meet the requirements for achieving G6. There are no online training materials, no customer assistance, and no opportunities for users to provide feedback or evaluate their experiences. VP1 demonstrates how to implement these requirements.

Requirement	Implemented in MoTeCH	Currentimplementation	Expanded implementation
R1.1	No	In the current MoTeCH architecture there are no communication options.	VP1 (Section 4.4.1) and VP3 (Section 4.4.3) indicate how this can be implemented.
R1.2	No	In the current MoTeCH architecture there are no communication options.	VP1 (Section 4.4.1) and VP3 (Section 4.4.3) indicate how this can be implemented.
R1.3	Yes	The MoTeCH security model ensures secure access and usage through hashed passwords, role-based permissions and configurable session time-outs [39].	This can be supplemented by what is represented in VP2 (Section 4.4.2).
R1.4	No	In the current MoTeCH architecture there are no transcription options.	VP1 (Section 4.4.1), VP3 (Section 4.4.3) and VP5 (Section 4.4.5) indicate how this can be implemented.
R2.1	Yes	Clients receive text messages (SMS) or automated voice messages informing them about key aspects of health behaviours during pregnancy and infancy [11, 53, 55].	This can be supplemented by what is represented in VP1 (Section 4.4.1) and VP4 (Section 4.4.4).
R2.2	Yes	The clients receive messages related to their own pregnancy or the health of their newborns/infants [11, 53, 55].	This can be supplemented by what is represented in VP1 (Section 4.4.1) and VP4 (Section 4.4.4).
R2.3	Yes	The MoTeCH security model uses dynamic URI, settings for secure access, supports two login modes, and manages user roles and permissions [11, 39].	This can be supplemented by what is represented in VP2 (Section 4.4.2).

Requirement	Implemented in MoTeCH	Current implementation	Expanded implementation
R3.1	Yes	If the client is due for scheduled care, then a notification of the upcoming visit is included with their weekly educational message. Nurses receive MoTeCH system generated messages about patients who are overdue for routine healthcare [11, 53, 55].	This can be supplemented by what is represented in VP1 (Section 4.4.1).
R3.2	Partial	The MoTeCH system only generates reminders for immunization shots, not for other medications [55].	To fulfill this requirement the platform must be supplemented by what is represented in VP1 (Section 4.4.1).
R3.3	Yes	For each client, data about language and time preferences are maintained [55].	This can be supplemented by what is represented in VP1 (Section 4.4.1).
R3.4	No	In the current MoTeCH architecture there is no appointment management option.	VP1 (Section 4.4.1) indicates how this can be implemented.
R4.1	Yes	MoTeCH uses Simplified Registers to securely store medical data. These registers are designed to make data collection and storage more efficient and reliable [11, 39].	This can be supplemented by what is represented in VP2 (Section 4.4.2).
R4.2	Partial	Personal medical records are stored and updated. Patients do not have access to these themselves [11, 55].	To fulfill this requirement the platform must be supplemented by what is represented in VP1 (Section 4.4.1).
R4.3	Partial	Conventional healthcare workers have access to their patients' medical records. This cannot be shared with traditional healthcare workers or patients [11, 53, 55].	To fulfill this requirement the platform must be supplemented by what is represented in VP1 (Section 4.4.1).
R4.4	No	In the current architecture there are no options for audit trails and version control.	VP1 (Section 4.4.1) indicates how this can be implemented.
R4.5	Yes	The data entered by the nurse is used to automate the generation of reports for district and regional health administrators and planners [11, 55].	This can be supplemented by what is represented in VP1 (Section 4.4.1).
R5.1	Partial	MoTeCH is designed for use on simple mobile phones [11, 55]. However, many conventional healthcare staff and some patients use smartphones; this design needs to be adjusted accordingly.	To fulfill this requirement the platform must be supplemented by what is represented in VP5 (Section 4.4.5).
R5.2	Yes	MoTeCH works via SMS and IVR, which does not require internet access [11, 53, 55].	This can be supplemented by what is represented in VP5 (Section 4.4.5).
R5.3	Partial	The users can receive voice messages, but not everything is accessible for illiterates [11, 53, 55].	To fulfill this requirement the platform must be supplemented by what is represented in VP5 (Section 4.4.5).
R5.4	Yes	Users can choose their preferenced (local) language [55].	This can be supplemented by what is represented in VP1 (Section 4.4.1) and VP5 (Section 4.4.5) .
R5.5	No	In the current MoTeCH architecture there are no concrete tools for users with disabilities.	VP5 (Section 4.4.5) indicates how this can be implemented.
R6.1	No	In the current MoTeCH architecture there are no online training materials.	VP1 (Section 4.4.1) indicates how this can be implemented.
R6.2	No	In the current MoTeCH architecture there is no customer support.	VP1 (Section 4.4.1) indicates how this can be implemented.
R6.3	No	In the current MoTeCH architecture there are no options for user feedback/evaluation.	VP1 (Section 4.4.1) indicates how this can be implemented.

Table 14: MoTeCH comparison

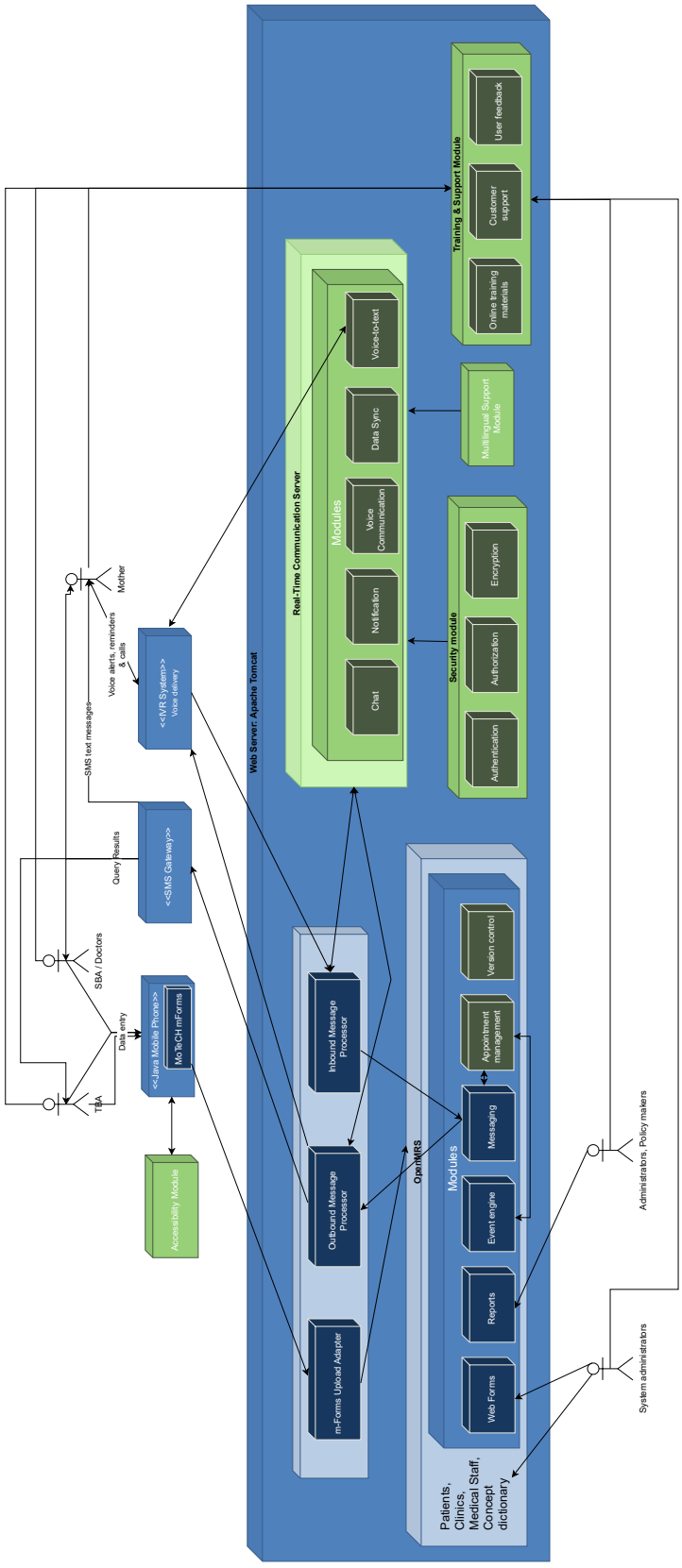


Figure 14: MoTeCH architecture adopted from MacLeod et al. [2012] and supplemented with requirements from research findings.

Section 2.2.2 discussed MoTeCH's current infrastructure. Going through the method steps provided a design of the extended MoTeCH structure. Figure 14 shows how the infrastructure should be extended. The blue parts are original, the green parts are proposed for the extension of MoTeCH.

The Real-Time Communication Server is an important addition to MoTeCH's infrastructure. This server allows for real-time communication and data exchange among various modules and users. This increases the speed and efficiency of information transit inside the system. The Real-Time Communication Server consists of various components, including:

- Chat: allows for direct text communication between users
- Notification: manages and provides notifications to users about significant events and updates
- Voice communication: enables real-time voice communication between users
- Data sync: ensures data synchronization between different system components
- Voice-to-text: converts spoken words into text, allowing voice-activated data entry and recording messages to be saved as text in the record. This improves accessibility and usability, particularly for those who struggle with text input via a keyboard.

The Accessibility Module was designed to make the system more accessible. This module guarantees that the system interface and functions are accessible to all users, including those with disabilities. See also view 5. The web server has added a training and support module. This module provides users with access to training resources that will help them learn how to utilize the system and its different functionalities. This module also includes customer support and user feedback modules. This improves the user experience, skills, understanding of the system, and ability to enhance it.

The Multilingual Support Module integrates different (local) languages into the system, allowing a broader range of users to efficiently use MoTeCH. This module handles translations and guarantees that all information and features are available in several languages. Finally, the security module was included to ensure the system's security. This module has multiple sub-modules. First, there's the authentication submodule, which handles user authentication to guarantee that only authorized users have access to the system. Second, there is the authorization submodule, which manages access rights and defines which users can access specific parts of the system. Finally, the encryption submodule encrypts data and messages while they are being stored and transmitted to preserve their confidentiality and integrity. Figure 10 depicts the security module's functions.

4.6 Expert validation

All intermediate results and analyses have been discussed with the experts. Based on feedback from the ICT4D expert, additional strategic goals were included, the structure of the thesis was improved and additional diagrams were added to improve the overall picture. The discussion with the local doctor was at a late stage of the study, this ensured that the results were found to be consistent with the local context experienced by the doctor. She provided some feedback points in particular in nuancing the strategic goals and requirements. The feedback of the other context expert, Gideon Ali, was very positive. He stated: "I must say I am impressed at the level of work you have done with the little resources and limited time you had. [...]. I am satisfied with the findings and conclusion of this study".

5 DISCUSSION

The findings of this study provide important insights into the potential extension of MoTeCH to encourage collaborations between TBAs and SBAs in Ghana. The study's findings indicate nine substantial goals that must be met in order for the expansion to be implemented successfully. This expansion can have major implications for maternal healthcare. During this study, the following design question was the focus: *"How can the existing MoTeCH (Mobile Technology for Community Health) infrastructure be expanded to facilitate a partnership approach between traditional birth attendants (TBAs) and skilled birth attendants (SBAs) in Ghana?"* An answer to this design question has been generated after extensive and detailed research. To arrive at the answer to this design question, the sub-questions must first be answered.

To start with the first sub-question: *What is the current status of mobile health solutions, health technology and the role and relationship between TBAs and SBAs?* The foundation for the introduction and theoretical background (sections 1 and 2) as well as an extensive understanding of the context were provided by carrying out the study of literature and thereby answering this sub-question. In Ghana, especially in rural regions, mobile health solutions are proving to be increasingly significant in terms of enhancing both the quality and accessibility of medical care. It additionally laid out the background, objectives, and rationale behind the continued use of TBA services. The literature evaluation also clarified the function of SBAs and the relationship between TBAs and SBAs. Friction seems to be the result of the two groups' lack of collaboration and coordination. Through job shifting, new partnerships, and training, the partnership model put forth by Haruna et al. [2019] seeks to enhance collaboration between TBAs and SBAs.

The following is the second sub-question: *Which important stakeholders are there in this context and need to be part of the design process?* A stakeholder analysis was done in order to provide an answer to this question; the findings are shown in Section 4.1. According to this stakeholder analysis patients, TBAs, SBAs, and doctors are the most essential stakeholders to involve in the design process. In addition to these key stakeholders, NGOs and GHS were also identified as stakeholders, but because of their roles, they were not directly involved in the design process.

Multiple method steps were used to answer the third sub-question: *What are the ideas, needs, and expectations of the selected stakeholders?* The steps comprised conducting in-depth interviews, encoding the results of the interviews, and creating stakeholder profiles based on the outcomes of those encoded interviews. These stakeholder profiles are detailed in Section 4.2 and complemented by Sections 4.3.1 and 4.3.8 that contains the goals and requirements mentioned by the stakeholders. The stakeholder profiles explained the stakeholders' background, their relevance, interest and power, and their expectations, wishes, worries and demands. The subsections in Section 4.3 shows 9 main goals along with the requirements necessary to achieve them. These goals and requirements are divided into operational and strategic ones. The operational goals revolve around enhanced communication between end-users, access to information, reminder and appointment management, patient records management, accessibility and inclusivity, and training and assistance. The strategic goals are about engagement, trust, education, awareness, and coordination. The strategic goals and requirements are not further included in the other research steps because they do not affect the design of the system.

Based on these stakeholder profiles and operational goals and requirements to be met, the views and viewpoints were developed to answer the subsequent sub-question: *How can various points of view be characterized to comprehend the MoTeCH infrastructure from the standpoint of all the stakeholders?* These viewpoints and views can be seen in Section 4.4. There is a usage view(point) (VP1), a security view(point) (VP2), a communication view(point) (VP3), an access to information view(point) (VP4), and an accessibility view(point) (VP5).

Finally, based on a comparison between the previous results and the current MoTeCH architecture, the last sub-question was answered: *What are the differences between the suggested extension and the existing MoTeCH design, and how can these be reconciled to satisfy the requirements of all stakeholders?* Some of the requirements were found to have already been met in the current architecture, some of the requirements require minor modification because they have already been partially met, and some require major changes to be made to receive fulfillment. Only G2

has already fully been met with the current structure, and only G6 has completely not been met with the current structure. The other four goals have partially been met. The complete comparison is shown in Table 14 and Figure 14.

Based on the answers of the sub-questions and the comprehensive method conducted, the research question can be answered. The study comes to the conclusion that it is possible to enhance maternal healthcare in Ghana by extending the current MoTeCH infrastructure to support collaboration between TBAs and SBAs. After a thorough examination of the literature, a stakeholder analysis, and the gathering of stakeholder needs and expectations, nine essential goals were determined that must be met in order to carry out this expansion. Improved communication, information access, appointment and reminder management, patient record management, inclusivity and accessibility, training and support, community engagement and trust, healthcare education and awareness, and collaboration and coordination represent these goals. Although the current MoTeCH architecture partially satisfies some technical needs, some major alterations are required to fully accomplish all operational goals. A strong basis for cooperation and coordination between TBAs and SBAs is provided by the partnership model of Haruna et al. [2019], facilitating an integrated approach to healthcare. MoTeCH can effectively improve maternal healthcare and foster stronger collaboration between TBAs and SBAs in Ghana by putting these recommendations into practice.

5.1 Limitations

While this study provides valuable insights for expanding the MoTeCH infrastructure to encourage collaboration between TBAs and SBAs, there are certain limitations that may influence how the results are interpreted. This Section highlights the study's primary shortcomings, which mostly include the conduct of the interviews, the quality of the audio recordings, and the sequence of the research methodologies.

5.1.1 Quality and relevance of interviews. One significant limitation is that not all interviews were completed just for this study. Some interviews from prior research were repurposed in this study. This may have influenced the relevance and specificity of the data collected with regard to the research aims. Because several interviews included more than only the expansion of MoTeCH for maternal healthcare, some findings may have been incorrectly generalized to this context. In addition, not the same question or topic lists were used for all interviews. This caused the interviews to be generally broader than this particular research topic and were less specific about the integration of MoTeCH (Section 2.2) and the partnership approach (Section 2.3).

5.1.2 Sound quality of audio recordings. The sound quality of the audio recordings of the interviews was not always sufficient. Poor audio quality may have resulted in misinterpretations or missed details during transcription and analysis of the interviews. This can have an impact on data accuracy and completeness, potentially resulting in a less robust outcome.

5.1.3 Order of research methods. The order in which the research methodologies were implemented turned out to be less than ideal. In this study, views and viewpoints were generated before comparing the requirements to the existing MoTeCH framework. It would have been more rational and practical to compare the requirements to the current infrastructure before developing views and viewpoints based on the discovered gaps and requirements. This inconvenient sequence may have led to a less coherent and methodical approach, resulting in a less efficient research design.

5.1.4 Validity. Several strategies were used to ensure the study's validity, including triangulating data and methodologies, using standardized interview questions, and expert validation (see Section 3.10.1). However, even with these metrics, there may be limitations in how well the study instruments measure what they are designed to measure. For example, recycling interviews from other studies may have an impact on internal validity because these interviews may not entirely match the study's specific research goals.

5.1.5 Reliability. Standardized methods and procedures were used to ensure the reliability of the study (see Section 3.10.2). Despite these efforts, variability in participants' responses and the quality of audio recordings may affect

the consistency and repeatability of the results. In addition, inconsistency in the conduct of interviews by different researchers may contribute to variations in the data, which may reduce the reliability of the findings.

5.1.6 Generalizability. The study's unique setting, namely the MoTeCH infrastructure and cooperation between TBAs and SBAs in Ghana's rural areas, limits the findings' generalizability. Although attempts were made to choose representative groups and use a clear study methodology (see Section 3.10.3), extrapolating the findings to other situations should be done with caution. The conclusions may not be directly applicable in other nations or settings due to Ghana's distinct cultural, institutional, and infrastructural factors. The conclusions should be interpreted as guidelines that can be applied to comparable circumstances rather than universal solutions.

5.2 Implications

The maternal healthcare system in Ghana will see substantial modifications and improvements as a result of the MoTeCH infrastructure expansion, which encourages cooperation between TBAs and SBAs. To properly grasp the worth and potential of the suggested model, as well as to make plans for its future implementation and scale-up, it is imperative to understand these implications.

First, better access to (maternal) healthcare is the primary implication. Access to professional healthcare services is increased when TBAs and SBAs work more closely together, particularly in rural and remote locations where TBAs are frequently the only accessible providers. TBAs and SBAs working together more effectively will promote integrated care delivery, which will speed up the identification and resolution of complications. This will guarantee a drop in the MMR. Additionally, it will help achieve SDG 3 (ensuring healthy lives and promoting well-being for everyone at every age).

TBAs also have access to assistance and training, which helps them advance their expertise. As a result, there will be greater care standards and TBA incorporation into the official healthcare system. By enhancing their partnership with TBAs, SBAs can also receive improved support, which will reduce their burden and enhance care quality.

Additionally, the MoTeCH infrastructure's expansion encourages the use of mobile technology in healthcare, which enhances data gathering, patient monitoring, and provider-to-provider communication. Improved data management and patient records facilitate patient history tracking, enhance continuity of care, and help guide treatment decisions.

The study's encouragement of multidisciplinary research fusing technology, cultural studies, and healthcare is one of its scholarly contributions. This all-encompassing method advances our comprehension of the methods and difficulties involved in maternal care. The accomplishments of this study might encourage other academics to use integrative methods of this kind in their own areas of study.

While the outcomes of this study may have great importance for the various stakeholders in the research context, success hinges on willingness. The stakeholders who participated in this study are generally positive about the collaboration between traditional care and conventional care and using technology in this process. However, willingness must also be found at the policy level. Policies must support the collaboration of SBAs and TBAs. What this should look like in practical terms is not within the scope of the study, but it is essential to find willingness at other levels as well to ensure the success of these research findings.

5.3 Future research

Although this study gives valuable insights into expanding the MoTeCH infrastructure to promote collaboration between TBAs and SBAs, there are several areas that need to be investigated further in order to address the study's shortcomings and assess the usefulness of the proposed design.

First, future research should aim to address the shortcomings mentioned in this study. For example, doing new interviews for this study may improve the reliability and validity of the findings. While doing so, special attention should be paid to improving the audio quality of the interviews to ensure that all data is accurately and completely captured.

Furthermore, it is of the uttermost essence to test the design and expansion of MoTeCH in a practical setting. This can be accomplished by conducting pilot studies in various parts of Ghana. These studies should assess the feasibility, acceptance, and impact of the suggested additions, such as better communication, information accessibility, and patient record management. The results of these pilot studies can provide useful information for further design optimization.

Further research should also attempt to meet the overarching study's knowledge goal, which is different from the design goal that this study focused on. This suggests that further study is needed to understand the underlying mechanisms and factors that drive collaboration between TBAs and SBAs, as well as how this collaboration can contribute to better maternal health outcomes. Understanding how collaboration works in various cultural and organisational contexts is critical for increasing the generalizability of the findings.

Regarding the WHO Six Building Blocks Framework, which is covered in Section 2.4, other follow-up research is needed. The third building block's measurements should be used to assess the proposed design. If this proves to be insufficient, the system ought to be modified appropriately. Furthermore, how well the six components work together determines how effective the health system is as a whole. This research has emphasized health information systems, but it is important to understand how these components work together. Strengthening the resilience and responsiveness of healthcare systems in addressing maternal health challenges in Sub-Saharan Africa may require evaluating and possibly implementing improvements in other building blocks, such as health service delivery, health workforce, access to essential medicines, health financing, and leadership and governance.

Finally, further research should focus on the long-term effects of implemented MoTeCH interventions. This includes monitoring the longevity of the changes, as well as their impact on the broader health-care systems and outcomes. A thorough long-term evaluation can determine whether improvements in collaboration between TBAs and SBAs will lead to a sustainable improvement in maternal healthcare in Ghana and elsewhere.

6 CONCLUSION

This study highlighted the potential for expanding the MoTeCH infrastructure to promote collaboration between Traditional Birth Attendants and Skilled Birth Attendants, which could result in considerable improvements in maternal health services in Ghana. A comprehensive context analysis and needs assessment with Ghanaian stakeholders identified six key operational goals to improve current mobile health services: improved end-user communication, access to information, appointment and reminder management, patient record management, accessibility and inclusiveness, and training and support. Although the current MoTeCH architecture partially fits some needs, considerable adjustments are required to completely realize all objectives.

In addition to operational goals and requirements, three strategic goals were identified: community participation and trust, health education and awareness, and collaboration and coordination. Expanding the MoTeCH infrastructure to meet these objectives encourages a more integrated approach to healthcare, making better use of limited resources and boosting collaboration between TBAs and SBAs.

Context experts verified the findings and offered design, ensuring that the recommendations are both achievable and appropriate for the local healthcare environment. This validation method lends credibility to the study and validates that the proposed modifications are consistent with on-the-ground realities.

By implementing these concepts, MoTeCH can greatly enhance maternal healthcare and serve as a model for similar programs around the world. The proposed collaborative method promotes a comprehensive and contextually aware strategy that balances technology capabilities and cultural norms. This can result in a more sustainable healthcare system that serves the requirements of all stakeholders while also improving overall healthcare quality.

MoTeCH can make the best use of limited resources and offer the greatest potential for long-term outcomes by using a collaborative strategy that covers the health information needs of clients, health professionals, managers, and legislators [55]. This study demonstrated that expanding the existing MoTeCH infrastructure to encourage collaboration between TBAs and SBAs will not only increase communication and information availability, but will also allow for a more holistic and integrated approach to maternal healthcare in Ghana. This integration will help to create a more efficient use of resources and a more sustainable healthcare system that can better satisfy the requirements of all stakeholders, thereby increasing the overall quality of healthcare delivery. However, the strategic goals must also be fulfilled for this to be a success. As already discussed in Section 1, willingness at all levels of government and policy-making is also required to accomplish and build on this success.

Ultimately, the successful design for the expansion of the MoTeCH infrastructure represents a significant step towards improving maternal health outcomes in Ghana and has the potential to inspire similar initiatives globally. By fostering collaboration, leveraging technology, and respecting cultural contexts, we can create a more equitable and effective healthcare system for all.

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7 APPENDIX

7.1 Acronyms

7.1.1 *Stakeholders:*

S1 Patients
S2 TBAs
S3 SBAs
S4 Doctors

7.1.2 *Goals:*

G1 Enhanced communication between end-users
G2 Access to information
G3 Reminder and appointment management
G4 Patient records management
G5 Accessibility and inclusivity
G6 Training and assistance
G7 Community engagement and trust
G8 Healthcare education and awareness
G9 Collaboration and coordination

7.1.3 *Requirements:*

R1.1 Various communication channels
R1.2 Real-time and interactive communication options
R1.3 Secure communication
R1.4 Transcription of Voice Messages
R2.1 Access to comprehensive information
R2.2 Personalisation of information
R2.3 Secured access
R3.1 Automatic appointment reminders
R3.2 Automatic medication reminders
R3.3 Flexible reminder settings
R3.4 Integrated appointment management
R4.1 Secure storage of medical data
R4.2 Access to personal medical records
R4.3 Data sharing with healthcare providers
R4.4 Audit trails and version control
R4.5 Automatic report generation
R5.1 User-friendly interface
R5.2 Accessibility for users with limited internet access
R5.3 Accessibility for users with limited literacy
R5.4 Support for cultural and linguistic diversity
R5.5 Accessibility for users with disabilities
R6.1 Online training materials
R6.2 Customer support
R6.3 User feedback and evaluation
R7.1 Community involvement initiatives
R7.2 Culturally sensitive training programs
R7.3 Trust-building activities
R8.1 Educational campaigns
R9.1 Regular coordination meetings
R9.2 Clear division of tasks
R9.3 Compensation for TBAs
R9.4 Appointment of an independent system manager

7.1.4 *Viewpoints:*

VP1 Usage
VP2 Security
VP3 Communication
VP4 Access to information
VP5 Accessibility

7.2 Interview questions - version 1

7.2.1 *TBA questions.*

(1) Can you tell us about your experience and involvement in providing birth care in this community?
(2) What do you think are the most common challenges in delivering prenatal care in this particular setting?
(3) Do you use technological devices in performing your work?
  (a) How do they impact your work?
(4) What aspects of local birth traditions and practices do you consider essential to preserve when implementing new health technologies?
(5) How do you see your role in promoting the adoption of health technologies such as MoTeCH within the community?
(6) Can you share specific examples of positive changes you have observed as a result of technology interventions in birth care?
(7) What concerns or hesitations do you have about integrating MoTeCH into your practice?

(8) How, in your opinion, can health technologies be adapted to better fit local needs and cultural contexts?
(9) What do you think are the most critical aspects of fostering successful collaborations between traditional midwives (TBAs) and skilled midwives (SBAs)?
(10) How would you promote the involvement of other local stakeholders, such as the community, in the implementation of MoTeCH?
(11) Is there specific training or support you feel is needed to effectively use MoTeCH in your practice?
(12) What role would you like to play in the educational aspect of implementing MoTeCH within the community?
(13) Do you see opportunities for MoTeCH to facilitate continuity of care between TBAs and SBAs?
(14) What do you think are the main (business) goals that MoTeCH should pursue to be effective?
(15) How do you think we should measure success related to MoTeCH implementation?
(16) Are there any ethical considerations or cultural aspects that should be taken into account when using MoTeCH?
(17) Can you provide specific examples where technology solutions have been successfully integrated into birth care?
(18) What do you think are the most critical elements for building trust and acceptance of MoTeCH within the community?

7.2.2 SBAs:

(1) Can you describe what your role as a skilled midwife (SBA) looks like within the current healthcare environment?
(2) What do you think are the main challenges you face in delivering prenatal and birth care?
(3) In what ways have technological advances affected your current practices in birth care?
(4) How do you see collaboration with traditional midwives (TBAs) and how do you think technology can improve this collaboration?
(5) What do you think are the most valuable aspects of local birth traditions and practices that should be integrated into modern birth care?
(6) What specific benefits do you see in integrating MoTeCH into your daily practice?
(7) How do you think MoTeCH can help improve continuity of care between TBAs and SBAs?
(8) What are your expectations and goals regarding the implementation of MoTeCH in the community?
(9) How can we ensure that MoTeCH seamlessly meets the needs and expectations of skilled midwives?
(10) Are there specific training or support mechanisms that you feel are necessary for the effective use of MoTeCH?
(11) Can you share examples of previous experiences with technology solutions in birth care?
(12) In what ways do you think MoTeCH can improve the efficiency of your practice?
(13) How do you see the role of SBAs in the educational aspect of MoTeCH implementation in the community?
(14) What challenges do you foresee in establishing effective collaboration between TBAs and SBAs through MoTeCH?
(15) What do you see as the most important (business) goals for MoTeCH to achieve in the context of your practice?
(16) How would you measure the success of MoTeCH implementation?
(17) Are there any ethical or cultural considerations that are specifically important when using MoTeCH in your practice?
(18) How do you think MoTeCH can help improve trust and acceptance within the community?

7.2.3 Patients: pregnant women.

(1) How would you describe the current healthcare experience during pregnancy?
(2) What challenges do you currently face in obtaining maternal care, and how do you think MoTeCH can address these challenges?

(3) What are your expectations and desires regarding the care you receive during pregnancy?
(4) In what ways do you think MoTeCH can improve communication between pregnant women and healthcare providers?
(5) What information would you like to receive through the MoTeCH platform during your pregnancy?
(6) How do you think MoTeCH can help raise awareness about healthy pregnancy practices in your community?
(7) What role do you see for yourself and other pregnant women in promoting acceptance and effectiveness of MoTeCH?
(8) What support mechanisms would help you use technology solutions such as MoTeCH during your pregnancy?
(9) How do you think MoTeCH and similar technologies can take into account the unique needs and cultural contexts of pregnant women?
(10) What do you think are the key factors that would influence the acceptance and effectiveness of MoTeCH, both at the individual and community levels?
(11) Do you currently have access to care provided by traditional midwives (TBAs) or trained midwives (SBAs)? If so, can you briefly describe what this care looks like?
(12) What do you think are the main benefits of receiving care from TBAs or SBAs?
(13) Are there any specific challenges or concerns you experience in receiving care from TBAs or SBAs?
(14) Do you think the integration of MoTeCH into healthcare practice would affect your choice of healthcare providers? If so, in what ways?
(15) In what ways do you think MoTeCH could improve collaboration between TBAs and SBAs for the benefit of pregnant women?
(16) Are there certain aspects of care delivery by TBAs or SBAs that you would want to maintain even if MoTeCH is integrated?
(17) How do you think MoTeCH could facilitate communication and coordination between TBAs and SBAs to ensure a seamless transition in care?
(18) Do you see potential challenges or concerns in using technology such as MoTeCH in conjunction with care from TBAs or SBAs?
(19) Would the availability of MoTeCH affect your willingness to seek care from TBAs or SBAs?
(20) What role do you see for yourself in promoting understanding and acceptance of MoTeCH within your community concerning care by TBAs and SBAs?

7.2.4 Patients: mothers.

(1) Can you share how your experience was with the care you received during the maternal period?
(2) Did you make use of care provided by TBAs or SBAs? Why? What was your experience?
(3) In your opinion, what were the most positive aspects of the health care you received before, during, and after giving birth?
(4) Were there any specific challenges or concerns during this period regarding health care?
(5) Do you think the integration of MoTeCH into health care would have affected your experience? If so, in what ways?
(6) What improvements in maternal health care would you wish for future mothers?
(7) Do you currently have access to care provided by traditional midwives (TBAs) or trained midwives (SBAs)? If so, what was your experience like?
(8) Do you think MoTeCH could improve communication between healthcare providers and yourself? How?
(9) What do you think about the idea that MoTeCH would play a role in coordinating care between different healthcare providers?
(10) Do you have specific suggestions for improving women's health care using technology solutions such as MoTeCH?
(11) Do you see any potential challenges or concerns in using MoTeCH in the context of maternal care?

(12) How do you think MoTeCH can contribute to engaging women in decision-making processes regarding their health care before, during, and after childbirth?
(13) What role would you like to play in promoting awareness and acceptance of MoTeCH within your community?
(14) What information and support would be valuable to you in the maternal period?
(15) How do you see MoTeCH's role in providing maternal support?
(16) Would you be willing to use MoTeCH to receive maternal care? Why or why not?
(17) How do you feel about the idea of shared care between traditional midwives (TBAs) and trained midwives (SBAs) supported by MoTeCH?
(18) Are there certain aspects of maternal care that you would like to retain even if MoTeCH is integrated?
(19) What sources of information do you trust most when it comes to maternal health advice?
(20) How do you think MoTeCH can help raise awareness about maternal care within your community?

7.3 Interview questions - version 2

7.3.1 SBAs:

- Introduction:
(1) Can you introduce yourself?
(2) How long have you been working as a skilled midwife?
(3) What are your duties and responsibilities as a midwife in the clinic?
(4) What do you think are the main challenges you face in your work as a midwife?
(5) Are there specific areas in which you would like to receive more training or support in your work?
(6) Have you previously participated in projects or initiatives aimed at improving health care?
- Patients:
(1) Can you tell me about the patients you handle?
(2) On average, how often do you see patients?
(3) In what ways do you communicate with patients?
(4) What are the challenges in interacting with patients?
(5) How would you like to interact with patients?
(6) To what extent do cultural and traditional considerations play a role in health care practices in your community?
- TBAs:
(1) What do you know about traditional bed attendants (TBAs)?
(2) What are the duties and responsibilities of TBAs?
(3) How do you interact with TBAs in your work?
(4) What are the challenges in interacting with TBAs?
(5) How would you like to interact with TBAs?
(6) What do you think are important services that TBAs provide?
- Technology:
(1) What kind of technologies do you use in your work?
(2) How comfortable are you with using technology in your work?
(3) Do you have a phone? What kind?
(4) Do your patients have a phone? What kind?
(5) Do the TBAs you work with have a phone? What kind?
(6) How is patient data currently managed?
(7) Is some form of electronic record keeping system currently in place?
(8) What do you think are the main challenges and needs in managing patient data?
- MoTeCH:
(1) Are you familiar with MoTeCH?

(a) Yes: please explain what you know
(b) No: MoTeCH, which stands for Mobile Technology for Community Health, is a program launched in 2009 in partnership with the Grameen Foundation and Ghana Health Services (GHS) to use mobile technology to improve the uptake and quality of care for mother, newborn and child (MNCH). The program includes two mobile applications, "Mobile Midwife" and the "Client Data Application." Mobile Midwife allows pregnant women and mothers of children under one year of age to receive pre-recorded audio messages or text messages about MNCH education and care in local languages, tailored to the gestational age or age of the child. The Client Data App allows health workers to use cell phones to identify women and babies in need of care in their area and digitally record the care given to patients. Currently, MoTeCH is focused on delivering educational messages and improving care allocation and data capture in Ghanaian communities.

(2) What do you think about MoTeCH?
(3) What are your main worries about using MoTeCH?
(4) What are your expectations when using MoTeCH?
(5) Are there any features you want to see in MoTeCH besides the current features?

- Implementation:

(1) How do you see your role in the implementation project?
(2) What are some of the key challenges in engaging the community in health interventions?

- Success:

(1) When is the implementation of such an intervention successful?
(2) What do you need in such an intervention?

7.3.2 Patients: pregnant women.

- Introduction:

(1) Can you tell me a little bit about yourself and your current pregnancy?
(2) Is this your first pregnancy?
(a) No: can you tell me more about the previous pregnancies?
(3) What are your expectations regarding maternal care during your pregnancy?
(4) What are your desires regarding maternal care during your pregnancy?
(5) What are the challenges you face in accessing maternal care?
(6) What are the main concerns or fears you have regarding your pregnancy and the care you receive?
(7) Can you describe your current healthcare experience during pregnancy?
(8) Do you have access to educational materials about pregnancy and health care? If so, how reliable and understandable do you find these materials?

- SBAs/TBAs:

(1) Do you receive care of skilled bed attendants or care of traditional bed attendants?
(2) What are the benefits from the care of this bed attendant?
(3) What are the challenges from the care of this bed attendant?
(4) In what way can the care be better?
(5) How do you communicate with your bed attendant?

- Technology:

(1) Do you have a phone? What kind?
(2) How comfortable are you with using technology?

- MoTeCH:

(1) Are you familiar with MoTecH?
(a) Yes: please explain what you know
(b) No: MoTeCH, which stands for Mobile Technology for Community Health, is a program launched in 2009 in partnership with the Grameen Foundation and Ghana Health Services (GHS) to use mobile

technology to improve the uptake and quality of care for mother, newborn and child (MNCH). The program includes two mobile applications, "Mobile Midwife" and the "Client Data Application." Mobile Midwife allows pregnant women and mothers of children under one year of age to receive pre-recorded audio messages or text messages about MNCH education and care in local languages, tailored to the gestational age or age of the child. The Client Data App allows health workers to use cell phones to identify women and babies in need of care in their area and digitally record the care given to patients. Currently, MoTeCH is focused on delivering educational messages and improving care allocation and data capture in Ghanaian communities.

(2) What do you think about MoTeCH?
(3) What are your main worries about using MoTeCH?
(4) What are your expectations when using MoTeCH?
(5) Are there any features you want to see in MoTeCH besides the current features?
(6) What information or support would you like to receive through the MoTeCH platform during your pregnancy?
(7) How do you think MoTeCH can help improve communication and collaboration between pregnant women, SBAs and TBAs?

- Cultural context:

(1) Can you tell me more about the cultural context of pregnant women?
(2) How can MoTeCH fit in this cultural context?

- Implementation:

(1) How do you see the implementation of such an intervention?
(2) What role do you see for yourself in promoting understanding and acceptance of MoTeCH in your community?
(3) What are the key factors that can affect the acceptance and effectiveness of MoTeCH in your community?

7.3.3 Patients: mothers.

- Introduction:

(1) Can you tell me a little bit about yourself and your experience during the maternal period?
(2) How long ago did you give birth?
(3) Can you describe the care you received during pregnancy, childbirth, and the postpartum period?

- Care Providers:

(1) Did you make use of care provided by traditional bed attendants (TBAs) or trained bed attendants (SBAs)?
(2) Why did you choose this type of care?
(3) Can you describe your experience with these care providers?
(4) What aspects of the care provided by TBAs or SBAs did you find most beneficial?
(5) Were there any specific challenges or concerns you faced during the maternal period regarding the care provided by TBAs or SBAs?
(6) How did you communicate with your care provider?

- Maternal Health Care Experience:

(1) What were the most positive aspects of the health care you received before, during, and after giving birth?
(2) Were there any specific challenges or concerns you encountered during this period regarding health care?

- Technology:

(1) Do you have a phone? What kind?
(2) How comfortable are you with using technology?

- MoTeCH:

(1) Are you familiar with MoTeCH?
  (a) Yes: please explain what you know

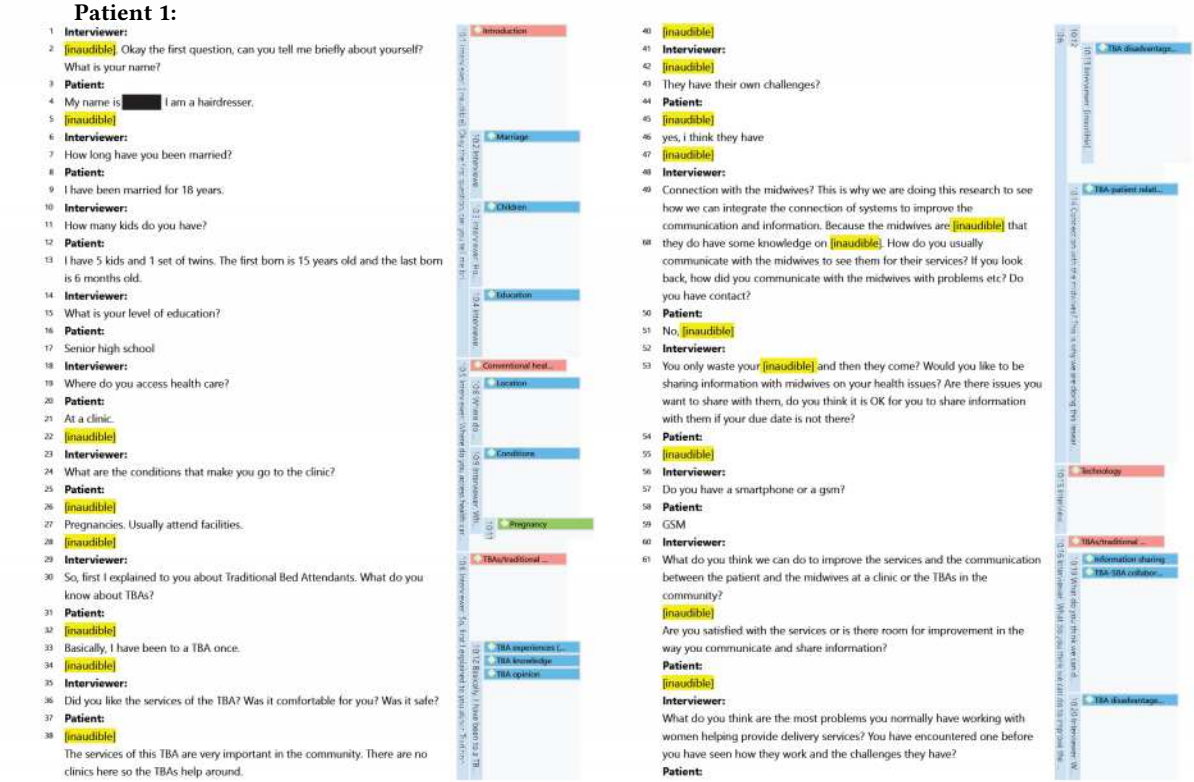
(b) No: MoTeCH, which stands for Mobile Technology for Community Health, is a program launched in 2009 in partnership with the Grameen Foundation and Ghana Health Services (GHS) to use mobile technology to improve the uptake and quality of care for mother, newborn and child (MNCH). The program includes two mobile applications, "Mobile Midwife" and the "Client Data Application." Mobile Midwife allows pregnant women and mothers of children under one year of age to receive pre-recorded audio messages or text messages about MNCH education and care in local languages, tailored to the gestational age or age of the child. The Client Data App allows health workers to use cell phones to identify women and babies in need of care in their area and digitally record the care given to patients. Currently, MoTeCH is focused on delivering educational messages and improving care allocation and data capture in Ghanaian communities.

(2) What do you think about MoTeCH?
(3) What are your main worries about using MoTeCH?
(4) What are your expectations when using MoTeCH?
(5) Are there any features you would have wanted to see in MoTeCH besides the current features?
(6) What information or support would you have liked to receive through the MoTeCH platform during your pregnancy?
(7) How do you think MoTeCH can help improve communication and collaboration between pregnant women, SBAs and TBAs?

7.4 Coded interviews

Not all codes are well represented in the transcripts below. All the full transcribed and full coded interviews can be seen in the following google drive folder: https://drive.google.com/drive/folders/1ldax-PSbvh2Wr9ZKwhvTievsQsD-X$_6$*j?usp = sharing*
Please contact the researcher if the files cannot be accessed at farahvandenberg@gmail.com

Patient 1:



Interviewer:
[inaudible]. Okay the first question, can you tell me briefly about yourself? What is your name?
Patient:
My name is [redacted] I am a hairdresser.
[inaudible]
Interviewer:
How long have you been married?
Patient:
I have been married for 18 years.
Interviewer:
How many kids do you have?
Patient:
I have 5 kids and 1 set of twins. The first born is 15 years old and the last born is 6 months old.
Interviewer:
What is your level of education?
Patient:
Senior high school
Interviewer:
Where do you access health care?
Patient:
At a clinic.
[inaudible]
Interviewer:
What are the conditions that make you go to the clinic?
Patient:
[inaudible]
Pregnancies. Usually attend facilities.
[inaudible]
Interviewer:
So, first I explained to you about Traditional Bed Attendants. What do you know about TBAs?
Patient:
[inaudible]
Basically, I have been to a TBA once.
[inaudible]
Interviewer:
Did you like the services of the TBA? Was it comfortable for you? Was it safe?
Patient:
[inaudible]
The services of this TBA are very important in the community. There are no clinics here so the TBAs help around.
[inaudible]
Interviewer:
[inaudible]
They have their own challenges?
Patient:
[inaudible]
yes, i think they have
[inaudible]
Interviewer:
Connection with the midwives? This is why we are doing this research to see how we can integrate the connection of systems to improve the communication and information. Because the midwives are [inaudible] that they do have some knowledge on [inaudible]. How do you usually communicate with the midwives to see them for their services? If you look back, how did you communicate with the midwives with problems etc? Do you have contact?
Patient:
No, [inaudible]
Interviewer:
You only waste your [inaudible] and then they come? Would you like to be sharing information with midwives on your health issues? Are there issues you want to share with them, do you think it is OK for you to share information with them if your due date is not there?
Patient:
[inaudible]
Interviewer:
Do you have a smartphone or a gsm?
Patient:
GSM
Interviewer:
What do you think we can do to improve the services and the communication between the patient and the midwives at a clinic or the TBAs in the community?
[inaudible]
Are you satisfied with the services or is there room for improvement in the way you communicate and share information?
Patient:
[inaudible]
Interviewer:
What do you think are the most problems you normally have working with women helping provide delivery services? You have encountered one before you have seen how they work and the challenges they have?
Patient:
[inaudible]
Interviewer:
We are looking at how they can both share knowledge and help with [inaudible] issues.
Patient:
[inaudible]
Interviewer:
But your experience with one of the TBAs for your first born was not a disastrous one?
Patient:
no, [inaudible]
Interviewer:
So, do you think families [inaudible]. What are reasons?
Patient:
[inaudible]
Interviewer:
Some of them use medication?
Patient:
[inaudible]
Interviewer:
They do not force you to take the medication?
Patient:
[inaudible], they don't ask you to take them if you don't want to?
Interviewer:
What are the reasons for not taking the medication?
Patient:
[inaudible]
Interviewer:
What was the name of that medicine?
Patient:
I don't know
Interviewer:
[inaudible]
Patient:
[inaudible]
Interviewer:
How did you pay the TBA with your first born?
Patient:
[inaudible]
Interviewer:
The TBAs can call the midwives and give information. What information is very critical that they should be sharing with the midwives at the clinic? [inaudible]
Patient:
[inaudible]
Interviewer:
I don't have other questions for now. Thanks for your time.

Patient 2:

[redacted]

Interviewer:
Okay, thank you, madam [redacted] Can you briefly tell me about yourself?
Patient:
I am [redacted] I am actually a teacher at [inaudible] school.
Interviewer:
Are you married?
Patient:
Yes, seven years.
Interviewer:
How many kids do you have?
Patient:
3 kids
Interviewer:
How many years?
Patient:
Three years, [inaudible], six months.
Interviewer:
How do you access healthcare in general? For yourself or if the kids are not feeling well. Why do you normally access healthcare?
Patient:
By the grace of God, with my kids they're not really forced. It's mostly teaching and with teaching we have managed to get them to teach. I think with the second born, he was coughing one time [inaudible] clinic [inaudible].
Interviewer:
How are the services here in terms of child welfare in terms of you as a nursing mother?
Patient:
This is a very institution here, the services are perfect because it was out of the services. I decided to even come and give them to the [inaudible] here. I made this one here.
Interviewer:
You delivered?
Patient:
Yes in January right here. I think here are the services and that goes to his needs. The services are okay to his satisfaction.
Interviewer:
In terms of the communication, maybe antenatal services, postnatal services, and other child welfare services, what is the communication like? Is it okay? Are there any challenges? Where do you think there can be improvement?
Patient:
Well, for me, I think it is okay, because they speak my language. Not really my native language, but the English that he speaks, it comes to my level and I've never encountered any challenge since I came here. So, I think communication is key.
Interviewer:
Are there moments where you felt, after coming to seek for health care services you get back home, and then maybe you wished you had somebody to discuss something you have discovered, or an emergency case issue, or something you wanted more information on?
Patient:
From the facility?
Interviewer:
From the facility, yes.
Patient:
Are you asking whether there have been instances I would wish to tell you? [inaudible]
Interviewer:
Yes, or you actually called in, and how was it if you did call in?
Patient:
Well, I think when they turned on, that's when I was applying for maternity leave. And then, throughout the process, I was asked, one doctor was like, no, I should just go on your last day, prepare everything for you. So, I was at home and then the doctor had to call me. And I think it was something I misexpected, because you should rather come running, but then they were like, no, the child is still little, and I should rather rest. They rather call me, and call me later, and I think it was something I really, really appreciated them for. That is the only instance I remember.
Interviewer:
We are looking at how we can improve the services of midwives and TBAs in the community, because we see that most women in the community also seek the services of this. It is key to see how they can partner with each other. What do you know about TBAs?
Patient:
I don't know anything.
Interviewer:
You don't know anything about TBAs so it means you've never, have you heard about them?
Patient:
Yes, I've been hearing about them in general, but not here.
Interviewer:
What did you maybe happen to hear about these TBAs?
Patient:
Actually, there is one woman I know, and what I heard about her was, she was actually, they saw how good she was, and then I think there was a system in the health section that wanted to help those people. And then she happened to be trained. She had the opportunity to be trained, but she's not using it. She's at home. And that she was lik, the woman who was telling me about her, she's too good to the extent that they wanted to assimilate her into the formal world. But then she wasn't willing, so then she was trained, and that is the little I know about.
Interviewer:
So that is a positive recommendation of what maybe she's doing at her level. So in your opinion, do you think their services are actually important for adult women, especially in rural areas where there are no clinics?
Patient:
Yes. Very, very important.
Interviewer:
Do you own a mobile phone?
Patient:
Yes.
Interviewer:
What type of phone?
Patient:
It is a smartphone.
Interviewer:
Do you have internet access?
Patient:
yes.
Interviewer:
Do you buy data?
Patient:
yes.
Interviewer:
So if there is something we can do to improve the communication between you and the clinic here, what do you think maybe would be of more benefit to you as a client in terms of accessing information and exchanging information?
Patient:
I think maybe there can be a common platform created for such purposes. And there is this, I don't know, but it has to do with more, should I say, like when there is this app which when you are pregnant, they update you on steps, like what you eat, how old your baby is, the size of your baby, and stuff. So I think if there is a common, maybe an app generated for such, specifically for this baby here, where their client can access them, not necessarily can be right here. I think that would help.
Interviewer:
So to give education on how to practice maybe a good, healthy lifestyle for both the child and the parent. That is a [inaudible] of an idea. and one other question. Do you think the distance between where you live and the facility is a challenge?
Patient:
No.
Interviewer:
The distance is okay?
Patient:
Yes. It's not a challenge.
Interviewer:
Mostly, what are the services you seek when you come to the clinic?
Patient:
Mostly, the services i seek is the A&C and SOAR
Interviewer:
So if you were to get a platform where you can have information or any education material that can compliment you as a nursing mother on how to navigate, that's a good idea for you?
Patient:
yes.
Interviewer:
... What other issues or concerns do you think maybe you have that would help the midwives here and yourself, if there;s any for now?
Patient:
For now, no. I don't know whether mostly new things, going to a new thing altogether, they introduce a new thing all along. I don't know whether it is because of myself, for me, it's okay. And so I pray they shouldn't change from their services and how they attend to us. We should not deviate from that. And most people don't know. When people get to, actually, one colleague of ours was in labor and we are trying to obtain it, I was then carrying him. So when I brought him in, I saw the facilities, I saw the ground floor, I knew how to reach here. I came to deliver. I was telling one lady, she laughed and said, I have one, I said you with them? She said, no, I don't. I also came to school and labor started. I had to rush here. So I was also recommending this place to some people because the place is just neat. And the service was just perfect. As compared to where I went, we had two. Yes, this one here.
Interviewer:
Thank you so much. I know your time is very costly and i really appreciate your time and your contribution to this
Patient:
Nice meeting you. You're welcome.

Patient 3:

Interviewer:
What is your name?
Patient:
[redacted]
Interviewer:
Where are you from?
Patient:
Nyema.
Interviewer:
Okay, you are a trader. How long have you been married?
Patient:
I don't know.
Interviewer:
How many children do you have?
Patient:
Four children and this is the fifth pregnancy I'm carrying. The first one is more than 10 years old and the last one is three years old.
Interviewer:
Okay, so she has three boys and then one girl. She has not been to school.
Patient:
[inaudible]
Interviewer:
So it's only the first born she delivered at home, but the remaining three were all delivered at the clinic. the first delivery was at home and it happened that it was in the night and she didn't have any choice than to deliver at home and it was the TBA that assisted her deliver at home and subsequently when she went to the clinic to seek further care, the nurses were not happy with her that she delivered at home and even as a result they decided to sell some medications to her because she delivered at home and they were not happy with her. She delivered at home because she was a stranger in the community by then and didn't have much information on the facility that was available.
Patient:
[inaudible]
Interviewer:
Why were the nurses not happy with her after she presented herself after delivering home with the TBA?
Patient:
It was midnight around 11 pm that the labor set in and my husband wasn't around so it was the husband's father that assisted me to the TBAs place to deliver and that was the only reason why the nurses were not happy that she didn't come to the hospital and then she delivered at home.
Interviewer:
Were there any complications in the delivery with the TBA?

Patient:
No.
Interviewer:
The baby was delivered successfully and then they came home but she went to the hospital because the child was getting temperature and then when they got to facility the nurses were not happy because of that the medication they were supposed to give the baby they decided to sell the medication to her as a form of punishment even though the health insurance had covered that particular medication. So, because of that she decided not to deliver at home from then. So, the remaining three kids were delivered at the hospital.
Interviewer:
I asked how she sees the clinic midwives services and the TBA and she said both are okay for her because she successfully delivered with the TBA and she's also at the clinic seeking for healthcare that is also good for her. When she presented herself at the TBA facility she was able to deliver successfully so both services are okay for her but there are others that goes to the TBAs and then they do not have successful delivery and for that reason they will be referred to the clinic but in her case she didn't have that kind of delivering at the TBA facility.
Interviewer:
I asked her what does she think the midwives can also educate the TBAs in order to improve their services and she thinks the midwives need to meet the TBAs for them to have an engagement or a conversation to understand what their issues are so that they can help them appropriately with what knowledge they can share with them and likewise.
Interviewer:
I asked in case she goes back and there is any issue. She wants information from the facility and what she does and she says unless she goes back here.
Interviewer:
I asked if she needs further information in terms of communication and updates on her health issues. How would she want to be contacted? Does she have the facilities and contacts that she can call? She said okay for this particular UDS clinic she doesn't have their contact but then the other community clinic within the Nyangpala they have a contact but she doesn't have their contacts.
Interviewer:
So, this is her first time coming to the UDS clinic for ANC service. So in that sense she has to present herself physically here in order for them to access what is wrong with her again.
Interviewer:
I asked if there's any platform for her to be able to call in and seek further information or education on her pregnancy if she would like to have something like that. She said yes. That would have been very helpful for her to be able to call in and seek further information or education on her pregnancy if she would like to have something like that, she said yes. And I further asked if maybe that would extend to further engagement with the midwives and if there's any complication they can advise her whether she should present herself physically here or there's no need coming. She said yes that would have been very helpful for her.
Interviewer:
I asked whether the medication that the TBA gives and the midwives also give at the clinic, what are the differences or what she thinks about medications. It is like for the TBAs, when you go to them and examine you, I think there's a need for you to have medication that they'll give you a medication but if there's no need. But at the clinic where you come, they also have medication that they give you. So, depending on your situation that's where you would know whether you should go home with the medication for your situation or not. 9
Interviewer:
She has a GSM phone and that is what she uses. Thank you very much.

Patient 4:

Interviewer:
What is your name?
Patient:
I'm [redacted]
Interviewer:
Where are you from?
Patient:
Basra
Interviewer:
What do you do?
Patient:
I'm a tailor
Interviewer:
Are you married?
Patient:
Yes.
Interviewer:
How long have you been married?
Patient:
About a year.
Interviewer:
How old are you?
Patient:
[inaudible]
Interviewer:
She doesn't have children. This is the first pregnancy she's having.
Patient:
[inaudible]
Interviewer:
Level of education is a first year.
Interviewer:
[inaudible]
Patient:
[inaudible]
Interviewer:
What do you present?
Patient:
[inaudible]
Interviewer:
How do you come here? They bring you on motorbike?
Patient:
Yes.
Interviewer:

Have you heard about TBAs?
Patient:
Yes.
Interviewer:
She has not been to the TBA before, but she has heard about them and what they do. According to her, some of them have safe delivery or good delivery, but others, too do not have a good encounter or delivery with the TBAs from what she has heard.
Interviewer:
I asked what are some of the things that do not go well with the TBAs and delivery of care. And, according to her, sometimes they give some of the women medication and the time for the delivery usually elapses and they are not able to deliver the women. And when the time elapses, then they now refer them to the clinic or the hospital and by the time they get to the hospital, it can happen that the child or the unborn baby would pass away or they end up having a stillbirth, which she thinks is not a good thing.
Interviewer:
But some of the women that deliver are attended by a TBA, they do not encounter any problems.
Interviewer:
I asked if the services of the TBAs are important. And she said, well, she would not be able to determine, but she knows that it can be good for other women and also bad for some other women. And I asked why she doesn't patronize the services of the TBAs. It's really not any.. She doesn't really have any reason, but she attends the clinic.
Interviewer:
I asked if the services in the clinic are okay for her. She said yes. And if the communication is also going very well between her and the midwives. And she said yes.
Interviewer:
I asked if after coming to seek services here and she has to get further information when she's at home, what does she do? And she says unless she comes back here physically, because she doesn't have the contact or any other means to reach out to the facility.
Interviewer:
She uses a smartphone, but she doesn't actually use internet services.
Interviewer:
So, the hospital doesn't have that resource to call her when there's any information they want to pass to her. So, I asked if maybe she would like to have any form of ICT platform where she can call in to seek or get education on her pregnancy, on what to eat, what not to eat, and what to do and what not to do. Whether she would like that kind of intervention. And she said yes, she would like that kind of intervention.

Interviewer:
So, in addition, she says when they come for medication and go to start taking the medication, sometimes the medication can trigger certain other things that they might need to seek information or more clarification on. That's issues out of the medication. So, if there is a way they could reach out to the community to educate them when they take these medications and then they get these reactions, that would have been a very good thing for them.
Interviewer:
According to some of the women, the local medicines that they take from the TBAs, they got home to use those medications, which sometimes doesn't really help. So, if the midwives could educate these TBAs concerning those local medications that they receive and then it doesn't help them at long last, would have been a very good intervention to help them deliver quality service to these women.
Interviewer:
So, I asked whether there are other issues or concerns that she has if the midwives have to educate this woman, the TBA side of the community, apart from the medication, if there are other concerns. And she says there are no other concerns she has. So thank you very much for your time.

Patient 5:

Interviewer:
[introduction]
What is your name?
Patient:
[redacted]
Interviewer:
What do you do?
Patient:
I sell food.
Interviewer:
How many years have you been married?
Patient:
Fifteen years.
Interviewer:
The first child was nine years old and the second child was six years old. One is on the way.
Interviewer:
She attends for health care services at the hospital or the clinic. She only attends the clinic when she is sick. Or for A&C when she is pregnant, but not to present any sicknesses or diseases.
Interviewer:
What do you know about the TBAs in the community?
Interviewer:
She always delivered at the hospital, so she has never been delivered with the TBA. Have you heard about them? They also deliver?
Patient:
Yes.
Interviewer:
She knows a particular TBA that is really helping the women to deliver in the community. And if there are complications, she doesn't attend to them, she refers them to the clinic.
Interviewer:
So, the services of these TBAs are very important because they are really helping some of the women in the community to deliver. And sometimes some of their husbands don't support their hospital delivery, so they prefer their wives to go to the TBAs to deliver. And these women have really been of help in the community to help them deliver.
Interviewer:
Whenever she is in labor, she prefers to rush to the hospital, whether the husband is around or not. And sometimes she'll even be at the hospital before they call their husband. Sometimes she doesn't wait. So, she doesn't want them to call a TBA for her at home, but she rather goes to the clinic.
Interviewer:
I asked what her perceptions are about the midwives at the clinic, and she said their services are very good for her. Personally, she thinks their services are good.
Interviewer:
She thinks the communication is very good between them and the midwives at the clinic. So, I asked if she's at home and she needs the services of these midwives, how does she get in touch? And she says unless she comes back physically.
Interviewer:
Usually she presents herself physically when she has any emergency case. She didn't ask for their contacts to call in terms of emergencies. So, she always has to be there. And the last time she was here, she had some complications and she had to come personally. And when they attended to her, she never encountered that issue again.
Interviewer:
I asked if it is okay for them to have any ICT platform here or a communication channel that she could call in for information or any other information she needs at home without necessarily coming physically. And she said, yes, that would have been very helpful because as a business woman or someone resourceful, she's always very busy and that would have really saved time for her and then get her the information that she needs without coming here physically.
Interviewer:
So, I asked what information that is necessary in her opinion that the midwives here should educate the TBAs on. And she said she has a mother that delivered with the TBAs and the uterus didn't come out after the delivery and they were putting some form of a wooden, a wood that they use to stir food at home through the throat of the mother so that she could try to in a form of vomiting or pushing so that the uterus could come out of the womb. And it was a very nasty way of trying to get the uterus out after the delivery.
Or in some cases she said they keep a hot chili or pepper, dried pepper on fire, on charcoal within the room so that the smoke will become very hot. And if the woman inhales the smoke it makes her cough and through the cough they expect the coughing to push the uterus out of the uterus of the womb. So in her opinion she thinks the midwife should be able to educate the TBAs with the right procedure to go through this kind of issues or complications resolved.
Because if the mother had gone to the hospital to deliver she wouldn't have gone through this kind of procedure to get her resolve that kind of complication she encountered. So, because of that experience or that encounter she saw that the mother went through it, it scared her or it kept this fear in her and that's why she doesn't patronize the services of this TBA.
Interviewer:
I asked if she has a mobile phone and she said yes. She has a GSM phone, it's not a smartphone.
Interviewer:
She should be very happy if from time to time if the hospital has any information they could reach out on her GSM phone to deliver the messages.
Interviewer:
Thank you so much for the information and then participating in the questionnaire. So thank you very much.

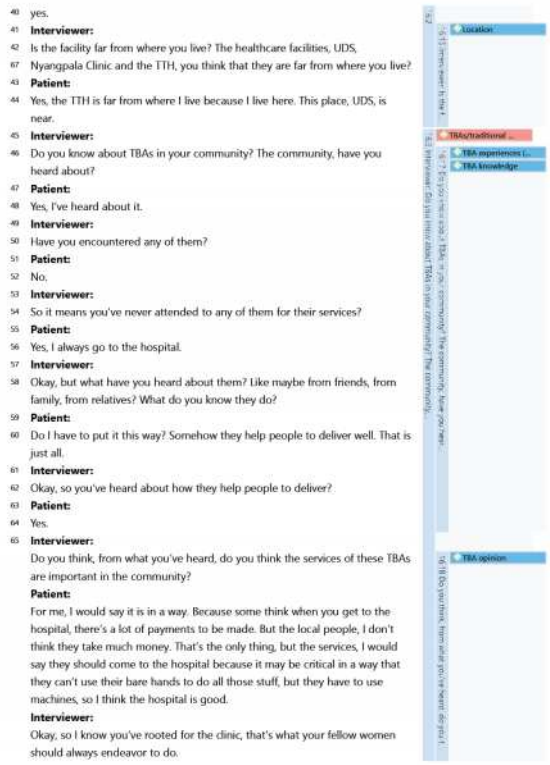
Patient 6:

Interviewer:
Briefly tell me about yourself.
Patient:
I am [redacted]
Interviewer:
You are a trader. Are you married?
Interviewer:
Ten years in marriage. You have children? Two boys.
Interviewer:
The first one is nine years old and the second one is five years old.
Interviewer:
What is your level of education?
Okay, you haven't been to school?
Patient:
No.
Interviewer:
Why do you seek healthcare?
Interviewer:
So, she comes to the Yampala Clinic more often for healthcare and also at the community clinic level. Yampala community clinic level. But it is the UDS Clinic that she attends and healthcare services. So, she usually presents with malaria and chest pains at the clinic.
Interviewer:
What do you know about the TBAs?
Interviewer:
All the two children, she delivers at the clinic or the hospital. She usually walks all the way to the clinic. She hasn't delivered at home yet or a TBA delivering a baby for her.
Interviewer:
She comes home to her family when she's pregnant. So, she delivers and then she goes back to the husband's place who lives outside the community. So, she doesn't have much information or know much about the TBAs within the community. Because she always delivers at the clinic.
Interviewer:
She is saying that services of these TBAs are in a way important. She says so because she happens to encounter the TBAs with her uncle or her younger sisters and she has never been to the services of the TBAs. She was in labor for the whole night and she couldn't deliver at the TBAs care. And she was being referred at the end of the day back to the clinic for her to deliver. And when she got to the clinic within no time she was able to actually deliver. So, for her she thinks that is where the challenges are. In that sense she would rather prefer to go to the clinic.
Interviewer:

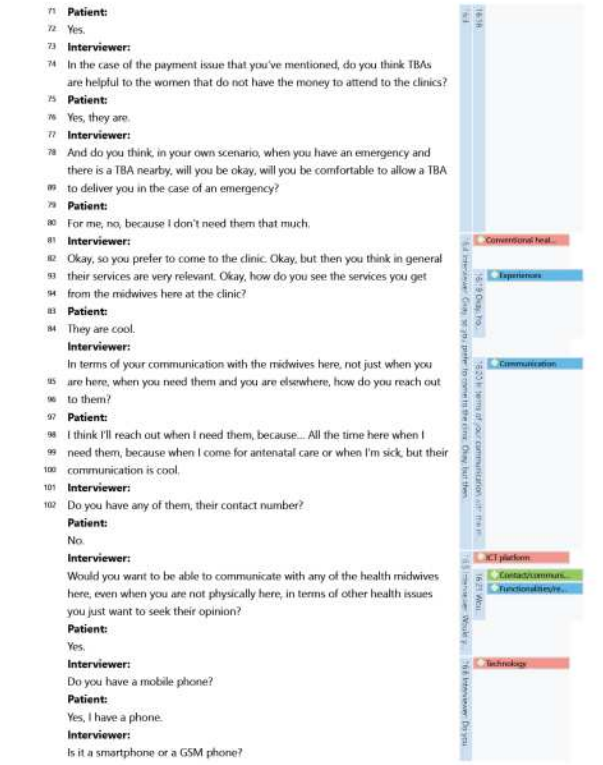
Her opinion is that the services of these TBAs are very important. Working with the midwives in the sense that the TBAs turns out to be old women in the communities. And in her opinion if the younger ones at the clinic who are much energetic and youthful could exchange information with the older women because these older women also do have experience in terms of delivery. And in that sense if they are able to exchange the experience that they have as older women in the communities with the younger ones they can also benefit from them. And likewise the midwives at the clinic can also empower the TBAs at the community level with the knowledge they have also acquired conventionally to help them improve the services the TBAs give in terms of delivery. Or giving them the medications that they help the women at the clinic with that helps them to deliver safely.
If the TBAs are empowered in that sense it can also help them help the women that are in the community that seeks the services of these TBAs.
Interviewer:
Do you have a mobile phone?
She has a smartphone.
Interviewer:
I was asking if she needs information from the midwives at the clinic if she comes to seek their services and go back home and it's not necessary for her to come back, she needs some form of information from the clinic how does she get this information and she says she doesn't actually have their contacts personally but the clinic is having her contacts so she has a book that records her information inside but she doesn't have any contacts that she can call in so she always has to come back on a review date for any other health care services that she needs.
Interviewer:
So she's okay exchanging contacts and then being able to call in when there is a need for her to get information from the facility and likewise the midwife is also reaching her out to update her on any other information she might need on her review dates and any other information.
Interviewer:
Okay so she's okay if the midwives here would exchange information with the TBAs, she doesn't have any problem with the information exchange on her health issues.
Interviewer:
Thank you very much.

Patient 7:

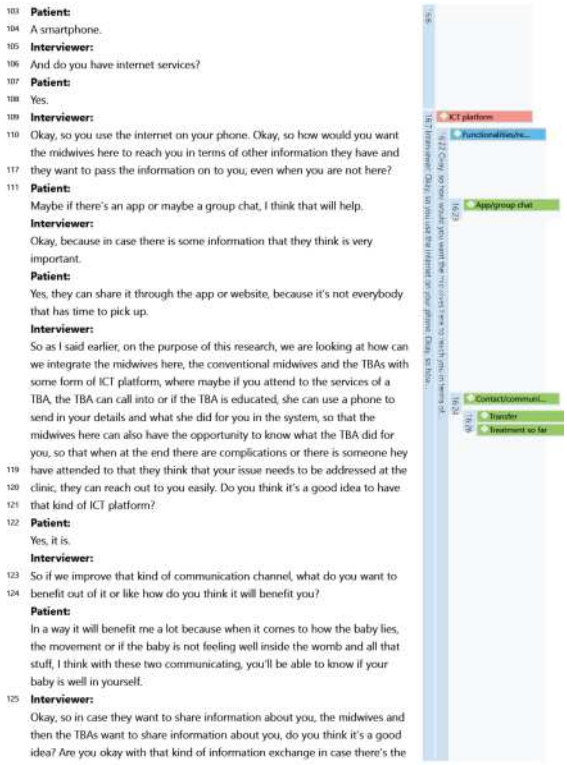
Interviewer:
So thank you very much madam for agreeing for me to interview you. Can you briefly tell me about yourself?
Patient:
My name is [redacted]. I'm 23 years old, lady or a girl. I'm just a student, I do some small business.
Interviewer:
Where do you live?
Patient:
Nyangpala here.
Interviewer:
Are you married?
Patient:
Yes
Interviewer:
How long?
Patient:
A year now.
Interviewer:
Any children?
Patient:
Yes, one.
Interviewer:
What is your level of education?
Patient:
SHF
Interviewer:
How do you seek healthcare when you're not feeling well or you need some health services? Where do you go?
Patient:
I come to this hospital and mostly TTH
Interviewer:
Okay, the UDSM clinic or the Tamil Teaching Hospital?
Patient:
The two.
Interviewer:
Usually, what conditions do you present at the hospital or what did they diagnose you?
Patient:
Sometimes malaria and I'm an asthmatic patient.
Interviewer:
Okay, so you get crisis?
Patient:



yes.
Interviewer:
Is the facility far from where you live? The healthcare facilities, UDS, Nyangpala Clinic and the TTH, you think that they are far from where you live?
Patient:
Yes, the TTH is far from where I live because I live here. This place, UDS, is near.
Interviewer:
Do you know about TBAs in your community? The community, have you heard about?
Patient:
Yes, I've heard about it.
Interviewer:
Have you encountered any of them?
Patient:
No.
Interviewer:
So it means you've never attended to any of them for their services?
Patient:
Yes, I always go to the hospital.
Interviewer:
Okay, but what have you heard about them? Like maybe from friends, from family, from relatives? What do you know they do?
Patient:
Do I have to put it this way? Somehow they help people to deliver well. That is just all.
Interviewer:
Okay, so you've heard about how they help people to deliver?
Patient:
Yes.
Interviewer:
Do you think, from what you've heard, do you think the services of these TBAs are important in the community?
Patient:
For me, I would say it is in a way. Because some think when you get to the hospital, there's a lot of payments to be made. But the local people, I don't think they take much money. That's the only thing, but the services, I would say they should come to the hospital because it may be critical in a way that they can't use their bare hands to do all those stuff, but they have to use machines, so I think the hospital is good.
Interviewer:
Okay, so I know you've rooted for the clinic, that's what your fellow women should always endeavor to do.



Patient:
Yes.
Interviewer:
In the case of the payment issue that you've mentioned, do you think TBAs are helpful to the women that do not have the money to attend to the clinics?
Patient:
Yes, they are.
Interviewer:
And do you think, in your own scenario, when you have an emergency and there is a TBA nearby, will you be okay, will you be comfortable to allow a TBA to deliver you in the case of an emergency?
Patient:
For me, no, because I don't need them that much.
Interviewer:
Okay, so you prefer to come to the clinic. Okay, but then you think in general their services are very relevant. Okay, how do you see the services you get from the midwives here at the clinic?
Patient:
They are cool.
Interviewer:
In terms of your communication with the midwives here, not just when you are here, when you need them and you are elsewhere, how do you reach out to them?
Patient:
I think I'll reach out when I need them, because... All the time here when I need them, because when I come for antenatal care or when I'm sick, but their communication is cool.
Interviewer:
Do you have any of them, their contact number?
Patient:
No.
Interviewer:
Would you want to be able to communicate with any of the health midwives here, even when you are not physically here, in terms of other health issues you just want to seek their opinion?
Patient:
Yes.
Interviewer:
Do you have a mobile phone?
Patient:
Yes, I have a phone.
Interviewer:
Is it a smartphone or a GSM phone?



Patient:
A smartphone.
Interviewer:
And do you have internet services?
Patient:
Yes.
Interviewer:
Okay, so you use the internet on your phone. Okay, so how would you want the midwives here to reach you in terms of other information they have and they want to pass the information on to you, even when you are not here?
Patient:
Maybe if there's an app or maybe a group chat, I think that will help.
Interviewer:
Okay, because in case there is some information that they think is very important.
Patient:
Yes, they can share it through the app or website, because it's not everybody that has time to pick up.
Interviewer:
So as I said earlier, on the purpose of this research, we are looking at how can we integrate the midwives here, the conventional midwives and the TBAs with some form of ICT platform, where maybe if you attend to the services of a TBA, the TBA can call into or if the TBA is educated, she can use a phone to send in your details and what she did for you in the system, so that the midwives here can also have the opportunity to know what the TBA did for you, so that when at the end there are complications or there is someone hey have attended to that they think that your issue needs to be addressed at the clinic, they can reach out to you easily. Do you think it's a good idea to have that kind of ICT platform?
Patient:
Yes, it is.
Interviewer:
So if we improve that kind of communication channel, what do you want to benefit out of it or like how do you think it will benefit you?
Patient:
In a way it will benefit me a lot because when it comes to how the baby lies, the movement or if the baby is not feeling well inside the womb and all that stuff, I think with these two communicating, you'll be able to know if your baby is well in yourself.
Interviewer:
Okay, so in case they want to share information about you, the midwives and then the TBAs want to share information about you, do you think it's a good idea? Are you okay with that kind of information exchange in case there's the

Patient 7:

need for them to send you information for the midwives here to also know about? Do you have any problems with that?

Patient:

No, I don't have any problem because it's for our own good that you do that.

Interviewer:

And if that system is able to send you educational messages on your pregnancy, what you should eat, what time you should eat, what you should avoid, do you think it's a good idea? Would you like something like that?

Patient:

Yes, because as a first-time mom, we wouldn't know what to do, but if those things are in, then you'll be able to know how to handle your pregnancy.

Interviewer:

So you think it's a good idea to have something like that?

Patient:

Yes.

Interviewer:

I know I haven't been to the TBAs services before, but what do you think they do wrong that makes you not like the services of these TBAs? What do you think is the perception that people have that they don't do right?

Patient:

I don't have any friends that go there.

Interviewer:

Okay, all right. So for now, I think that's all the questions I have for you, but maybe later, if there's something else I need, I think I'll come back again. And I hope I'll be welcome.

Patient:

Yes, of course.

Interviewer:

Thank you very much for your time.

Patient 8:

Interviewer:
What is your name?
Patient:
I'm [redacted]
Interviewer:
What do you do?
Interviewer:
She is not working at the moment.
Interviewer:
Are you married?
Patient:
Yes.
Interviewer:
How long have you been married?
Patient:
Two years.
Interviewer:
Do you have children?
Interviewer:
She is eight months pregnant. She doesn't have a child yet. Her level of education is senior high level.
Interviewer:
Where do you access healthcare?
Patient:
Drugstore.
Interviewer:
Sometimes she goes to the drugstore or the pharmacy in the community or she comes to the clinic to seek for healthcare.
Interviewer:
She takes medication to boost her immunity so that the child can be very healthy but not presenting any diseases or sicknesses.
Interviewer:
I'm asking if she knows about the TBA
Interviewer:
She said she has not been to a TBA before but what she knows is that they also help in delivering babies.
How important is the services of this?
Interviewer:
The services are very important. The services are very important for the child to have good health.
Interviewer:

She knows most of the time to give her baby successfully without any issues. That's what she knows from what she has heard from other people within the community, other colleague women in the community.
Interviewer:
I'm asking what the services that she comes here to give the services okay for her?? in terms of communication and she said that the services are okay.
Interviewer:
So, I asked if after visiting the clinic and it turns out she has emergency issues, how does she call in? And she said she has one of the nurses or the midwife's phone number in her waiting book. The Maternal and Child Health Reports book.
Interviewer:
She has a smartphone and she has internet but she doesn't make good use of it.
Interviewer:
Why is it that she doesn't seek the services of the TBAs?
Interviewer:
Because she comes to the clinic, that's why she don't go to them.
Interviewer:
So, I asked in case she's in labor and there happens to be a TBA around, would she allow the TBA to deliver her or she would just want to get to the clinic for delivery. She said she wants to get to the clinic for delivery. I asked why she wouldn't allow the TBA to deliver her and her response is that she doesn't really like to be delivered with a TBA. And the reason is that she attends the antenatal services at the clinic so she wants to get to the clinic.
Interviewer:
So, the services of the TBAs are actually helpful at the community level. She has the support of the TBAs in case they attend to her and they can exchange information with the clinic. she doesn't have any resistance to the information exchange.
Interviewer:
I asked how can we improve the information and communication between the TBAs and their midwives and she said that they should have phone numbers exchanged so that they can always be able to reach each other to exchange communication.
Interviewer:
Thank you very much for your support.
Patient:
You're welcome.

Patient 9:

Interviewer:
What is your name?
Patient:
[redacted]
Interviewer:
Where are you from?
Patient:
Nyangbala
Interviewer:
You are a seamstress?
Patient:
yes.
Interviewer:
You are married?
Patient:
yes.
Interviewer:
How long have you been married?
Patient:
2 years.
Interviewer:
She is pregnant for like 8 months now.
Interviewer:
Level of education is [inaudbile]
Where do you seek for healthcare?
Patient:
Titans Medical clinic here.
Interviewer:
So she normally comes here or there's one community hospital at Kasargu. These are the two places she usually accesses healthcare. So, what conditions do you normally present?
Interviewer:
Usually headache, or stomach pain, or high temperature, fever.
Is the health facility far from your place?
Interviewer:
Her house is very far from the clinic, and for that matter she uses transportation. So, the [inaudible] needs to get her to the clinic.
Interviewer:
What do you know about the TBA?
Interviewer:
According to her, what she knows about the TBAs is that they deliver babies, or they help in positioning the fetus or the baby if they are not properly in position, and they also assist the women when they are not feeling well, and they need their services. So, she has been to the TBA before.
Interviewer:
So, her abdomen was paining her, and she decided to go to the TBA, and she discovered that the baby was not properly in a good position, so she repositioned the baby well for her, and also gave her a medication. So, she gave her a local medication, and she took the medication and it helped her. Then the pain subsided after she took the medication.
Interviewer:
So have you been there again?
You've not been there again?
The woman didn't ask her to come back again, so that's why she didn't go back to the TBA again, and she wasn't feeling any pain again, and that's why she decided not to go back.
Interviewer:
I asked if the services of the TBAs are very important. She said yes it is very important for her.
Interviewer:
She thinks the services are very important for her because she has ever been there and the women was able to heal her, condition that she took, she trust their services, and moreover she was been referred by a friend to also see her and that means that they are good testimonies for [inaudible]. So it is very important for her and her baby.
Interviewer:
I was asking if she want to deliver with the TBA and her response is that she doesn't have a problem but the proximity the UDS clinic is closer to her house than the TBA so in that sense she will look at the facility.
Interviewer:
Are the services of the midwives here good for you?
Interviewer:
How do you exchange information?
Interviewer:
Not unless she got back here.
Interviewer:
According to her, she doesn't have any of their contact numbers. So, if she is in an emergency she has to physically come back to the clinic.
Interviewer:
She wishes she could have the contact numbers but she doesn't have a SIM card right now that she can use for contacts.
Interviewer:
Do you have a mobile phone?
Interviewer:
She has a mobile phone but she doesn't have a SIM that she can use to the communication now because of the ongoing registration restrictions. Because of that she is not been able to register her SIM and for that reason she doesn't have a SIM to use.
Interviewer:
She is working on it and she can get a SIM.
Interviewer:
I asked if her husband has a mobile phone that is functioning and she said yes. It is possible for her husband to call when there is an emergency.
Interviewer:
What do you think the two healthcare systems midwives and TBAs can do to improve the connection in the service?
Interviewer:
She really doesn't know what exactly can be an intervention for the midwives and the TBAs to improve the quality.
Interviewer:
The last question was is there a partnership between the midwives and the TBAs important to improve the health quality. She said it is important and it will improve the services for the patients.
Interviewer:
Thank you very much

Patient 10:

Interviewer:
Can you briefly tell me about yourself?
Patient:
[redacted]
Interviewer:
You are married.
How long have you been married?
Patient:
7 years.
Interviewer:
How many children do you have?
Patient:
3 children
Interviewer:
How old is your first born?
Interviewer:
Ok, your first born is 7 years old. The last born is 5 years old.
Interviewer:
What is your level of education?
She has no educational background
Interviewer:
How do you access healthcare?
She either come to the UDS clinic or Nyangpala community clinic.
Interviewer:
What conditions do you usually present?
Patient:
Malaria
Interviewer:
How far is the health care facility from your home?
Interviewer:
Ok, so it is very far from you.
Interviewer:
Do you know about TBAs?
Interviewer:
She knows about them, but she has never delivered at the TBA's place.
Interviewer:
According to her, any times she has any issues about her health, she comes either to the clinic at the UDS campus or the community clinic at the Nyangpala community. So she has never been to the TBA when she needs health care.
Interviewer:
So even though she has never been to the TBA to give birth but she's aware of a TBA in the community who sometimes attend to the needs of women in terms of delivery and according to her she is TBA works with some of the nurses or the clinic at the Nyangpala community here and whenever there are complications that she cannot handle she does refers to the community clinic so that is what she knows about the TBAs in her community who is not far from their house.
Interviewer:
What do you think of the services of these TBAs are important?
Interviewer:
According to her, the services of these TBAs are very important because there are some of the women that she know in her locality that only give birth at home and she refers to a particular lady that has delivered about that has about five children that she delivered all these five children at home with the aid of the TBA so the services of these TBAs are very important at home in the community.
Interviewer:
I asked her why she herself doesn't see the services of these TBAs but she can testify to the fact that some of her other colleagues in the community do go to the TBAs and her response is that she's always afraid of services.
Interviewer:
Her fear always sets in and she's always reluctant because whenever she is in labor sometimes it starts either three days or four days prior to her delivery so whenever she gets the symptoms that the labor is setting in she always insists that they send her to the clinic or the hospital for her to deliver even though sometimes the family would want to stick her to the TBAs but she always prefers the hospital services because she believes they also have their knowledge that can help her deliver safely.
Interviewer:
I asked here what we can do to improve the services of these TBAs in the community for them to have more confidence in what they do. Her opinion is that we should engage or we should speak to the TBAs to collaborate with them. Collaborate with the midwives at the clinic so that there can be information exchange and knowledge sharing so that they can work as partners.
Interviewer:
So she would suggest we speak to them to collaborate with the midwives.
Interviewer:
I'm asking whether the services or the platform we want to develop will be something that will be of good measure or a solution to this problem we are trying to solve.
Interviewer:
I'm asking what is the level of service or communication between her and the midwives at the clinic here.
Interviewer:
I'm asking if she gets home and there's an emergency, how does she reach the midwives at the clinic here.
She's saying that if it is an emergency, she might let somebody take her on a motorbike to the facility or she has the contacts of these midwives in the maternity book which she can call to reach out to the nurses.
Interviewer:
I asked whether the contact numbers she has in her maternity book how the contacts are able to help her and she said yes. She has ever called in because she was bleeding and she thought it wasn't something that was significant but it appeared later that it was becoming excessive bleeding so she called in and the midwife responded and asked that they rush her to the clinic and they brought her to the clinic and this incident actually led to her delivering. She delivered in the process.
Interviewer:
So, i'm asking whether she is okay if the TBAs in emergency cases wants to share her information with the clinic and she agrees. She would give the permission to exchange and share this information about her.
Interviewer:
She has a mobile phone. It is a GSM phone that she uses.
Interviewer:
I'm asking what is her opinion on whatever she thinks the services here are that they can improve in terms of communication with her and the services that they render to her.
Interviewer:
She doesn't have much. I asked if the [inaudible] and she said yes the review dates are okay and it is fine for her.
Interviewer:
Thank you very much.

TBA 1:

A. Semi-Structured interview for Traditional Birth Attendants

1. **Question:** Please can you briefly tell me about yourself?

   TBA Answer: *My name is [redacted], I live in Nyankpala and I am a traditional Birth attendant. I don't know my age but my some of my children are more than 40 years.*

2. **Question:** How long have you been practicing as a TBA?

   TBA Answer: *I cannot give a specific number of years I have been working as a traditional birth attendant but I was still a young girl in my puberty when I started assisting women in labor to deliver. So, it is a something I have done for my entire life even till I gave birth to 13 children.*

3. **Question:** Do you have any form of formal education?

   TBA Answer: *No, I haven't been to school. So, I do not read nor write. Education was not a priority I our time and our parents didn't also have any form of western education so they didn't see the need.*

4. **Question:** How did you learn to practice as a TBA?

   TBA Answer: *I was brought up by my grand mother who was a traditional birth attendant, anytime she was delivering a woman I would be there with her, even when the expectant mother doesn't want me around my grand mother would tell her to allow me stay because one day, I would step into her shoes to assist women. Till my grandmother died and I was sent to mother side parents and there also my grandmother was also was a TBA, so I learnt it from my childhood in the family line. There were times I would come to call my grandmother to attend to an expectant mother and she wouldn't be feeling too well and I would ask her to allow to go and assist the woman deliver and she agrees. My father gave me a lot of beaten at the initial stage to stop but I never stopped learning it.*

5. **Question:** What services do you render as a TBA?

6. **TBA Answer:** *I examines pregnant women that comes to me, I am able to tell if an expectant mother is anemic or not, I could assist expectant mothers to deliver safely with any issues or when after delivery I realize she has last a lot of blood or she is not in a good condition I would refer her to the hospital, I wasn't offering any medications to them.*

7. **Question:** What issues do pregnant women usually bring to you?
   TBA Answer: *Pregnant women would come with all forms of complaints, every day this house was full of pregnant women with all kinds of issues and mostly those that were in their due dates to deliver, some of the women would come with complications such as bridged presentations and when I notice that I would refer the woman to the hospital.*

8. **Question:** What challenges do you have a TBA?

   TBA Answer: *I was over burdened with the number of women I attend to on daily basis and this didn't allow me to always get enough rest and as a result I developed a high blood pressure. I have been practicing is TBA profession for free and not for monetary gains. Now I am old and do not have much strength like I use to do. I also use to have a separate room where the pregnant women would be kept until they deliver but the room has collapsed so I do not have any space for them now.*

9. **Question:** Do you sometimes offer your patients any medication?

   TBA Answer: *No, I don't offer medications to women that come to me for examination or for delivery, even when I assist you to deliver and there are complications, I refer her to the hospital. There were times I would call a hospital midwife to come and assist the mother some infusions if the woman was not well after delivery. Once I diagnose the women and she needed some form of medication I would ask her to go to the hospital.*

10. **Question:** Do you work with conventional midwives?

    TBA Answer: *Yes, after I started practicing as TBA, they posted one conventional midwife to our Nyankpala community called Madam Vero. When she came to the community, she looked for me because she heard I was a TBA. We had a very good working relationship and she gave me a book to be writing the names of the women I assisted to deliver. Any time I assisted a woman to deliver I will make one of my children to write or I will take the book to Madam to record the delivery. But she is now on retirement and lives in Tolon.*

11. **Question:** How do you work with conventional midwives?

    TBA Answer: *When I started as a TBA there was no conventional midwife in the community yet so I worked alone until Madam Vero, a conventional midwife was posted to the community. She met with all the TBAs in the community and had meetings from time to time to discuss matters what we could do as TBAs and what we had to refer to the hospital. That initiated the records we started keeping for the women we had assisted to deliver. There were days madam Vero will call me to come to the clinic to assist her during deliveries.*

12. **Question:** Do you sometimes refer your patients to conventional midwives for further treatment?
    TBA Answer: *I do referrals all the time to the clinic. When I do an examination of a pregnant woman and recommend them to the clinic for further examinations because I do not have certain equipment's. Sometimes when a situation is beyond my expertise, I don't hesitate to refer the patient to the clinic.*

13. **Question:** Have you ever received any training from conventional midwives?

    TBA Answer: *I did receive some training from Madam Vero on a number of occasions. She always tried to advise us on any delivery we do that would have some complications so that we can do better the next time we encounter such difficulties.*

14. **Question:** If no, would you like to receive some training the conventional midwives?
    TBA Answer: *Knowledge is a good thing; one can't have it all so if there is an opportunity to learn why not? My doors are always open to improve on the practices that I have. Because of the good relationship we had with Madam Vero we learnt a lot from her and she also took some of the knowledge we had.*

15. **Question:** If yes, what is your working relationship with midwives?
    TBA Answer: *it's been a very long time I have worked with any conventional midwife. After Madam Vero left the clinic in the community I haven't worked with any midwife. The midwives that came after Madam Vero told any woman that delivered at home that they wouldn't attend to them at the clinic if they deliver at home and come to the clinic for postnatal care. So, I decided not to assist women at a point but refer them to go to the clinic.*

16. **Question:** How do you communicate with your clients and the midwives you work with?
17. **TBA Answer:** *I use to walk to their homes if they send for me that the woman is in labor or most cases, they bring the woman to my house. Now I have a mobile phone that they call me through if the woman is far from me to know if I am available. If they come for examination, I tell them when next to come and they will come.*

18. **Question:** Would you like to share information about the clients you attend to with midwives?

    TBA Answer: *We have always been sharing information with them, when I examine a patient, I tell her what my findings are and ask her to go to the clinic and tell them. if the clinic also examines her and she comes to me the next time she confirms what the clinic findings are. So, in that sense we exchange information on the client.*

19. **Question:** Do you own a mobile phone?
    TBA Answer: *Yes, I do,*

20. **Question:** What type of mobile phone do you own?
    TBA Answer: *it's a small phone, not a smart phone.*

21. **Question:** Do you have internet access?
    TBA Answer: *No, I don't use it. I don't know how they operate it.*

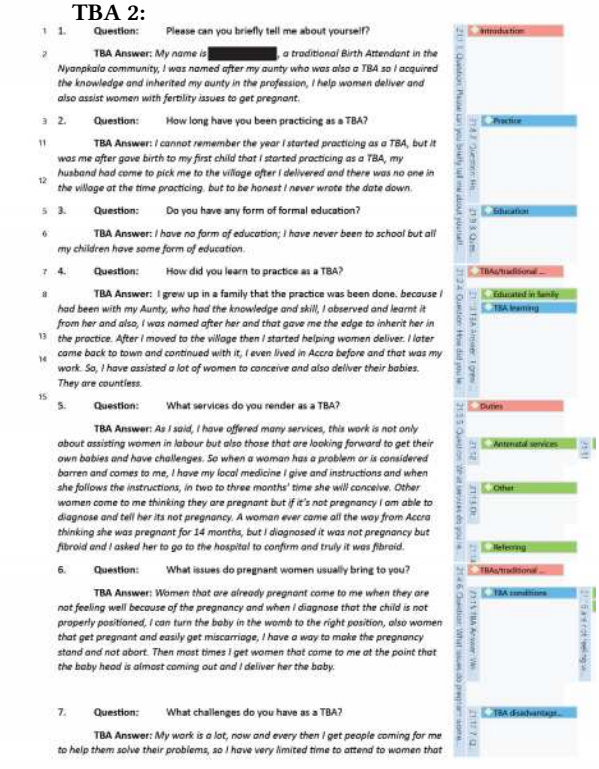
22. **Question:** Would you like to have an ICT platform where you can share information with midwives?
    TBA Answer: *Yes, that's a very nice thing, even tho I don't do deliveries at home again but the women still come for me to examine them.*

23. **Question:** If yes, how would you like to send information through the system?
    TBA Answer: *Yes, if only I can use it why not. We all want the best for the women that in the community for safe deliveries.*

24. **Question:** What features would you like to see or have on the system?
    TBA Answer: *I don't know, but just the way you explained I can call and report to the clinic, that will be good.*

25. **Question:** Any other thing you want to say towards the purpose of this interview?
    TBA Answer: *we are always here to support, so anything you people think is good and you bring we will work with you.*

TBA 2:



1. **Question:** Please can you briefly tell me about yourself?

TBA Answer: *My name is [redacted], a traditional Birth Attendant in the Nyanpkala community, I was named after my aunty who was also a TBA so I acquired the knowledge and inherited my aunty in the profession, I help women deliver and also assist women with fertility issues to get pregnant.*

2. **Question:** How long have you been practicing as a TBA?

TBA Answer: *I cannot remember the year I started practicing as a TBA, but it was me after gave birth to my first child that I started practicing as a TBA, my husband had come to pick me to the village after I delivered and there was no one in the village at the time practicing. but to be honest I never wrote the date down.*

3. **Question:** Do you have any form of formal education?

TBA Answer: *I have no form of education; I have never been to school but all my children have some form of education.*

4. **Question:** How did you learn to practice as a TBA?

TBA Answer: *I grew up in a family that the practice was been done. because I had been with my Aunty, who had the knowledge and skill, I observed and learnt it from her and also, I was named after her and that gave me the edge to inherit her in the practice. After I moved to the village then I started helping women deliver. I later came back to town and continued with it, I even lived in Accra before and that was my work. So, I have assisted a lot of women to conceive and also deliver their babies. They are countless.*

5. **Question:** What services do you render as a TBA?

TBA Answer: *As I said, I have offered many services, this work is not only about assisting women in labour but also those that are looking forward to get their own babies and have challenges. So when a woman has a problem or is considered barren and comes to me, I have my local medicine I give and instructions and when she follows the instructions, in two to three months' time she will conceive. Other women come to me thinking they are pregnant but if it's not pregnancy I am able to diagnose and tell her its not pregnancy. A woman ever came all the way from Accra thinking she was pregnant for 14 months, but I diagnosed it was not pregnancy but fibroid and I asked her to go to the hospital to confirm and truly it was fibroid.*

6. **Question:** What issues do pregnant women usually bring to you?

TBA Answer: *Women that are already pregnant come to me when they are not feeling well because of the pregnancy and when I diagnose that the child is not properly positioned, I can turn the baby in the womb to the right position, also women that get pregnant and easily get miscarriage, I have a way to make the pregnancy stand and not abort. Then most times I get women that come to me at the point that the baby head is almost coming out and I deliver her the baby.*

7. **Question:** What challenges do you have as a TBA?

TBA Answer: *My work is a lot, now and every then I get people coming for me to help them solve their problems, so I have very limited time to attend to women that need me. That makes me very tire often. I don't do this work and charge the women a fee, if they have anything to offer me that's ok.*

8. **Question:** Do you sometimes offer your patients any medication?

TBA Answer: *Yes, I have our local medicine that I offer depending on the situation the pregnant has. My medicine is very effective and it does not fail. Whether the woman is now seeking to get pregnant or she is to deliver and there are complications or prolonged labor I have all the medications.*

9. **Question:** Do you work with conventional midwives?

TBA Answer: *I used to work with the old hospital midwives, madam Vero. There were times she would send for me to come to clinic to assist in deliveries and I would go. Madam Vero used to call most of that were TBAs in the community and we hold meetings but she is on retirement and ever since I have not worked with any conventional midwife again. The young ones that are there don't even know us.*

10. **Question:** How do you work with conventional midwives?

TBA Answer: *There were times when Madam Vero would involve we the TBAs to also bring our expertise to the assist in complications at the clinic. She was teaching us also to keep records of the deliveries we conduct at home in a book. We were working together until she went on retirement.*

11. **Question:** Do you sometimes refer your patients to conventional midwives for further treatment?

TBA Answer: *Yes, now refer all the women that comes to me to go to the hospital for examination, unless the it is a critical emergency that I can intervene and even after that I would refer to go to the clinic for continuous care. I do not agree for them to only stay at home. So, I refer most of them to the clinic. Even when the woman is resisting, I make sure goes there for examination.*

12. **Question:** Have you ever received any training from conventional midwives?

TBA Answer: *When we use to work with Madam Vero, who was the midwives, there were times she will give us training on some complications and we also learn it and apply it. But that was a very long time ago. As for the new midwives we haven't done anything with them. You know we are old now.*

13. **Question:** If no, would you like to receive some training from the conventional midwives?

TBA Answer: *Why not, knowledge is good I would like to receive training and also share what I also have with them. im an old woman and I have done this work for years so I can contribute to their knowledge as well. Madam Vero created that enabling environment and we served the community.*

14. **Question:** If yes, what is your working relationship with midwives?

TBA Answer: *I am very open to work with them if they so wish but is because its been a very long time, now I just walk pass the clinic and watch but I don't go there. I have some health concerns which makes me not to like going to the clinic. When I smell the scent at the clinic, it makes me feel uncomfortable. But then if its important we meet briefly and I get back home I can do that.*

15. **Question:** How do you communicate with your clients and the midwives you work with?

TBA Answer: *Every one knows me in this community, they come to meet me in this room and I attend to them, the small room at the other corner of the house is where I use to deliver pregnant women that in labor or sometimes inside this very room we are seated when it is an emergency and the baby is almost out. There some that I will reach them in their homes when the woman cannot move or when im been called to bath the new born baby.*

16. **Question:** Would you like to share information about the clients you attend to with midwives?

TBA Answer: *That is all for the benefit of the woman, that is why when they come, I encourage them to visit the clinic so that the midwives can also examine them. where human lives are involved, you need not to prevent information from other experts in the field. There re times we consult our fellow TBAs when we encounter difficulties. So information exchange is of essence.*

17. **Question:** Do you own a mobile phone?

TBA Answer: *Yes, I have this mobiles phones one of my children bought for me, I had one earlier that was very small and I could not use it to do mobile money, so any thing concerning mobile money goes through my daughter's phone. This one I have here is for only making and receiving calls.*

18. **Question:** What type of mobile phone do you own?

TBA Answer: *It is a "yam phone" meaning a GSM or its not a smart phone.*

19. **Question:** Do you have internet access?

TBA Answer: *No, I don't know how that thing is done. I haven't been to school so I cannot use it, unless my children.*

20. **Question:** Would you like to have an ICT platform where you can share information with midwives?

TBA Answer: *From what you have explained I understand it, so it's a nice thing if there is something like that to facilitate and enhance our communication with the clinic staff. Something that can bring progress and development must be welcomed by all. I will use it if it is there.*

21. **Question:** If yes, how would you like to send information through the system?

TBA Answer: *I only know how to receive and make calls, no education so if I can call and explain my problem and the clinic receive it and do follow up that will be nice. And I can also tell them from my experience what I have observed about the patient. When the patient gets the best are all happy.*

22. **Question:** What features would you like to see or have on the system?

TBA Answer: *Once I understand what to do that is enough, I don't like complicated things. I say this because pregnant women are always in distress and there is not time to waste.*

23. **Question:** Any other thing you want to say towards the purpose of this interview?

TBA Answer: *I don't know what else to add but you those with education is good at your work so do what we can also easily adopt and understand. God will give us long life to see it.*

TBA 3:

Semi-Structured interview for Traditional Birth Attendants

1. **Question:** Please can you briefly tell me about yourself?

TBA Answer: *My name is* [redacted] *I live in Nyankpala and I am a traditional Birth attendant.*

2. **Question:** How long have you been practicing as a TBA?

TBA Answer: *I cannot give a specific number of years I have been working as a traditional birth attendant but I started this practice after I gave birth to my last child. My last child is more than 20 years so I have done this work for the past 20 years.*

3. **Question:** Do you have any form of formal education?

TBA Answer: *No, I haven't been to school. It is two of my kids that has been to school and one of them is a teacher and teaching in one of the basic schools in the Nyankpala community.*

4. **Question:** How did you learn to practice as a TBA?

TBA Answer: *My grandmother delivered me almost all my children, except the last born. I gave birth to all of them in the house and so I learn it through personal experiences with my grandmother through childbirth. I started with the women in my household, anytime a woman in my house was about giving birth they will call me to come and assist her and subsequently the women in the neighborhood also started asking for my services and that was how I got into the practice*

5. **Question:** What services do you render as a TBA?

TBA Answer: Because I just do it to help my fellow women it varied from one woman to another, depending on the woman needs then I know what to do to help her. Some time back we use to give most women that were in labor a local medication that could help the woman give birth easily but the midwives came to tell us to stop giving them our medication so we stopped.

6. **Question:** What issues do pregnant women usually bring to you?

TBA Answer: *Currently is mostly deliveries that they bring, because the government is encouraging women to attend ANC at the clinic we also encourage them to go there when they are pregnant for check up. But when the woman is in labor at home and maybe the husband wants her to deliver at home then they bring her or they call and I go there to deliver her baby. Most times too when the labor sets in in the night and they cant go to the clinic they call me to come and deliver the baby.*

7. **Question:** What challenges do you have a TBA?

TBA Answer: *It is a tiring work, especially when it is a complicated one. When the woman is in labor, until the baby is delivered safely you cant rest or sleep. There was one time we couldn't get the baby delivered from midnight until the morning. We called the Tamale teaching hospital to bring an ambulance then I got into the ambulance with the pregnant woman and on the way she finally delivered before we got to the hospital. So I was made to come back home and they admitted the woman to check her. Now I don't have that strength to go that length with a pregnant woman. Am getting too old now but we can still help once it does not require going up and down.*

8. **Question:** Do you sometimes offer your patients any medication?

TBA Answer: Those times the midwives were not in the community we use to give them our own local medication to help them in different ways especially the one that quickens the delivery to become fast. But after the clinic was established and the midwives were brought here they came to tell us not give the women anything again so we stopped. But some TBAs still give the medication at the blind side of the midwives if the woman comes to her and the delivery is prolonging.

9. **Question:** Do you work with conventional midwives?

TBA Answer: I worked with madam Vero at the community clinic when she was posted here as the midwive. She came to my house to greet me and also to other TBAs in the community. She told us she wanted to work with us so we were having meetings with her from time to time. She gave us books and showed us how to do the recordings any time we delivered a pregnant woman at home. So we were recording and reporting that to when we go for the meeting. Then she later she asked we send the women to clinic for the delivery. So she would call us from time to time to the clinic to help her with the deliveries. For avery long time when madam Veronica was here we worked together. She was later transferred from the community and since then we were no longer working with the new ones that came.

10. **Question:** How do you work with conventional midwives?

TBA Answer: we were referring most of the women to the clinic for ANC when madam Vero came to start work here and it was a good thing because it was free for all the women to go there and they examine them. Except for some women who did not want to go but we didn't force any woman because we understood the cultural and traditional values. If the husband does not give her the go ahead she couldn't just decide that on her own. But those that agreed we allowed them to see the midwives at the clinic. At the end they could decide where they wanted to give birth. *We had a very cordial relationship with madam Vero through out our dealings with her and she understood our work.*

11. **Question:** Do you sometimes refer your patients to conventional midwives for further treatment?

TBA Answer: Those times the clinic was not around we were not in anyway capable of transferring the women to any clinic until we got the clinic here and madam Vero was posted here. Even before she started her work officially she asked around the community to identify us the TBAs and came to greet us and introduced her self to us. Through that she became our friend and she advised we start referring the women to the clinic. There were some days she will call us to the clinic to show us some of things she practices and gave us the opportunity to also do same and encouraged us. So we were referring women to the clinic. But as it stands now I have no working relationship with the new midwives there.

12. **Question:** Have you ever received any training from conventional midwives?

TBA Answer: Yes, Madam Vero thought us a lot of things when she came to the community, Even though I could not write but she thought as how to record the deliveries we were doing. She also learn so of the things we were doing as TBAs. Most of our women are not used to lying down and giving birth so she gave most of the women in the community an opportunity to choose the position they are comfortable with once they did not have any complications. Because she was not sleeping in the community she wanted us to know certain things when we deliver the women in her absence.

13. **Question:** If no, would you like to receive some training from the conventional midwives?

TBA Answer: At my age can I even still learn anything? The strength is no more there to do things but if it is something to help everyone in the community we can all participate. Learning new things is not a bad idea, small girls that go to the midwifery school to learn how to deliver women are now more and they don't even see our need but if you bring something that can help us improve we will learn.

14. **Question:** If yes, what is your working relationship with midwives?

TBA Answer: *For now I don't have any working relationship with the clinic or the midwives there , we don't know each other. Only some of the old workers knows me and one even came to greet me the last time and told me she was taking some time off to go to her home town. So for the old ones even when I go to the clinic and they see me coming to seek health care they will take my folder inside and the doctor will attend to me immediately and I come home.*

15. **Question:** How do you communicate with your clients and the midwives you work with?

TBA Answer: The first time Madam Vero came here to asked people in the community and they directed her to my house because every one knows me in the community and at the time I didn't have a mobile phone, it was not common as it is now so she gave us specific days that we go to the community to have meetings with her. But later I had a mobile phone so we could now call each other. She was the one doing the calling most of the times. With the clients in the community, those around or not far just come to the use but those at a distance and has a mobile phone will call me, especially if am not home the time they need me. Usually the man calls because when the woman is in distress she is no longer able to communicate.

16. **Question:** Would you like to share information about the clients you attend to with midwives?

TBA Answer: *The women want their problem to be solved when they are in pain. We had always shared information with Madam Vero on daily basis and when she calls us to the clinic then we discuss the issues. Especially women that we observed they had complications. It was a good thing because it helped both of us to understand what care we needed to give the woman.*

17. **Question:** Do you own a mobile phone?

TBA Answer: I have one there, but I hardly use it. The children use it often than me.

18. **Question:** What type of mobile phone do you own?

TBA Answer: *it's a 'yam' phone, meaning not a smart phone.*

19. **Question:** Do you have internet access?

TBA Answer: *No, I didn't go to school , how can I use it. We are old now.*

20. **Question:** Would you like to have an ICT platform where you can share information with midwives?

TBA Answer: *if only I can use it but if it is the internet things that you people use now am not sure I can use it.*

21. **Question:** If yes, how would you like to send information through the system?

TBA Answer: I was using my phone to make calls or if someone calls I know the button to press to receive the call, apart from that I cant use the phone for any other things. So it should be a calling system that one

TBA 3:

am sure I can manage to send information or receive information.

22. Question: What features would you like to see or have on the system?

TBA Answer: You know I cannot read, unless I call my son to help so it should just be a normal calling system am familiar with.

23. Question: Any other thing you want to say towards the purpose of this interview?

TBA Answer: if the midwives want us to work with them they should let us meet but they think we are not important again but we have worked with the first midwife that was here and she appreciated our work.

TBA 4:

1. **Question:** Please can you briefly tell me about yourself?

TBA Answer: *My name is [redacted] a traditional Birth Attendant in the Nyanpkala community, my elder aunty was a traditional birth attendant so I acquired the knowledge through her.*

2. **Question:** How long have you been practicing as a TBA?

TBA Answer: *I cannot remember but that was when my first child was born. She is more than 20 years now so it's been long. I delivered my own last two children by myself. But I only deliver my house hold women when they are in labor.*

3. **Question:** Do you have any form of formal education?

TBA Answer: *I have no form of education; I have never been to school. Our time there were no need for women to go to school so I have never*

4. **Question:** How did you learn to practice as a TBA?

TBA Answer: I learnt how to deliver women in labor after i gave birth to my first child. My elderly aunty came to assist me deliver the first pregnancy and that was it. I delivered my last 2 children alone before people came to pick the baby. So no one taught me how to deliver babies, it was the experience I had with my first child. Since then I have helped anyone within the extended family to deliver as well.

5. **Question:** What services do you render as a TBA?

TBA Answer: I only help women through childbirth, I don't do it for monetary gain so I don't sell any product for women or those in labor neither to I charge them for my assistance, most of these women I help are my own relatives.

6. **Question:** What issues do pregnant women usually bring to you?

TBA Answer: Most of the time women that are having their first child turn to worry about a lot of the things that occur in the pregnancy or during child birth. *Women that are already pregnant come to me when they are not feeling well because of the pregnancy. Then most times I get women that come to me at the point that the baby head is almost coming out and I deliver her the baby.*

7. **Question:** What challenges do you have as a TBA?

TBA Answer: *The women will always wait till the baby is almost falling before they rush them to me for help. And sometimes it can be very difficult to assist when the woman is not strong enough. I don't also do this work full time so sometimes I might not be available when labour sets in then they will call me to come and before I get there, she might be weak already if proper care is not taken. These are some of the challenges that comes with my work.*

8. **Question:** Do you sometimes offer your patients any medication?

TBA Answer: *No, as I said earlier on I don't do this for monetary gain so I don't give or sell any medications to the women I assist give birth. I didn't use any medication when I was giving birth to nay of my children so once a woman is in good condition there is no need for medication unless it is critical and even with such a situation the local medications won't solve the problem unless hospital*

9. **Question:** Do you work with conventional midwives?

TBA Answer: *I have never worked with any clinic or the hospital midwives, Some TBAs can sometimes call me to assist them when they have a difficult situation, even with that it is once in a while and those people are usually our relatives or neighbors. Now I only assist women in our family when they want to deliver.*

10. **Question:** How do you work with conventional midwives?

TBA Answer: I don't actually work directly with the clinic midwives. I don't even know any of them. Most of the women that I have assisted through child birth have been to the clinic for the midwives there to examine them and I sometimes tell the women to go to the clinic for antenatal but I don't have any working relationship with the clinic.

11. **Question:** Do you sometimes refer your patients to conventional midwives for further treatment?

TBA Answer: *Yes, as I said, i don't normally attend to women for many other issues apart from when they are in labor and they come to me. I refer women that comes to me to go to the hospital for examination. The government want all pregnant women to go to the hospital for checkup, which is a good thing.*

12. **Question:** Have you ever received any training from conventional midwives?

TBA Answer: No, I have never received any training from them, even with my traditional practices I learnt it through my own experiences with the help of my aunty who assisted me with my first child delivery. I cant remember the last time I even stepped foot to the clinic to visit anyone. My own is to help them deliver and they go to the clinic themselves afterwards.

13. **Question:** If no, would you like to receive some training from the conventional midwives?

TBA Answer: *Why not, knowledge is good I would like to receive training and also share what I also have with them. Am an old woman and I have done this work for years so I can contribute to their knowledge as well. But they might say we are not knowledgeable with current practices.*

14. **Question:** If yes, what is your working relationship with midwives?

TBA Answer: *I would like to work with with them, we are all trying to save lives of pregnant women and children, so it's the same work we are all doing. They happen to be at the clinic and we are also at home. As a TBA I do not attend to deliveries as much frequently as the midwives at the clinic do but all the same I do well to assist women through labor.*

15. **Question:** How do you communicate with your clients and the midwives you work with?

TBA Answer: The women in the community knows am a TBA, especially those around here so when there is a delivery case, they bring the woman to my house or sometimes if the woman cannot move because of the baby is almost to come out they call me on a phone to come or if it is a nearby house, they can send a someone to rush here to inform me. Sometimes they even call and I will not be home so I have to rush home if the husband of the woman insists, they bring her to me.

16. **Question:** Would you like to share information about the clients you attend to with midwives?

TBA Answer: Yes, but I don't know how that information can be shared since I don't go to the clinic. I only ask the women to go to the clinic on their own after I assist them deliver.

17. **Question:** Do you own a mobile phone?

TBA Answer: *Yes, I have this mobiles phone long ago that I use. The child bought it for and that is where they call me when am not home.*

18. **Question:** What type of mobile phone do you own?

TBA Answer: *It is a normal phone, not what the young girls and boys are uusing. meaning a GSM or its not a smart phone.*

19. **Question:** Do you have internet access?

TBA Answer: *No, I don't know how that thing is done. I haven't been to school so I cannot use it, unless my children.*

20. **Question:** Would you like to have an ICT platform where you can share information with midwives?

TBA Answer: *Why not if is something I can use it to help the women that come to me for delivery, we all want to save lives and women can have better care than before. so, it's a good thing you want to do which we can all support.*

21. **Question:** If yes, how would you like to send information through the system?

TBA Answer: *I only know how to receive and make calls; I didn't go to school so I cannot read or write so if I can call and explain my problem and the clinic receive it and do follow up that will be nice. And I can also tell them from my experience what I have observed about the patient.*

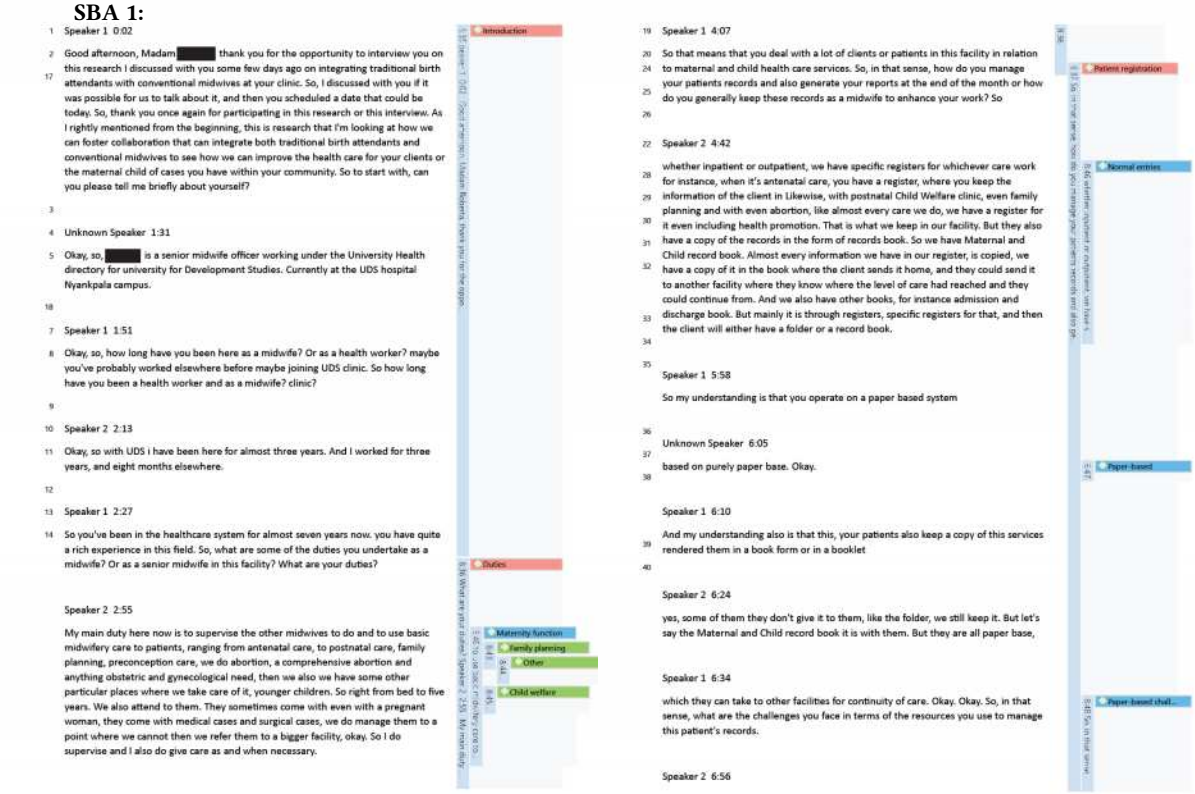
22. **Question:** What features would you like to see or have on the system?

TBA Answer: *If I can understand what to do that will be good for to just send information and if they also understand what I send to them is most important.*

23. **Question:** Any other thing you want to say towards the purpose of this interview?

TBA Answer: Nothing more to say than to also thank you coming to talk to me and recognize the work am doing. If we put our heads together, we can help pregnant women have save delivery.

SBA 1:



Speaker 1 0:02

Good afternoon, Madam [redacted] thank you for the opportunity to interview you on this research I discussed with you some few days ago on integrating traditional birth attendants with conventional midwives at your clinic. So, I discussed with you if it was possible for us to talk about it, and then you scheduled a date that could be today. So, thank you once again for participating in this research or this interview. As I rightly mentioned from the beginning, this is research that I'm looking at how we can foster collaboration that can integrate both traditional birth attendants and conventional midwives to see how we can improve the health care for your clients or the maternal child of cases you have within your community. So to start with, can you please tell me briefly about yourself?

Unknown Speaker 1:31

Okay, so, [redacted] is a senior midwife officer working under the University Health directory for university for Development Studies. Currently at the UDS hospital Nyankpala campus.

Speaker 1 1:51

Okay, so, how long have you been here as a midwife? Or as a health worker? maybe you've probably worked elsewhere before maybe joining UDS clinic. So how long have you been a health worker and as a midwife? clinic?

Speaker 2 2:13

Okay, so with UDS i have been here for almost three years. And I worked for three years, and eight months elsewhere.

Speaker 1 2:27

So you've been in the healthcare system for almost seven years now. you have quite a rich experience in this field. So, what are some of the duties you undertake as a midwife? Or as a senior midwife in this facility? What are your duties?

Speaker 2 2:55

My main duty here now is to supervise the other midwives to do and to use basic midwifery care to patients, ranging from antenatal care, to postnatal care, family planning, preconception care, we do abortion, a comprehensive abortion and anything obstetric and gynecological need, then we also we have some other particular places where we take care of it, younger children. So right from bed to five years. We also attend to them. They sometimes come with even with a pregnant woman, they come with medical cases and surgical cases, we do manage them to a point where we cannot then we refer them to a bigger facility, okay. So I do supervise and I also do give care as and when necessary.

Speaker 1 4:07

So that means that you deal with a lot of clients or patients in this facility in relation to maternal and child health care services. So, in that sense, how do you manage your patients records and also generate your reports at the end of the month or how do you generally keep these records as a midwife to enhance your work? So

Speaker 2 4:42

whether inpatient or outpatient, we have specific registers for whichever care work for instance, when it's antenatal care, you have a register, where you keep the information of the client in Likewise, with postnatal Child Welfare clinic, even family planning and with even abortion, like almost every care we do, we have a register for it even including health promotion. That is what we keep in our facility. But they also have a copy of the records in the form of records book. So we have Maternal and Child record book. Almost every information we have in our register, is copied, we have a copy of it in the book where the client sends it home, and they could send it to another facility where they know where the level of care had reached and they could continue from. And we also have other books, for instance admission and discharge book. But mainly it is through registers, specific registers for that, and then the client will either have a folder or a record book.

Speaker 1 5:58

So my understanding is that you operate on a paper based system

Unknown Speaker 6:05

based on purely paper base. Okay.

Speaker 1 6:10

And my understanding also is that this, your patients also keep a copy of this services rendered them in a book form or in a booklet

Speaker 2 6:24

yes, some of them they don't give it to them, like the folder, we still keep it. But let's say the Maternal and Child record book it is with them. But they are all paper base,

Speaker 1 6:34

which they can take to other facilities for continuity of care. Okay. Okay. So, in that sense, what are the challenges you face in terms of the resources you use to manage this patient's records.

Speaker 2 6:56

So, sometimes the client will come back and she cannot find her record book. Okay. For some reasons, either water poured on it or it got missing, or she's let's say, she's, she's attending services elsewhere, and she had come back, this is a local community. So most at times those in the urban community when they are about to give birth they come back to the local community because they want their immediate families to be they come in they don't have records of what they have done before either they kept it behind or something, it becomes difficult for you to continue keep you don't know where the provider ended and where you should start from even sometimes your own clients will come in the book is, it's not well managed, some parts are off. Or water had poured on it, or it is not well kept and some information is missing or they don't even have the book. It's a very common problem we face. When I came to UDS before i had problems with data, in the sense that at the end of every month we are supposed to send some reports to Ghana Health Service then every quarter we are supposed to send reports to UDS. I found it difficult to collate the data from the previous months I wasn't, there because of these register things. And the person had gone on retirement so we struggle to get some of these things. So with our side, sometimes the register it has some parts thorned off, or you don't know where they have kept it because it's books. If you want to date back, it will be difficult for me to give you records of this place five years ago, because is book and clients will come sometimes you cannot keep records. You cannot know what happened to them, that's what I think is the main challenge.

Speaker 1 9:01 loss of the information along the way. Yes. And also, when the clients misplace the booklets, we will not be able to know where and we always loosing data

Unknown Speaker 9:12

we always find it difficult to retrieve information

Speaker 1 9:19

is very vital information that you

Unknown Speaker 9:25

we even need to know what to do next for them

Speaker 1 9:31

okay, so once this research is looking at how we can also integrate traditional birth attendance what's what do you know about traditional birds' attendants or those we call TBAs in our communities.

Speaker 2 9:56

i will say they complement our work, in the sense that most of the people we work with, let's say that's a patient and the belief, your belief system is not purely conventional, they still believe in their traditional practices, they still have faith in that. So, I think, they are, the first line of care to the patients, whenever they have minor issues, or even health related problems, whether maternal related problems, no matter the form. They go there first. And before they come to us

Speaker 1 10:37

in even secondary, so, for

Speaker 2 10:40

us here in UDS, we see them to be a complement to our work almost everybody that comes here would have visited a TBA one way or the other before coming to our maternal and child health care here

Speaker 2 10:55

some even do both, they come and

Speaker 1 10:59

they also accass TBAs in the community for their assessments as well. So, have you encountered a TBA in your line of duty as a senior midwife for the past seven years now? And yes. What is your encounter like?

Speaker 2 11:27

So that wasn't here, that was in the western region, we had, she had kept the woman for quite some time because she thought the woman was going to deliver. And when she brought, I think she tried all means after four days, when the woman was in her care. She, she didn't have any way to monitor how the child was doing and the progress of labor wasn't moving like there was it wasn't going on well. And then she brought the woman for us to assess her to see what was happening unfortunately when she came not knowing the child had died even before the woman went to her and it was even misrouted. So, you had to remove dead body that is kind of rotted in literal terms And that's one I had a couple of them sometimes will come because they are having challenges most at times they will come because they are having challenges because they are attending to them and they come with them, And they come with them though. That was the beauty of the whole thing but here in tamale I haven't seen a TBA walking in with a patient. But you would know from interrogation that they have gone there before coming to you.

Speaker 1 12:52

SBA 1:

So that was just going to be my next line of question like, what are the experiences of your encounter with these patients in relation to traditional birth attendants? How is the relationship in terms of the information exchange when they access these TBAs? Or when they have complications and they come? what are some of the things you observe?

Speaker 2 13:23

So, what i will say is that's there's a problem with communication between we the midwives, and the TBAs we don't know what they do for the patients. We only have an idea they have gone there. What if what they have done, what their findings were? What's the client presented with? We don't have any information on that. And it becomes a bit of a challenge for you to even continue with what they have done. they don't even keep records. It's all Unlike we that have books whiles we keep record of what we are doing. They don't keep track of what they are doing. So, it becomes difficult for you to even know what to do next. Because the major problem we have with them and most of them can't also read and writes. Okay, so they also don't use our records. So, there is always a gap in between.

Speaker 1 14:34

Okay, so in that sense, do you think the services of these TBAs are important?

Speaker 2 14:42

For me? I'll say it is because whether we like it or not the people believe in their care. And no matter what you do, since they believe in them they will still go there, it would have been nice if we know what they are doing and then we could continue from there. it would have been nice if we have a connection with them so that if they are in need, they could call us and we could tell them do this and we can prepare for them, that kind of relationship. But it's like, there's a cut and the patient is in the middle and at the end they suffer. But they rather see the health facilities as because they come in their worst situations rather see the health facilities to be a place that will not help them. I don't know if you are getting what i am trying to say. They go there in their worst situations, they cannot help them then they ask them to come, when the situation is already worse and you cannot really save, do a lot to save the situation. If we were in link with them, we, would have been able to save a lot of the delays to try and minimize the complications.

Speaker 1 15:55

You just answered my next line of question whether what do you think that the challenge is that these TBAs are also pose to, in your opinion, you've made mention about, they not keeping records, as well. And the only wait till when the situation becomes know, before they push clients to you to now handle. And there's no communication between the two of you as health workers. So, I don't know if there's any other challenges you, you'd think in your personal own perspective, if you can reflect what you think is any other challenge that they are being posed to us? TBAs,

Speaker 2 16:56

I think they don't also have most of the equipment's with the kind of job they are doing. There are certain medical logistics that help us make the work a bit easier. They don't have it, they don't even have the knowledge to use it? is one and I think there's one TBA that i ever, as in western region. After attending to the woman, she approached and said, she was actually excited how we received her if it was another place she would have had insults. So they have that fear of coming close to us too, because of probably things that have happened in the past. I think it's also a challenge today.

Speaker 1 17:46

So would you like to work with these TBAs as a conventional midwife? Would you like to work with them in any way?

Speaker 2 18:06

I think in a way we are even working with them. Because they are doing some of the things we are doing and our clients will continue to go to them.

Unknown Speaker 18:18

I would like to work with them if they are willing to. Because at the end, it's the safety of the mother and the child, the safety of the patients that is paramount.

Speaker 1 18:40

So in your opinion, how would you like to work with them?

Speaker 2 18:48

I think there should be a link, a connection between the two of us, okay, as in the traditional birth attendants, and then we the conventional midwives where we will know what's going to happen if they have challenge, they could call and we prepare. As we sit right now, we are sending a client from here to another facility. We called, we told them what was happening, what we had done and why we cannot keep the person here, they have prepared. They're waiting for us. Okay, how is it possible because we have a communication with them. Okay. If they could do same it would have saved a lot of patients and to save a lot of situations, okay. So i think there should be a communication. It's all about communication and then whatever they do, if they could record, if there is a way they could record, because as I sit here, there is indeed a problem with almost every facility like every health care system in Ghana. If you attend Hospital in One facility and for some reason you are going to another facility, they don't know what, the new facility you have gone would not know what have gone on in the old facility, and is like you would to start right from the scratch. If there was a system in place where everybody's data is sent into one

particular system, wherever you go you could know, this is what happened at this particular time. And what you should do it would help, because medical history is very important.

Speaker 1 20:36

So in that sense, would you like to share information with TBS, on your clients, sharing of information, you think is not something to be worried about? If they have information on the same client that comes to you, and we're supposed to be sharing information about this client? You think it's, okay? To share information with each other.

Speaker 2 21:15

I think we already share information, just because they don't know how to use the information. I was telling you about the maternal record book. Wherever the client goes, the client's information is in and anybody can use it. Unlike the normal folder where, you have to keep a particular folder in a particular hospital so you can't move your folder Like hospitals, it's just because you don't know how to use the information that clients have. So they don't even ask them to come along with it. So I think we are already sharing information just that they don't know how to use the information.

Speaker 1 21:55

Okay. So as I rightly said, this research is looking at how it can develop an ICT platform. And for this platform to be able to operate it must have something that it will operate on. So you do you own a mobile phone, and what type of mobile phone you own if you have one.

Speaker 2 22:23

I do own a mobile phone is a it's a smartphone.

Speaker 1 22:30

And you have internet access.

Speaker 2 22:35

That's a problem. And that is the main reason why UDS as an institution that almost every office has access to internet, we're struggling to have records of our clients being in a software system. They tried connecting. Some offices have been connected but the network is bad.

Speaker 1 22:59

Okay? Even with the universities, own internet,

Speaker 2 23:06

yes, sometimes it's just from the company. The reason why we switched back to, we actually started the software base, but we came back to this because it was delaying us if the network is not stable then the client would have to wait longer and sometimes you cannot do that.

Speaker 1 23:31

It should rather improve and speed up your, your work and not delay.

Speaker 2 23:38

like today it has rained like this, you have problems even contacting some other people? Because the network is not so good.

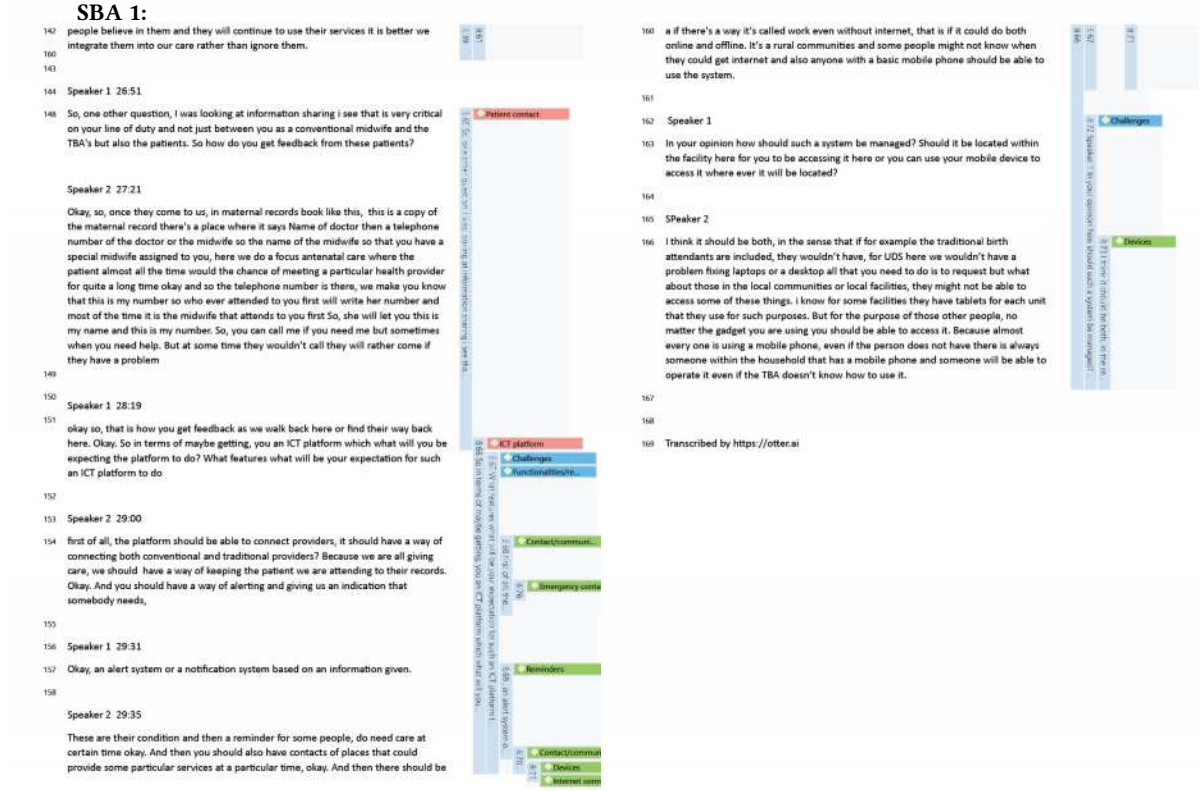
Speaker 1 23:50

So, let's say would you like to have an ICT platform that's looking at the challenges we have now getting this TBAs linked up to share information, would you like to have any ICT platform because if you don't want it or you're not in support of it, and at the end of the day, I bring it in here that you didn't like in the first place you might not even use it. So would you like to have any ICT platform that can help you work especially with the TBAS, also with sharing information and handling your patients records more in a better way.

Speaker 2 24:51

I think that would have been a great idea to have a platform like that and then that would even help us to save the situation of losing data. Because they could, such platforms could save a lot of data for quite a long time, so you could always refer back. Another thing is, since it's a platform everybody is on, we could even use that as an opportunity to even give the TBAs some basic, education, that will give them education or some basic care they could give to our clients, okay? Well, so that they don't rather worsen the situation before bringing them to us. And they could know who to call or who to contact. At certain points in time, for example, they have a pregnant woman who for some reason, collapse. Maybe because she is on the platform, she knows, okay, if her facility, wherever she's operating, she looks for the closest place is she would even call, yes, if they say if she could communicate and we say, Oh, there is space, okay, we are preparing for it come, or oh, there's no space, there's no doctor, I think it's better when you go to this place. So that's instead of just asking the person to come in and the personnel come and go through all this process, we could I've saved that time, just like we do in our normal conventional way most of the hospitals are linked. So if you could do that, it could save your time because I've said this and I'm going to say it again whether we like it or not the

SBA 1:



people believe in them and they will continue to use their services it is better we integrate them into our care rather than ignore them.

Speaker 1 26:51

So, one other question, I was looking at information sharing i see that is very critical on your line of duty and not just between you as a conventional midwife and the TBA's but also the patients. So how do you get feedback from these patients?

Speaker 2 27:21

Okay, so, once they come to us, in maternal records book like this, this is a copy of the maternal record there's a place where it says Name of doctor then a telephone number of the doctor or the midwife so the name of the midwife so that you have a special midwife assigned to you, here we do a focus antenatal care where the patient almost all the time would the chance of meeting a particular health provider for quite a long time okay and so the telephone number is there, we make you know that this is my number so who ever attended to you first will write her number and most of the time it is the midwife that attends to you first So, she will let you this is my name and this is my number. So, you can call me if you need me but sometimes when you need help. But at some time they wouldn't call they will rather come if they have a problem

Speaker 1 28:19

okay so, that is how you get feedback as we walk back here or find their way back here. Okay. So in terms of maybe getting, you an ICT platform which what will you be expecting the platform to do? What features what will be your expectation for such an ICT platform to do

Speaker 2 29:00

first of all, the platform should be able to connect providers, it should have a way of connecting both conventional and traditional providers? Because we are all giving care, we should have a way of keeping the patient we are attending to their records. Okay. And you should have a way of alerting and giving us an indication that somebody needs,

Speaker 1 29:31

Okay, an alert system or a notification system based on an information given.

Speaker 2 29:35

These are their condition and then a reminder for some people, do need care at certain time okay. And then you should also have contacts of places that could provide some particular services at a particular time, okay. And then there should be

a if there's a way it's called work even without internet, that is if it could do both online and offline. It's a rural communities and some people might not know when they could get internet and also anyone with a basic mobile phone should be able to use the system.

Speaker 1

In your opinion how should such a system be managed? Should it be located within the facility here for you to be accessing it here or you can use your mobile device to access it where ever it will be located?

SPeaker 2

I think it should be both, in the sense that if for example the traditional birth attendants are included, they wouldn't have, for UDS here we wouldn't have a problem fixing laptops or a desktop all that you need to do is to request but what about those in the local communities or local facilities, they might not be able to access some of these things. i know for some facilities they have tablets for each unit that they use for such purposes. But for the purpose of those other people, no matter the gadget you are using you should be able to access it. Because almost every one is using a mobile phone, even if the person does not have there is always someone within the household that has a mobile phone and someone will be able to operate it even if the TBA doesn't know how to use it.

Transcribed by https://otter.ai

SBA 2:

Speaker 1 0:04

Good morning, sister [redacted] thank you for the opportunity to participate in this research on how we can integrate professional midwives and traditional birth attendants in the Nyankpala community. So, as I earlier on discuss or briefly discuss with you, this research is looking at how we can develop the system that can improve the quality of service that you render to patients and how the system can also integrate the traditional attendants that are also attended to the same patients that you also deliver services to, to improve the health outcome at the end of the day. So thank you for squeezing your time to participate in this research. Please, can you briefly tell me about yourself?

Speaker 2 1:15

i'm [redacted], from UDS clinic Nyankpala at the MCH unit, i'm a midwife

Speaker 1 1:28

what is MCH? is maternity and child health, Okay. And how long have you been working as a midwife? Either in nyankpala clinic here or in general okay. three years Okay, so, you've been working as a midwife, a senior midwife officer for three years almost three years now okay. And what are some of the duties you undertake as a in the midwife clinic here

Speaker 2 2:10

we register new clients as clients who have just come for seed, we attend to them till they deliver and we also deliver their babies and afterwards we take care of them and their babies and also do CWC that is the weighing of the child till the child is five years we do all that here, we do family planning too

Speaker 1 2:48

so on daily basis, these are the duties that you are or the services that you render out to your clients that come to the clinic. So, how do you how do you keep the records of this patients that you attend to

Speaker 2 3:11

we have a record book and then we give a book to the client too. So as they come we record the information in our ANC book and then we record in their antenatal book as well so when anytime one misplaces her own and she come we can still get her information from our records and then we give her a new book

Unknown Speaker 3:36

Speaker 1 3:42

okay. So, you do you keep all the records of these patients in our antenatal book okay. That means you don't have any electronic system keeping these records. So, what are some of the challenges with this paper base or not the use of keeping these records

Speaker 2 4:22

The challenges are some times you might mistakenly, when you want ot write something the paper can tear or mistakenly you want to take something a paper pulls out so when it pulls out like that you might misplace it Because most times you have an informationa on a piece of paper or in the book and you can't even find it again and sometimes when you are working mistakenly you can just pour liquid or something because you are working on it, spirit and some other stuffs,mistakenly if there is a book it can pour on it and you may not get the information again or so if you don't get the inforamtion again what happens? yeay, so if you have not recorded it in any other book that means you are not getting it again.

Speaker 1 5:16

Okay, so there are alot challenges with the manuel way of keeping these records and at the end of the day how do you generate your reports

Unknown Speaker 5:30

we generate it through the ANC book

Speaker 1 5:34

that's also the same manual process of writing the reports that you need

Speaker 1 5:49

Have you already or let me put it this way as a midwife I know you have a lot of experiences with these patients that's use your services on a daily basis what to do you know about the traditional attendants that some of these patients also go to seek for their services

Speaker 2 6:15

The traditional attendants, I know they have been trained a little in the communities so when a woman is in labor some of them do go to them to assist them with delivery.

Speaker 1 6:36

have you encountered a traditional attendant before? No, So do think the services of these TBAs are important?

Speaker 2 6:55

Yes, it is important because sometimes when the client is in labor, especially when the person is a first timer and she doesnt know what to do, so if the TBA is around she can assist the client before they get to the hospital

Speaker 1 7:18

and has any patient discuss with you about she seeking the services of these traditional birth attendants but sometimes too when they go there they give them some local medicine to take and when it's critical and the person can't help anymore they rush them here and it usually abit complicated in such cases

Speaker 2 7:41

Yes, she said she likes giving birth at home so any time she is in labor she goes to the birth attendant that season nice even at home? So she's she wants to say that sometimes when the weather says and when it's critical that the percentiles go in the right and usually a little complicated such cases

Speaker 1 8:19

why do you think some of these patients would want to seek the services of these traditional birth attendants even if you think sometimes there are complicated issues or issues becomes complex before they push them to you. Why would they still want to be seeking the services of this TBAs

Unknown Speaker 8:49

some feel comfortable giving birth at home some they say because of the little little payments they have to make, they wont want to come to the hospital

Speaker 1 9:04

You think the services or the charges are expensive for some of them

Speaker 2 9:14

yes for some they are expensive for them. for some they don't have money, So if they come and you ask them to buy something it's usually a problem for them if there's a drug that's covered by insurance and you ask them to buy ,especially it's usually a problem for them, so they will prefer they go to the TBA and then she will manage and when she cannot handle it that's when they come here

Speaker 1 9:41

So you think maybe costs is something that's encouraging some of them to go to the TBA

Speaker 1 9:54

is the health insurance not covering all the services for Maternal and Child Health Services

Speaker 2 10:12

It covers but for some medications it does'nt cover all and some too it covers half so the insurance will take of the payment and the client will top-up

Speaker 1 10:32

so what do you think maybe are some of the challenges with these traditional better attendants, in your opinion what do you think are some of the things that you think they do wrong in the sense that it ends up at your facility

Speaker 2 10:55

The local medicine they give to them, usually with the local medicine they don't really know the quantity to give and the dosage so usually they might over dose and the client comes and the contractions are too much so in such cases is usually difficult, if you can't manage you have to refer to a bigger hospital and some too when they come they don't tell the truth even if they have finished using the local drugs they don't tell the truth they will say no they have not taken but you yourself assessing the client you will know that she has taken something and some too you have to deep-in before she will be able to tell you the truth

Speaker 1 11:52

so why do you think they always don't want to open up

Speaker 2 12:00

They think when they open up you will say something bad

Speaker 1 12:04

Do you say something bad

Speaker 2 12:10

No we don't but that's how they feel, because they didn't come to the hospital they know they're supposed to come to the hospital when labor starts but because they don't come thay think when they come and like they tell you the truth you will say they are they weren't supposed to do that or judge them or something, that's how they feel

Speaker 1 12:29

Do you think if not you but do you think some of your colleagues do maybe say or makes statements that makes them feel uncomfortable with and that is why they always want to hide such vital information that pertains to their own lives or their own health from you with the conventional midwives

Speaker 2 13:00

for the people i'm working with no, i don't know for the people outside but for the people i'm working with I've not had that experience

Speaker 1 13:11

so would you like to work with these traditional birth attendants, in a way would you like to have a working relationship with them, YES

Speaker 1 13:35

In terms of information exchange with them how would you want to work with them and exchange information

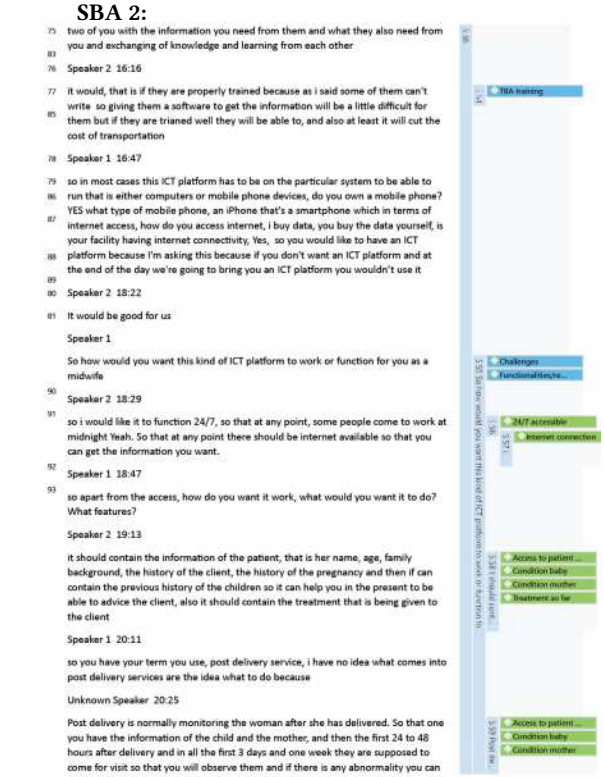
Speaker 2 13:56

I don't know if it is possible but if an attendant finds it difficult maybe during the process of delivery the person could at least come with the woman in labor so that any information that is even available she could communicate that to us for further managment but if the attendant is at home and the woman comes alone, sometimes they can even go there and they will give them something and they don't even know ,so at least if she comes to the ward we will be able to ask her and get more information than the client and also i know most of them are not educated so writing will be abit difficult for them, so i think they coming will be the best

Speaker 1 15:07

So as I earlier on said, looking at how we can develop an ICT platform that can help meets your Manual paper based work and integrates you also with the traditional birth attendants as their services in the communities also seem very vital because it does appear that these women will always seek the services of these TBAs no matter what because it is something they have come to accept and willing to do at any point in time so do you think an ICT platform will be a good idea to share or integrate the

SBA 2:



two of you with the information you need from them and what they also need from you and exchanging of knowledge and learning from each other

Speaker 2 16:16

it would, that is if they are properly trained because as i said some of them can't write so giving them a software to get the information will be a little difficult for them but if they are trianed well they will be able to, and also at least it will cut the cost of transportation

Speaker 1 16:47

so in most cases this ICT platform has to be on the particular system to be able to run that is either computers or mobile phone devices, do you own a mobile phone? YES what type of mobile phone, an iPhone that's a smartphone which in terms of internet access, how do you access internet, i buy data, you buy the data yourself, is your facility having internet connectivity, Yes, so you would like to have an ICT platform because I'm asking this because if you don't want an ICT platform and at the end of the day we're going to bring you an ICT platform you wouldn't use it

Speaker 2 18:22

It would be good for us

Speaker 1

So how would you want this kind of ICT platform to work or function for you as a midwife

Speaker 2 18:29

so i would like it to function 24/7, so that at any point, some people come to work at midnight Yeah. So that at any point there should be internet available so that you can get the information you want.

Speaker 1 18:47

so apart from the access, how do you want it work, what would you want it to do? What features?

Speaker 2 19:13

it should contain the information of the patient, that is her name, age, family background, the history of the client, the history of the pregnancy and then if can contain the previous history of the children so it can help you in the present to be able to advice the client, also it should contain the treatment that is being given to the client

Speaker 1 20:11

so you have your term you use, post delivery service, i have no idea what comes into post delivery services are the idea what to do because

Unknown Speaker 20:25

Post delivery is normally monitoring the woman after she has delivered. So that one you have the information of the child and the mother, and then the first 24 to 48 hours after delivery and in all the first 3 days and one week they are supposed to come for visit so that you will observe them and if there is any abnormality you can

be able to handle it, it should also contain the date of birth of the child and other basic information on the client.

Speaker 1 21:31

in terms of accessing information from the system you made mention about some of the patient TBAs not been educated in your opinion how do you think the system should incorporate these TBAs that are not educated so, that you can have that information exchange

Speaker 2 22:10

I think they should get people to educate them or train them on the application

Speaker 1 22:34

So if the TBAs cannot text or cannot read but can make a basic call which we know most of them are not, even if they cannot read or they cannot write, they make phone calls do you think the TBAs making a phone call into the system to leave a voice note is an ideal way to cater for those uneducated TBAs, YES I think i will prefer that one Okay, so what other issue or concern Do you think this system should be able to address for both conventional midwives and the TBAs, generally What else do you have in mind that you think the system should be able to do?

Speaker 1 23:58

Just Just letting you have in mind if you didn't have in mind I think that's fine

Unknown Speaker 24:14

they should provide data because to be able to access it and then with the phone call too they should be able to provide credit because some of them they might not have money to buy that's all

Speaker 1 24:39

Alright, so thank you very much for participating in this interview or this research, but it doesn't end here. Later on if I need more information on what we can do together to get you such a system i will always come back so thank you very much for your time

SBA 3:

Speaker 1 0:00

All right. Good afternoon, Madam [redacted] Thank you for the opportunity to participate. In this research I'm doing on how we can develop an ICT platform to integrate traditional birth attendants in the community and conventional midwives, like yourself here. To improve the quality of services you render to pregnant women and children in general, in the community, it does appear you have a common client that attend both health care systems. And the purpose of this research is to see how we can improve on the service delivery with an ICT platform. So, with your permission, I would like to record the interview, so that we could transcribe it later for this research purpose. Alright, thank you very much. Briefly, tell me about yourself.

Speaker 2 1:20

So my midwife at the University for Development Studies clinic, and then I have a diploma in midwifery from Bolgatanga Midwifery College and i stay in Tamale.

Speaker 1 1:37

Okay, so, how long have you been working as a midwife? Here or as a midwife in general?

Unknown Speaker 1:47

Three years,

Speaker 1 1:49

three years? Okay. So what are some of the duties you perform as a midwife in this clinic? Okay,

Speaker 2 2:01

so we do I do antenatal services, family planning services, and labour as well, we do CWC, that is child welfare clinic

Speaker 1 2:20

so how do you keep the records of these patients that you attend to on a daily basis? Or in a line of duty? How do you keep these records of the patients or manage these patients data?

Speaker 2 2:44

we do the paper system, where we have registers and we have folders as well. We have the antenatal cards as well, as the square we record the information of what's the pregnant woman and then for the child as well. So it's the cards, the registers and then the folders. This is how we keep records of them

Speaker 1 3:07

and how easy or how challenging it is it with this manual process of paper based system of managing these records.

Speaker 2 3:23

It's this I mean, everything that has an advantage has a disadvantage. For the advantages, I say, the client is able to carry their information home as well and be able to know the progress of labor, that's a benefit on the side because if it was just the computer, they might not be able to see that on their own. But for the disadvantages, they are alot that book can get missing anytime, the registers can get burnt, water can pour on them, and alot has been happening, they have children, their children's spoils the book and they bring them back and at the end of the day, you have to get another book and that is cost, i mean cost to the state as well, is not really easy handling those books.

Speaker 1 4:12

So think patient data or records are very key for you to make decisions and know the next line of action to take. So when some of these things happens, what are some of the consequences that could result not been able to properly keep these records.

Speaker 2 4:41

And so eventually it's going to be a two way thing is going to be a disadvantage to both the clients and to the healthcare provider. Because if a client with a particular problem comes and you don't have these records, pened down, eventually it means that you the health worker put yourself at risk In case of a situation like HIV, you put yourself at risk, because you don't know what you are handling, you go in with your, I mean, you go in with your lay man's mind thinking everything is fine, but that's not what it is. And to the client as well, if the person has a past obstetric history, which is very bad, you will not know and you will go in and eventually you, there are a lot of complications that can result out of it. And you could, at worst lose the clients. And it's a very big deal, especially for the Midwifery fraternity, you cannot lose a client.

Speaker 1 5:36

So that shows how critical the information you need on your patients are. And how important it is to have this information properly managed. So as I earlier on said, the reason as to, or the reason for this research is to see how we can integrate traditional birth attendants with conventional midwives. What's as someone who has worked for over three years? What is your experiences? Or what do you know about this traditional midwives in the system? Or in the community?

Speaker 2 6:20

Okay, with the very little knowledge i have of them. I mean, they are the genesis of all Midwifery, they started it before we came into being, they are more trusted, because they are with the people in the community. So in as much as they are doing good, I mean, I cannot completely say that its a bad thing no, they are doing good for the people in the community but its just that to an extent because of the lack of training, proper training let me use use proper training, they i mean, handle their clients according to their knowledge and not according to what its supposed to be okay. Yeah. So I mean, they do well for the clients, no lie about it. But at the end of the day, at the long ran, it's not what is documented. Is what they think is right they do for the client

Speaker 1 7:17

Have you ever encountered a midwife in your line of duty before? A midwife or a TBA? A TBA

Speaker 2 7:28

Not directly, not directly but indirectly? Yes. Because, I mean, they will say, Well, this is a TBA for this community and just know the person but not in direct contact with the person. Okay.

Speaker 1 7:39

Okay. And then what is your experiences with patients in relation to TBAs? Have they have some of your patients ever open up to you about, you know, the services of these TBS, and what was the experience? Okay.

Speaker 2 8:00

Yes, they have just a few have actually mentioned. Because when you're filling in antenatal cards, you asked them where their previous deliveries happened and if the person says at home you that ask what prompted them to do the home delivery. And that's where the information comes up from. So from the little they have said, it bounces back to trust. And these are their first point of call back at home, Because I mean, previously, they might not have had enough knowledge on proper health delivery for them. So these were the first parts of call. And depending on how the labor happened, if it was a precipitous labor, which some of them say it just happened, yes, if it's a precipitous labor, they do not even have the space of time to go to the health facility. And eventually, these TBAs, they said they have I've helped them but then it was not as compared to what the midwives have done for them from their own experience with comparing both, the TBAs and the midwives.

Speaker 1 9:09

So I know you have highlighted some of the the good work they are doing, but then I also have to ask whether you think the services of these TBAs are important at this stage?

Speaker 2 9:24

Yes, they are still important. I'm not sure we have gotten to the stage where we can do away with TBAs in Ghana? I don't think so. Personally, I don't think so. I think that's if a little bit of training is given to them, I'm sure and I mean, equipments are provided for them even in their homes or wherever they render their services to the clients. I think it will go a long way to help. Like I said previously, that precipitates labor. If the person is not able to assess the health care immediately I'm not Sure we would say that because of that reason the person should stay at his or her house, its more prefer that once that person is available. Um, you can start them until the person, too, with a bit experience in knowing abnormalities. So once that person is able to even detect abnormalities, the person might encourage you to even go to the health facility or who with you, which is actually safer than just sitting at home and saying that I won't attend, I don't want a TBA to attend to me. So rather than I think Ghana hasn't gotten there, from my point of view, I don't think we've gotten to a place where we can do away with them. I just think that proper training for them would help.

Unknown Speaker 10:48

We'd mentioned about trusts trusts with the TBAs less why they keep what do you think are some of the the challenges also? The opposed to as TBAs?

Unknown Speaker 11:06

I don't get that again.

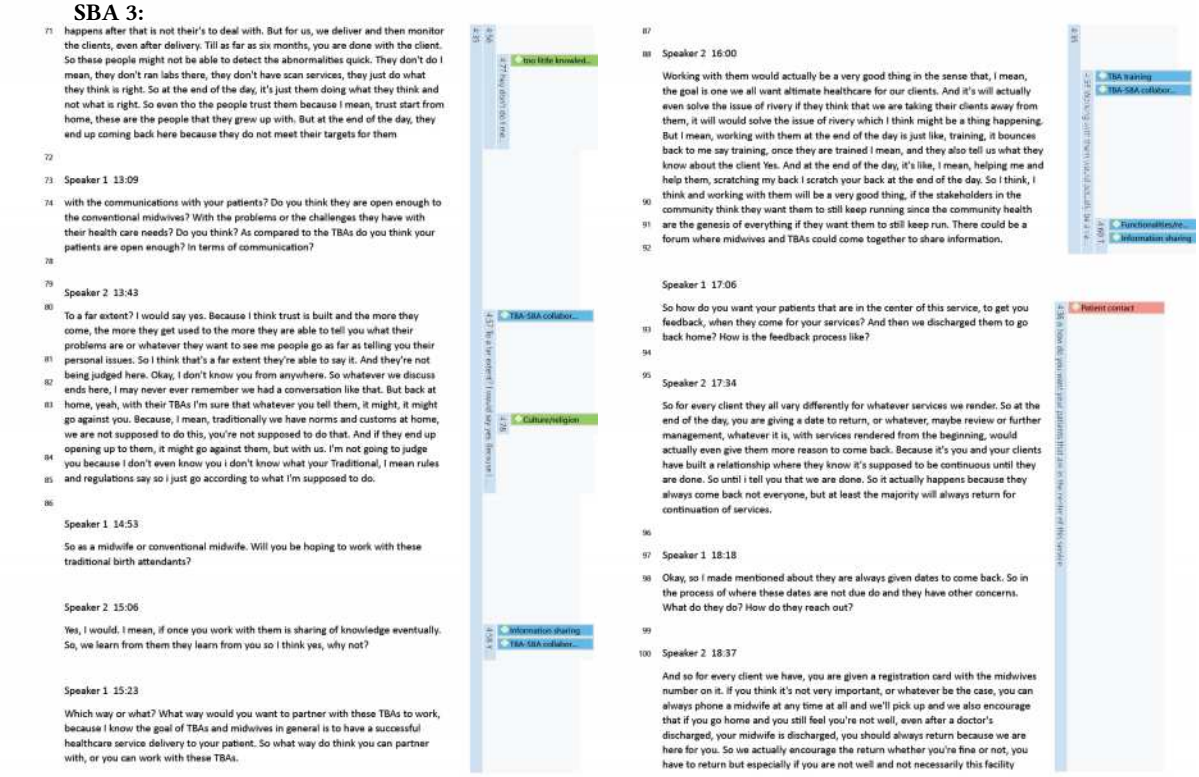
Speaker 1 11:07

What are the what are some of the challenges you think the TBAs I've been confronted, you know, in the communities in their line of duty. You you, at the end of the day, get to know, the some of these patients attend the services, the services of this TBAs, but only rush in here, when it becomes complicated is what what do you think the TBAs are doing wrong, that they cant stop going there? But at the end of the day, when things go bad, they'll still run back here? Okay.

Speaker 2 11:49

Okay. So I mean, it goes back to what I previously said, because the people know the normal labor, and we don't deal with only normal labor. Okay, we do have normal and anbnormal labor. And at the end of the day, if it's just the normal labor then I don't even think midwives will be existence, because it's normal, they can handle that. But for proper health care to take place and record keeping, which they don't do, because their's is just to deliver the child and they are done with you, whatever

SBA 3:



happens after that is not their's to deal with. But for us, we deliver and then monitor the clients, even after delivery. Till as far as six months, you are done with the client. So these people might not be able to detect the abnormalities quick. They don't do I mean, they don't ran labs there, they don't have scan services, they just do what they think is right. So at the end of the day, it's just them doing what they think and not what is right. So even tho the people trust them because I mean, trust start from home, these are the people that they grew up with. But at the end of the day, they end up coming back here because they do not meet their targets for them

Speaker 1 13:09

with the communications with your patients? Do you think they are open enough to the conventional midwives? With the problems or the challenges they have with their health care needs? Do you think? As compared to the TBAs do you think your patients are open enough? In terms of communication?

Speaker 2 13:43

To a far extent? I would say yes. Because I think trust is built and the more they come, the more they get used to the more they are able to tell you what their problems are or whatever they want to see me people go as far as telling you their personal issues. So I think that's a far extent they're able to say it. And they're not being judged here. Okay, I don't know you from anywhere. So whatever we discuss ends here, I may never ever remember we had a conversation like that. But back at home, yeah, with their TBAs I'm sure that whatever you tell them, it might, it might go against you. Because, I mean, traditionally we have norms and customs at home, we are not supposed to do this, you're not supposed to do that. And if they end up opening up to them, it might go against them, but with us. I'm not going to judge you because I don't even know you i don't know what your Traditional, I mean rules and regulations say so i just go according to what I'm supposed to do.

Speaker 1 14:53

So as a midwife or conventional midwife. Will you be hoping to work with these traditional birth attendants?

Speaker 2 15:06

Yes, I would. I mean, if once you work with them is sharing of knowledge eventually. So, we learn from them they learn from you so I think yes, why not?

Speaker 1 15:23

Which way or what? What way would you want to partner with these TBAs to work, because I know the goal of TBAs and midwives in general is to have a successful healthcare service delivery to your patient. So what way do think you can partner with, or you can work with these TBAs.

Speaker 2 16:00

Working with them would actually be a very good thing in the sense that, I mean, the goal is one we all want altimate healthcare for our clients. And it's will actually even solve the issue of rivery if they think that we are taking their clients away from them, it will would solve the issue of rivery which I think might be a thing happening. But I mean, working with them at the end of the day is just like, training, it bounces back to me say training, once they are trained I mean, and they also tell us what they know about the client Yes. And at the end of the day, it's like, I mean, helping me and help them, scratching my back I scratch your back at the end of the day. So I think, I think and working with them will be a very good thing, if the stakeholders in the community think they want them to still keep running since the community health are the genesis of everything if they want them to still keep run. There could be a forum where midwives and TBAs could come together to share information.

Speaker 1 17:06

So how do you want your patients that are in the center of this service, to get you feedback, when they come for your services? And then we discharged them to go back home? How is the feedback process like?

Speaker 2 17:34

So for every client they all vary differently for whatever services we render. So at the end of the day, you are giving a date to return, or whatever, maybe review or further management, whatever it is, with services rendered from the beginning, would actually even give them more reason to come back. Because it's you and your clients have built a relationship where they know it's supposed to be continuous until they are done. So until i tell you that we are done. So it actually happens because they always come back not everyone, but at least the majority will always return for continuation of services.

Speaker 1 18:18

Okay, so I made mentioned about they are always given dates to come back. So in the process of where these dates are not due do and they have other concerns. What do they do? How do they reach out?

Speaker 2 18:37

And so for every client we have, you are given a registration card with the midwives number on it. If you think it's not very important, or whatever be the case, you can always phone a midwife at any time at all and we'll pick up and we also encourage that if you go home and you still feel you're not well, even after a doctor's discharged, your midwife is discharged, you should always return because we are here for you. So we actually encourage the return whether you're fine or not, you have to return but especially if you are not well and not necessarily this facility

maybe Your place is a bit far. we encurage people to go to the nearest healthcare provider.

Speaker 1 19:23

So would you like if we come out with an ICT platform to help you with the patient's records management and integrating these TBAs that can also in a way exchanging information with you? Would you like something of that nature? Yes.

Speaker 2 19:50

So in a situation where the client actually delivers with a TBA and I need information probably the client has come for immunization and I needed particular information about a client, maybe the client over bleed from whatever the client said. So I could call I mean, go on the platform and then interact with the TBA and find out with this clients that came these days what happened, give me updates on the clients. And I think that at the end of the day, it's like, helping both parties because, I mean, I get information to be able to further help the client and then the TBA actually also help me. Yes, and then keeping of clients information. with the folders they can easily get missing, they are papers. But I mean, if the information is on the net, is on the Cloud, you can always have access to it any day at all.

Speaker 1 20:45

So that was going to be my next line of questions is fine. How, how would you want this system to work to function what features at the end of the day, what do you want the system to do for you, as a as a midwife, and as someone who wants to reach out also to midwife TBAs in the community

Speaker 2 21:16

encourage that if this is supposed to happen, this is going to happen. There should be an avenue for saving of client's information. And there should be a way to contact the TBAs and even the clients as well. Because if the clients information is there, maybe I need to make a phone call to the clients. Or maybe I transfer a client's to a different facility. you could call the client just to do a follow up. And at the end of the day, it's like helping both parties, its like i would always say because I know my client is fine wherever you are, i might not be able to call that hospital because they have many clients, but I can call you directly because your information is on the net. So, this is these are the features i will want to be in it.

Speaker 1 22:01

how would you want the system to be managed? Because this is something that should be in your care, how do you want it to be accessed in terms of accessing the system and when should such a system be it can because you are dealing with patient data data very confidential and so, in your own opinion, what do you think how the system could be managed? Okay.

Speaker 2 22:37

So, patients confidentiality is very key. And if this happens to come in to be in our data, whatever system it is kept in the particular unit where the services are used not necessarily the midwives alone handling it, if maybe you could help provide somebody that would run the services but then the midwife should also be trained as well as the TBAs should be trained on how to use these services because is like a new whole thing coming into being so once the training is done at a particular unit, not away from it. irrespective of who is handling it at least a midwife should be trained so that in case the main person handling it is not around and there's an emergency or something the midwife can handle what ever it is.

Speaker 1 23:35

definitely to access this kind of system you would need a device to be able to access Do you have any computers here or you own a mobile phone? And if yes, what type of mobile phones do you own?

Speaker 2 24:00

Okay, so currently for my unit, we don't have any computers everything is on paper. We don't have any mobile phone we use for data collection or anything we dont have any thing like that but if this has to come into being they have to be provided for us , I would prefer it being a computer than mobile phone because it could easily get broken and easily get weakened as compared to a computer and with the mobile phone can forget to carry it but I cannot forget the whole computer. So for continuity of services to happen i will prefer a computer.

Unknown Speaker 24:41

Do you own a personnel mobile phone? Yes. What type of phone, Is it a smartphone or a GSM. Phone? Smartphone and how do you get the internet? Do you have internet access How'd you if you do, how do you get access to internet?

Speaker 2 25:05

Like every other person I just buy directly from my network providers

Unknown Speaker 25:14

at your own costs? at my own cost

Unknown Speaker 25:18

so if this has to come into being it can be at my own cost

SBA 3:

139 Speaker 1 25:29

what other concerns, do you have, if we should have any electronic system to
141 manage this kind of patients and other healthcare providers we have in the
142 communities or the TBAs what are the concerns Do you have generally or any other
143 opinion,

Speaker 2 25:58

okay. For the electronic world, we can do without electricity. And for TBA in the very extreme parts, electricity would have to provided be to them, solar or whatever form of electricity has to be provided for them. And even in the facility as well. We don't have a plant running and so, in case lights or there is no power supply it means that internet is cut off. And there has to be good internet connection, because the moment the system is slow has to stop so working, I want to give my clients again, just because the system is slow, It stops work, i wont leave my work or clients because the system is slow, work has to go on. So it means there has to be good internet supply. So this is what I think would help.

144

145 Speaker 1 26:52

146 right? This will not be the end, i have actually exhausted the questions for now but that will not be the end of this interaction. I think as and when I need more information. I think I will still come back to you. So I hope I'll be welcome if I need further information. So thank you very much for squeezing your time after your your delivery, successful delivery, you had a baby boy, Ghana female percentage is increasing, right? So thank you so much for the time this afternoon to participate in this. So as I went on this researches or this interview is transcripted. I will still make the information available for you to see what it is. And if there are other corrections or additions or subtractions we could do that together. Thank you so much for your time today. Thank you for I can have your number as well. So that's it. There's the need to contact you further on mobile phone and reach out to you. Thank you very much

147

SBA 4:

Speaker 1 0:01

Thank you, Madam [redacted] I don't know the full name yet but when you introduce yourself i will get to know your full name. As I discuss with you briefly this interview is about how we can find an ICT solution to integrate conventional midwives at the Nyankpala clinic here and the traditional birth attendants or those we call the TBAs in the community. So, thank you for allowing me to interview you or have a discussion with you on this topic. Please, can you briefly tell me about yourself?

Speaker 2 0:46

I'm [redacted] a senior staff midwife in UDS clinic. Okay.

Speaker 1 0:55

Right. So, how long have you been a health worker or a midwife? Three years

Speaker 1 1:03

Okay. At the Nyankpala clinic here Yeah,

Speaker 2 1:07

I have been working as a midwife, as a qualified midwife three years. Before that. I've done other jobs.

Speaker 1 1:17

Yes. Okay. As a health worker, yes. Okay. So what are some of the duties you undertake here as a senior midwife? What are your duties? Okay,

Speaker 2 1:28

so at our facility here, our unity there, the services we offer are ANC services, child well fare clinic services, we do family planning, we do delivery care. We also take care of medical conditions and pregnancy, and we do postnatal, yeah.

Speaker 1 1:57

So that's quite a lot of duties you handle here. And that means that you have a lot of patients who interact on a daily basis. So how do you keep this patient's records that you attend to on daily basis?

Speaker 2 2:18

Okay, so for each of the activities i have mentioned, they have their registers. So we, we record everything that we are doing, the services we give to them is being recorded. for example the ANC clients when they come, every day, we record their attendance and then the outcome of the assessment we do on them and some of the labs we do, we record everything in the register. Okay, so

Speaker 1 2:52

that means that you do a paper base system, you don't have any electronic systems that you

Speaker 2 3:01

use to be yes, for now. That's what we do at our facility here, but we report monthly to the districts Okay, so after every month after the job is done. We'll compile the reports, then it is entered in a system and the districts, okay. So if you want the information, if you want our information you can get it from the district

Speaker 1 3:33

system, but you generate that report on paper on a monthly basis, so in that sense, what are some of the challenges that comes with this manual system or paper based system of keeping records as a midwife?

Speaker 2 3:59

Sometimes, like because it's, it's written, you are supposed to write, when you forget, nothing reminds you that you're supposed to do this. Maybe if it's a PC, and if you not entered something, something can pop up to tell to do something it's doesn't really give the real picture of what we are doing. And because it's not one person's job, i will do my shift and hand over to somebody. So if I forget to hand over something, it's that the information will be missing

Speaker 1 4:48

And information is very key also for you for continuation of your care.

Speaker 1 5:04

so, as I rightly said, This interview is looking at how we can foster an integration between you and the traditional birth attendants. What what do you know about this traditional Birth attendants?

Speaker 2 5:26

Ok, they are just those that believe they were born with that type of knowledge to help women in labor to help deliver them, some even also offer something like ANC services because some of the women that get here, some one will come and tell you that I have I had abdominal pains last week and then I was sent to this person then I had some medicine i took and it is better or it has worsen. So it like they do some kind of antenatal kind of service for them. And also during labor they conduct deliveries. But what I've realized is that they are just doing it based on traditional kind of knowledge and superstitions attached to it. They don't really know the anatomy and physiology behind it. So they are not able to detect any abnormality that might come with it. So, sometimes, when they are having a complication, they now bring the woman here. So we use that opportunity to talk to them about it, there was a time we gave numbers to them, if they report to you, you call us and bring the woman to us,

Speaker 1 7:01

that was just going to be my next line of question about you, if you have encountered these TBAs in your line of work.

Unknown Speaker 7:14

they will always run back to us when they have complications.

Speaker 1 7:17

Okay. So what are the experiences you've encountered with some of your patients in relation to the accessing these TBAs in the communities?

Speaker 2 7:35

Some of them they would prefer to come for ANC services, but when they are to deliver they want to deliver at home , because it's only with weak women that comes to hospital to deliver, So if you deliver at home you are strong, you are a strong woman yeah

Speaker 1 8:07

but then how is the communication relationship between you know,

Speaker 2 8:13

another thing is I encountered a woman in labor, the positioning that we do to deliver them, some of them someone that delivers at home, i learnt some of them they sit in a sitting position and then others do other positions but the kind of beds we have here is just for you to lie at your back so some of them don't feel comfortable with that. So they prefer to doing it at home their way, may be sitting on a stool or they have a local something that they use

Speaker 1 8:58

Okay. So in that sense do you think the services of these TBAs are important

Speaker 2 9:11

Yeah, it's it's, it depends. It can be important but it's also it comes with its own challenges. So if we are able to train TBAs to let them know the implications of some of the things they do and we have a good relationship with them. Yeah, maybe some women is just like labor sets in and they are delivering in that case maybe they could be of help but cases that the labor will start and take sometime we can talk to them to always reports to us, to bring the women to us, some of them actually doing because they also they take money or they are being paid for that or they give them some things, i learnt maybe if you are a TBA and you conduct delivery during the outdooring you will take the head and neck and legs of the sheep they are going to slaughter or something, So we can also find a way we have also compensating them, so that's they will not keep them because of those benefits they get

Speaker 1 10:37

okay, I this is my first time of getting that information or what they gets after delivering a woman in the community. And so, what do you think your own perspective or opinion what do you think are some of the challenges that this TBAs are posed to in their communities on the line of duty? What are the challenges you think they face, so they are not protected, They use their bare hands in conducting deliveries and infections can be transmitted Okay. Okay. So that is what i think they are risky, So in that sense would you like to work with TBAs as a conventional midwife?

Speaker 2 11:39

Yes, because they help, if only we are able to give them the right information and they also try to understand and to work with us, even the home deliveries will reduce if the TBAs knows that if they bring this problem and I bring her to hospital am getting this they will, and if they bring we will be able to keep records and keep our data right. So it will not be bad working with them, they will even let us get more deliveries

Speaker 1 12:17

okay. So, in what way would you like to work with these women by accessing their clients or they just bringing their clients to you, or the two of you at a points, even having a collaboration on sharing knowledge and ideas, what way would you proposed that you will work with these TBAs? Yes. So

Speaker 2 12:55

I think we can work with them by, or it should be a two way if they have our contacts, they will be able to talk to us when there is a case, then we tell them what it means or what to do. Then whilst they are coming Yeah, they are bringing the case to prevent complications. So we can also give them some small training to just assess the woman whiles bringing and we can give them protective equipments. In case there is a labor case they can put that on whiles transferring the person to the health facility for further management

Speaker 1 13:54

so i think sharing information with a TBAs , on a patient that sometimes goes to them and also come to you sharing information do you think is a good thing that the two of you, healthcare workers sharing information on a same client?

Speaker 2 14:21

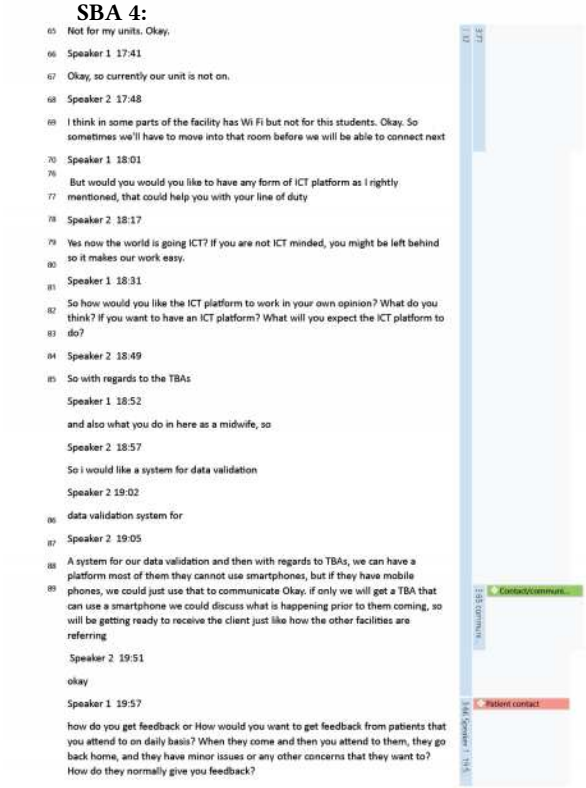
It's not going to be, the language will differ if with the TBA, they are from the community. These people are not able to diagnose they are just doing what's they learn from maybe their grandmother so they thought like they are just born with that kind of thing that they are doing , they are not able to diagnose, is actually when they bring the the person here and Confidentiality is very key to us. Since they can't diagnose they are just given us, this woman is in labor she is bleeding, she is doing this then we are like, look for means and do this to bring the person so we can attend to the person, but not like go into details, like you even seen the client so we will not be able to discuss anything confidential about the client to them, okay? Because if you do so they are in the same community. After that case, the person might not feel fine again incase there is something.

Speaker 1 15:31

So is there's some level of information that you think you could share, which will not be just like you rightly said, The woman is bleeding, maybe started from yesterday. This is, okay. Now, surely, that wouldn't be much of an issue to do. So as I rightly said, this research I'm trying to undertake is looking at what ICT platform we can develop to help integrate you as a conventional midwife and a TBA in a community that is also serving the same patient that you will also attend to the clinic level. And in a sense, also address some of the data records management system that you're having challenges because you do a paper based system and for such a system to be able to also operate it needs certain devices to be able to leverage on to work. So do you own a mobile phone? And what type of mobile phone do you use? The smartphone is a is a smartphone with GSM. Smartphone. And in terms of internet access, how do you see your internet connectivity? If you have any? Is just the mobile internet that we use yourself by yourself, what about the facility is your facility having an internet access for you to use?

Speaker 2 17:37

SBA 4:



Not for my units. Okay.

Speaker 1 17:41

Okay, so currently our unit is not on.

Speaker 2 17:48

I think in some parts of the facility has Wi Fi but not for this students. Okay. So sometimes we'll have to move into that room before we will be able to connect next

Speaker 1 18:01

But would you would you like to have any form of ICT platform as I rightly mentioned, that could help you with your line of duty

Speaker 2 18:17

Yes now the world is going ICT? If you are not ICT minded, you might be left behind so it makes our work easy.

Speaker 1 18:31

So how would you like the ICT platform to work in your own opinion? What do you think? If you want to have an ICT platform? What will you expect the ICT platform to do?

Speaker 2 18:49

So with regards to the TBAs

Speaker 1 18:52

and also what you do in here as a midwife, so

Speaker 2 18:57

So i would like a system for data validation

Speaker 2 19:02

data validation system for

Speaker 2 19:05

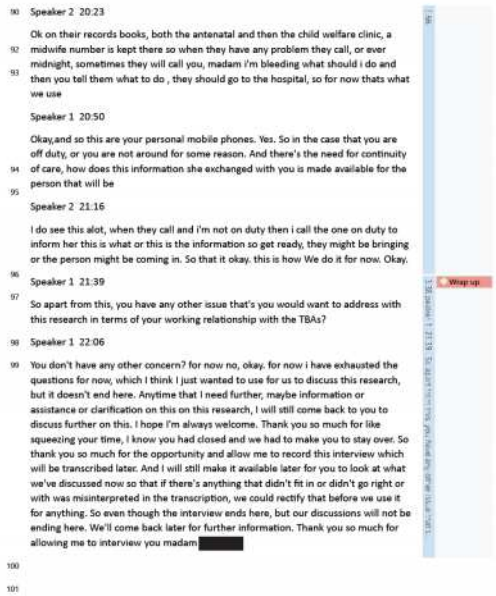
A system for our data validation and then with regards to TBAs, we can have a platform most of them they cannot use smartphones, but if they have mobile phones, we could just use that to communicate Okay. if only we will get a TBA that can use a smartphone we could discuss what is happening prior to them coming, so will be getting ready to receive the client just like how the other facilities are referring

Speaker 2 19:51

okay

Speaker 1 19:57

how do you get feedback or How would you want to get feedback from patients that you attend to on daily basis? When they come and then you attend to them, they go back home, and they have minor issues or any other concerns that they want to? How do they normally give you feedback?



Speaker 2 20:23

Ok on their records books, both the antenatal and then the child welfare clinic, a midwife number is kept there so when they have any problem they call, or ever midnight, sometimes they will call you, madam i'm bleeding what should i do and then you tell them what to do , they should go to the hospital, so for now thats what we use

Speaker 1 20:50

Okay,and so this are your personal mobile phones. Yes. So in the case that you are off duty, or you are not around for some reason. And there's the need for continuity of care, how does this information she exchanged with you is made available for the person that will be

Speaker 2 21:16

I do see this alot, when they call and i'm not on duty then i call the one on duty to inform her this is what or this is the information so get ready, they might be bringing or the person might be coming in. So that it okay. this is how We do it for now. Okay.

Speaker 1 21:39

So apart from this, you have any other issue that's you would want to address with this research in terms of your working relationship with the TBAs?

Speaker 1 22:06

You don't have any other concern? for now no, okay. for now i have exhausted the questions for now, which I think I just wanted to use for us to discuss this research, but it doesn't end here. Anytime that I need further, maybe information or assistance or clarification on this on this research, I will still come back to you to discuss further on this. I hope I'm always welcome. Thank you so much for like squeezing your time, I know you had closed and we had to make you to stay over. So thank you so much for the opportunity and allow me to record this interview which will be transcribed later. And I will still make it available later for you to look at what we've discussed now so that if there's anything that didn't fit in or didn't go right or with was misinterpreted in the transcription, we could rectify that before we use it for anything. So even though the interview ends here, but our discussions will not be ending here. We'll come back later for further information. Thank you so much for allowing me to interview you madam [redacted]

SBA 5 & 6:

Interviewer:
Good afternoon, thank you for agreeing to participate in this research that I have just briefly explained on how we can come up with an ICT platform to integrate conventional midwives and traditional birth attendants or those we term as TBAs in the community and how this can improve on a working relationship and information exchange for an improved and quality of care and service delivery. So my name is Gideon, can you briefly tell me about yourself?

Midwife:
I'm [inaudible], I'm a midwife

Interviewer:
How long have you been working?

Midwife:
I just started one year ago

Interviewer:
Okay, so what are your duties as a midwife at the Young Mala Clinic here, Madam [redacted]

Midwife 1:
Okay, so at this facility, what we do is we attend to pregnant women from scratch, immediately they come, first we do the test, if they are pregnant, then our services starts from there, so from antenatal, to labor, and postnatal, so basically that's what we do here, providing care for pregnant women, right from conception, to be driven after delivery to care the specific place we do, we have our routine, AAC, when they come for AAC visits, we have a routine, our patient, vital signs, all that to check how they are feeling, we give them their medication, if there are some tests to be done, based on their needs, we write for them to do those lab tests, there are ultras for some, the scan and all that, we do it.

Midwife 2:
So basically, just like she said, basically we attend to them through providing services of antenatal care, postnatal care, labor and delivery, we do child welfare as well, and we do any test that's necessary, and if there's a need for any of the patients to be

Interviewer:
admitted, you do admissions as well, so you have patients that you have currently admitted here?

Midwife:
For now, no.

Interviewer:
Today you don't have any admission, so I can say your services are so many, okay, and so how do you keep the records of these patients that you attend to when they visit?

Midwife:
Normally, when they come, every health facility, we have registers, it means that we keep registration of patient data, and if we can, we take them through, so even at the end of the month, we do some evaluations, and we check the number of clients we had, certain conditions we had, how we can get certain equipment, so I think most of the registers are our main way of keeping track of our patients.

Interviewer:
Okay, so that means that you use paper-based to record?

Midwife:
Yes, paper-based.

Interviewer:
Okay, so how challenging is this paper-based system of keeping records?

Midwife:
I think the major challenge, I wouldn't say on our part, but okay, both the clients and the midwives practice, when their folders or alternator card gets missing, sometimes it's difficult, although you have a register, where you've included the name and the registration number and all that, but mostly the registration number is what we use to identify them, because the patients, two different patients can have the same names, so in a situation where the patient misplaces the alternator book or the folder in cases of medical conditions, it's difficult to go back and find the information, because you might go through and see other names, so you might give the wrong

Interviewer:
information to the patient with the similar name.

Midwife:
And to add to what she said, we all know paper-based is always susceptible to wear and tear, but mostly you may even have a register, but then due to maybe one or two reasons, certain parts of the information may get missing, which will make you lose certain information of clients that come, and there are some clients that also come and they may have been beaten by the rain or something, they realise their books get forked, and that one, shrugging some of the information becomes difficult, especially after the period, because when they come for child welfare services, mostly you have to rely on the neighbourhoods and the antenatal was previously had, and sometimes continuity of that's difficult.
I think that's one of our major challenges.

Interviewer:
So in terms of generating reports at the end of the month or weekly, I don't know how how do you handle that?

Midwife:
It's very challenging, stressful. You have to be doing a manually, so you count manually, then you write, go back, count, so you see the register, let's say they come, each visit has a column you write, so the date, their gestation, the medication you put them on. So when it gets to the end of the month and you don't write on each service you provided, you have to do it manually.
So you pick the register, you are now counting for your rights. Sometimes you see the time you finish counting, you forget something, then you start again.

Interviewer:
So you might end up presenting not a very accurate report if you miss this count. As I earlier said, we are looking at how we can integrate this TBAs in the community with conventional midwives. So what do you know about these traditional midwives?

Midwife:
I haven't had an encounter with any, but there are some situations that I've attended to certain clients who may be saying they took certain medications and options from these TBAs which ended up not doing too well for the clients. I think that's what I can say for now.

Midwife:
Personally, I haven't encountered one.

Interviewer:
But from the patients that you've attended to?

Midwife:
Actually, I think somewhere last year, around September or so, there was one lady here, she comes here for her antenatal, all right, but she said it was a weekend and she wasn't feeling well. So she decided to visit a TBA who gave her some pump-punches. So I think about three days later, she started experiencing stomach pains and when she came, although she wasn't 10, but she was in labour, we had to deliver a baby that was dead, stomach.
But she said she didn't know that although it wasn't time for her next day and she said she could have come. That's why she went to the TBA. So from what I've heard, they give them these pump-punches.
So depending on the problem you present, they have something for you. And some of them too, they are good. Like if they are not sure, they will tell you, oh, this one go to the hospital.

Interviewer:
Okay.

Midwife:
Yes, especially I've had some people that say, oh, when I went, she said she couldn't hear my baby. I don't know how they do it. Okay.
So I should come to the hospital and you guys will also have a second look.
Okay. Some of the TBAs, they do well.
When they are not sure, they will tell you, oh, go to the hospital. This one is below me.

Interviewer:
Okay. So in that sense, we've both presented the bad aspect and the good aspect of the services of TBAs. And I think likewise here, you also have your limits to where when you manage a situation to your capacity, you also do referrals.

Interviewer:
Okay. So in that sense, do you think the services of these TBAs are important?

Midwife:
To some extent. Yes. Okay.
I think not to some extent. If their services are important, we just need to do some changes or some education. Okay.
So that their services, although to not match our expertise, they know their knowledge. They have a rationale for everything they do. Most of them, what they do, they don't know their anatomy and physiology.
They are just doing because, oh, it's a tradition. And that's what we were taught. That's what my grandmother used to do.
My mom did. Okay. And now I'm doing.
It's just, we just need to kind of interact with them, give them some education, if possible, so that at least when they are doing their care, they know what their health was. Okay. So just not to some extent.
I feel their services are important.

Interviewer:
Okay. Yes. So, Madam [redacted] would you like to work with these TBAs that are...

Midwife:
I don't have [inaudible]. That's why I said to some extent. I just indirectly answered that question because, yes, their services are needed.
We can't reach everybody. Okay. If you look at the midwives patient ratio, it's very bad.
I don't know what it is currently, but we can't reach everyone. And even sometimes getting transportation here is a challenge to most of them. So if we have TBAs who can serve in the community and are well-trained, well-vested, and well-equipped, I think...
I don't have a [inaudible]. I think they will even have... They will even give more...
They will reach a wider... Yes, they will reach a wider number of people than we would be able to reach. And I think even with them, because they are natives, they tend to listen to their mom.
Okay. Their influence and impact is even higher than ours. Because sometimes they come, we give them advice, and we're like, they told them this, they told them that.
But if you... They listen to their mom even more than us. And so something bad happens, they don't listen to what you say.
So I believe working with them is very important and to be very helpful.

Interviewer:

SBA 5 & 6:

So why do you think they listen to them more than you that have the professional training that they are supposed to? They probably listen more to you, but then it is the opposite way. What do you think is the reason?

Midwife:

I think they live with them. And I think others have had services from them before, and maybe they have had the desired resource. You know, most... They have this perception about going to the hospital, taking medication, and stuff like that. But with them, they just do one or two maneuvers and observation, and they get what they want. And then they feel, oh, this is worth it for me.

And mostly, they are in the first line of... Did I say impact or solution?

Interviewer:

First line of care.

Midwife:

Yeah, first line of care. And some of them, when they patronize them, they get what they want. So I feel, because they live with them, they have testimonies and relationships with them.

So just like you said, they are used to them. The girl with them, let's say she was a child, I mean a pregnant lady, and her mom used to go to this particular lady for services, and it had been working for them. So if she gets to that age, she's also feeling like, oh, this lady took care of my mom.

And it's easier to talk, to relate, like just share with. This lady, you don't even have to force them to open up. You ask them, oh, today, what's wrong? They tell you, I'm fine. Unless you go deep, you'll be like, oh, so were you able to sleep well? Are you eating well?

That's when she'll not say, oh, for the past days, I've not been feeling... But because we are like this, I don't know, they feel we are on top there, down, so they can't open up, they can't talk to us. Okay.

And they also have certain issues about the hospital. They feel maybe if they open up, they will not get the necessary attention or something, or maybe the reaction that may come. But I think a lot of things have changed in the healthcare system, period.

I think just to add some of the past experiences, we are all humans, so definitely some midwives or health workers might have gone out of order, like the way you talk to them or... So if she has a friend or a relative that visited the hospital, like the midwife acted in a particular way towards her, it's [inaudible].

Interviewer:

Yeah.

Midwife:

She'll go and say, oh, I went to this facility, and this... She won't be specific, because she doesn't know you. She's just going to say, I went to this facility, and they are like, we have them, we get something, come here, and they'll be like, I went there and they were this way.

That's why I came here. So if we also do something, she won't go back. Sometimes it's not so easy for me to...

We make mistakes, we talk to them in ways that are not appropriate. Okay. So they are like, okay, if I sit with my grandma, even if she shouts at me, she's my grandma.

Yeah, yeah. Rather than coming with some small girl.

Interviewer:

Yeah. And do you think maybe the language barrier is also something they consider?

Midwife:

Okay, so for me...

Interviewer:

You speak the local language to them?

Midwife:

Yes, so I haven't had a time where language is really an issue. Considering our appearance, the local barrier is okay for me. So I can talk for others, but personally, I don't think the language...

Interviewer:

So you both don't have a problem working with TBAs if that kind of integration system is established. And in terms of information sharing, what is your take on that? Do you think I know you have already chipped in in terms of the information exchange, why they feel so comfortable sharing information with the TBAs and when they come here, you would have to put in more efforts to even get them to speak.

But then with your relationship with TBAs, how do you think information exchange should be, considering the fact that you both attend to the same patients in the community?

Midwife:

Exchanging information with TBAs medually. So now social media is everywhere, but in their case, I doubt if they are literate enough to manipulate the mobile phones or even laptops. The only thing I can think of is maybe through phone call.

So maybe putting some numbers out, like the facility or a midwife's number to them so when they have a challenge or they need more information, then they call the midwife. But before that, you have to come together, you have to meet with them, are they also willing to share with the midwives. If yes, then the training can come, you can have workshops where you include them so that things will be strange.

When you mention certain things, it will be strange to them. Then from there, we can now go to telephone calls. If they have a problem, they call and ask the midwife to call, oh, maybe this month or this week, have you had any patient or a client?

What are some of the things your community members are presenting and all that. So I think phone calls will be the best way to exchange information as far as technology is concerned. Well, she kind of took the words out of my mouth.

And what I will add to that is, yes, we need, first of all, to even establish communication. First of all, there should be an interaction between the two groups. There should be a way that we are able to come together.

Before we can even start trying to get to the social media establishment. What I've noticed is, yes, they may not know much about oncology, anatomy, or physiology, but there are certain things they do that are even much better than what the services we can offer. They are equally very important to the community.

So I feel establishing the communication first, then getting sending this between these groups, to be able to learn from each other, relay or remain, then help them as well get certain scientific backgrounds, rationale behind certain methods, and be able to punish their skills. And we can equally learn certain things from them to punish our own skills. So first of all, we have to establish a good communication.

How we make shows together. Probably the IT being maybe also true, or phone calls, and I think in our communities here, most of them listen to radio stations more than people making phone calls or using social media. I think use radio stations, because radio stations have been wider each year.

Interviewer:

So as I rightly said, we are looking at what ICT platform we can design at the end of the day that can foster integration. You've made mention about the literacy level of this TBAs in the communities, and for that matter, considering that in the design phase is critical. Do you think placing phone calls to the system, okay, placing phone calls to the system for you to be able to have access to the voice notes, to listen to, could be a way of resolving the literacy level that the TBAs might face?

Midwife:

I don't think so. Because there are specific courts for specific information we would need.

Interviewer:

Okay, so we are looking at addressing the challenges that the TBAs might have in using the system, as you've mentioned about placing phone calls. This is just a suggestion I'm bringing, but you are working with the patients and you are with the system, so you understand how the system works much better than I do. But then I'm looking at if the TBAs sends a voice note, which might not be too difficult for them to do because of your calling to the system, and leave a voice note, and this voice note is saved in the system, that's when you can have access to that information to know what case was presented in the course of the day, so that you can be aware of maybe the patient that is involved in this particular situation. I don't know if that is something that will be workable or sustainable.

Midwife:

With what I've seen, I think the problem here is because we are still using the paper base, other hospitals internally have switched to the computer base, so that one is easier. So when you just come to work, you enter your credentials and you know everything that went on.

Interviewer:

So that is what I'm presenting, so if you are moving from the paper base, the ICT platform I want to propose should be able to take care of the paper based work that we are doing, so that you do it electronically. And then on that same system, TBAs can probably call in and then leave a voice note, and you can identify this TBAs with their telephone numbers and their location, okay, and they leave a voice note on the patient that they have attended to, and maybe what information they have for you as a midwife, in case the patient should also come to your facility for continual service. In the first place, would you like that kind of system?

Would you want to have that kind of ICT platform that would take care of the paper base system in the first place? And if you would like such a system, what would you want the system to do for you as a midwife, and information exchange between you and the traditional bed attendants?

Midwife:

So, yes, I would like a system like that to take place, what I want the system to do. With that one, I think as far as it can save information for someone else to also go share, have access to it, it's okay for me, it's enough. Now with the TBAs, I don't know how you get them on board so that they can also use it effectively. That would not be the problem.

So if the calls can also be in the system or something, I don't know how it would be done. But if it's possible, why not? So it can be saved here or something.

If it's possible, sure. The system, honestly, is not very much yet. But I'm still trying to imagine a TBA who is using a phone and logging into it.

I don't know if it's an app or if it's a code you would have to dial to have access to the system. So I'll need clarity on that.

Interviewer:

Okay, so we are looking at a system that should be able to take care of TBAs as well, whether she's able to read and write or she's not able to read and write. A TBA that is able to read and write can put in a text or other forms of information as and when she attends to clients. But TBAs that cannot read and write also have mobile phones that are maybe YAM or called GSM

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phones that are not smartphones, but they can place calls with these GSM phones.
And we can provide them maybe with short calls that they can dial and say, today I attended to Madam [redacted] as a first-time mom. She's 24 years. This is her first pregnancy.
And this is the diagnosis I did. And maybe she needs further care. So I'm referring Madam [redacted] from this community to your facility.
Just a phone, a voice note, as you use the WhatsApp voice notes. And I know you sometimes have friends that are not literates, but they manage to use the voice notes to be communicating even on WhatsApp and exchanging information. I have friends like that.
So another technology is to look at that voice system for them to be able to send you this basic information into the system that when you report and you log into your system, you can see this voice notes that is coming from the TBA in this particular community called this unique ID number. OK, so it is our responsibility to identify these TBAs in the community and profile them and give them unique codes and register them onto the system with their phone numbers and unique IDs. That when you see the name of the unique ID, you can know that, oh, this is Madam at this community.
So you can identify these TBAs in the system. And as and when they also provide information, you can have access to that information in the system, whether they are literates or illiterates. So I don't know if you have clarification on this.

Midwife:
OK, so in a situation where she gets the code, places them home or sends a voice note, how then will she get the feedback?

Interviewer:
So a feedback from you, the conventional midwife? Yes. So as I said, we profile them.
So with her unique ID number, we find her telephone number, we find her house address or her location. You can call back or you can trace to her house location or community. Her name is there.
And then you can trace back or you can place a call to the phone numbers that will provide for us to use as a communication channel that you can also get feedback to them on this platform.

Midwife:
Thank you. OK, I get it. Excuse my words.
It's a nice initiative actually. I think it will serve a lot of purpose. If it's done rightly and a lot of sensitization is done, a lot of education is done on how the system works.
And then I think checks and balances in the system to be able to control how information is sent because in as much as there's a lot of information coming in, it's not everything that you're getting in the system that will be accurate.

But I think there should be a form of checks and balances to be able to control what counts and what doesn't. I think what she said, meaning the system will have to be designed in a way that it can pick up all and kind of, should I say, it should be able to analyze the data.
Just categorize it. I think there should be an administrator or a set of administrators who will show how it's done. If not, at the end it will just be like the paper base.
If the system is not able to create a table or something, maybe. So within this week, this particular community, two TBAs with this number called in, with these conditions. So the system should be able to listen to the notes even before you deliver.
So before you come to listen, the system operating generated everything and tallied, if I should say. Even within the system, it should be able to even direct all these calls to specific facilities or people. Because, yes, we are a professional midwife in this area, but we are not all from the same facility.
We should be able to distinguish each facility and know which will be more... But I think with what you are saying, so yes, there are TBAs, so you can assign them to facilities. So say this...
UDS clinic. So they are taking the Nyangpala or UDS campus. You can assign them there.
If they have a TBA there, so you are kind of reporting to UDS clinic. There may be Nyangpala health clinic or health center also have their TBAs that are supposed to report or send information. So I think with that one, it will be very important to the nearest health facility.
So that it will be like everyone is just calling in. That way it will be difficult to track. You can have someone from Seattle calling in here.
At that place, they also have someone or a facility to report. So each TBA and the facility will also report.

Interviewer:
So I think managing this whole system, that was some of the questions I was here to ask. Somebody must be responsible on these messages that come in. And I think that is where the role of these in-charges comes in.
So as and when a TBA sends in an information, an in-charge can get an alert on the information that has come in. Then she decides what intervention or who should intervene or take the report up.

Midwife:
So I was hoping about it. I think it's okay if I bring it. I was thinking if they are leaving the message, sometimes it's a lie for them.
So if it's possible, although it's going into their system, but it should be directed to say if it's an in-charge. The message, she doesn't have to come to their facility to hear it. She can access it on her phone.
So immediately the message comes. He or she listens, then can contact. If she can give information on the interventions to be taken, the person goes ahead.

If it needs that the TBA should bring the person to the hospital, if the in-charge is not around, the in-charge should be able to tell whoever is at the facility that they are bringing so and so. So this TBA is bringing a patient with this disease. Although it's on their system and all that, I think someone should be there to have prompt response.

Interviewer:
From the few interviews we've done so far, these TBAs mostly will refer when it's an emergency or when it's a complication already sets in. So that would require some form of an emergency intervention. So I think it's a very good idea we treat those information from the TBAs as emergency response cases.
Okay, that's a very fruitful input. Personally, do you use mobile phones?
Because for such a system to work, we have to understand the type of mobile phones you use.
Even if you have a mobile phone in the first place, because the system cannot run or cannot be utilized without any form of device, it being a mobile phone or a laptop or a tablet. So which of these devices do you personally use as a midwife? Phones.

Midwife:
Mobile phones.

Interviewer:
Mobile phones. You use their smartphones or their GSM?

Midwife:
Smartphones.

Interviewer:
Okay, and do you have internet access? If yes, how do you get your internet access?

Midwife:
Excellent, we do it. Just like everyone.

Interviewer:
You buy the data, but is there a facility having an internet?

Midwife:
Yes, there's Wi-Fi connectivity, but it's not so strong in this building. So if you want to get information online, you have to use your own data.

Interviewer:
We've looked at how patient TBAs can report to the system and how you can also access the information and also reach out to the TBAs through the system. How about the patients that are in the center of this system? How do you want to get feedback?
Most of the cases, they come to the facility, you attend to them, they go back and then when they have issues, I think you made mention about patients not even being aware that she can come back to the facility until her... It's due. It's due.

That means that there's a bit of communication gap on how patients can reach out to you for feedback. How do you want to get feedback from these patients that you attend to as well?

Midwife:
For now, I think when we have a patient on admission and the person is being discharged, when they are going home, apart from educating them on their medication and then telling them about the things they can do to prevent the condition they came with, we always encourage them to come back for a review. Okay. So for now, I think that's what we do.
But personally too, I've had clients that take my contacts. So they call in. So once I've saved the number, once in a while I can just call back to find out, oh, since you went, I've not seen you, but is everything okay?
I must confess, I don't do it all the time. Yeah. But some of the clients, when they are going, they will take your number.
Anything on their ANC, their midwife writes the contact number, telephone number. Some of them, when they have issues, they call to find out. But putting them in the system, I don't think it will be advisable because it should, it's like, yes, it's about them, but it should be confidential.

Interviewer:
Okay.

Midwife:
So I don't think I would encourage that the patients or clients are giving access to the system. Maybe we can provide them with codes or something they can call in to get information.

Interviewer:
Okay.

Midwife:
But to give them access to the information on their system, for me, I think it's to you particularly. Okay. Just as you said, the only way we can really find a solution is establishing effective communication.
I think that should be in favor of a lot of facilities. First of all, getting a trusting relationship with them. For them to be in the system, to be too ambiguous, certain information would be very easy to get.
So even if they are already in the system, meaning they should have certain limits, where they can get health education solely. So I think that's the only way they can be put in the system. Like they shouldn't have other access to other things that they want.
So the system can be a version for TBAs, health professionals, to, like you said, voice it. So they can have voices of health education and those gaps. I think that some of those fell there.
Network. Yes.
Living. Yes, living with messages. You listen.
You listen to it.

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The extension is a disaster. Yeah, I think that's where that can fit into the system. Okay.

Interviewer:

So a patient logging into the system and having access to her own personal health records, you don't think it's a good idea?

Midwife:

Everything is supposed to be confidential.

Interviewer:

From the patient?

Midwife:

Sometimes, yes, it's about you. But there are certain things around which certain things are better kept private, better kept between health professionals, better kept between this group of people. It would be nice, even with that one, even aside the person having access to their own information, any other person can have access.

And it's a community. This person might say, hey, this lady, this and this happened to her. We have a lot of stigma around it.

I don't think it's a good idea.

Interviewer:

Okay. It's not a good idea. I get it.

So the patient that we are, at the end of the day, looking at improving his health, you think it's better the person is not previewed to the health, the information that concerns him.

Midwife:

I'm not saying we shouldn't tell them what is wrong with them or hiding any details. My point is don't give them access to the system.

Interviewer:

To the system.

Midwife:

So yes, do the midwife, nurse, whatever. Try as much as possible to explain their condition to them. Yes, I have malaria.

How did I get it? What should I do to prevent it? My medication, how should I take it?

What am I supposed to do so that it doesn't come back again? Because at the end of the day, we are not just treating. We're also trying as much as possible to prevent.

The prevention should be comfort. Giving them access to the system, I don't see how it's going to improve their health. Don't get me wrong.

Yes, it's about them. They are supposed to know. But I think everything they need to know, you, the midwife, or the nurse should tell them.

Because even on the system, it might just be there that, yes, this patient has malaria. He or she logging into the system, he's not going to get the information that, oh, so if I have malaria, I'm supposed to take this medication. Or these are my signs and symptoms.

At the end of the day, you, the midwife or nurse, you are going to tell him. So he getting access to it is just going to complicate matters. Because if he sees his diagnosis, he's going to show it to someone.

Okay. Just as she said.

And it's going to start. Yes.

Interviewer:

Then everybody will want to have it. Okay.

Midwife:

So they being on, having access to it, know that health professionals should do as much as possible to explain to them, this is what you have. This is what we are doing for you. And this is what we are hoping to achieve at the end of the day.

If you have further questions, you ask. Or better still, you Google it yourself. If the information I'm giving you is not the number, whatever you see on the system, I don't see how it's going to enlighten you on your...

Okay. You might see things you don't really understand because some of the medication, you understand. What the doctor, the prescription or whatever he or she writes there, some of the times it's the nurse and doctor, medication and doctor, that will understand it.

Because we don't just take normal. Okay. We're not even saying that the patient shouldn't have the rights to their own information.

But we are saying that even before, it's like... Before, even if you are someone that is putting the information in the system, if you are really doing your work, the patient would not really know what is going on, what is happening, the next line of action. So I don't think it's necessary to even need to do that.

Okay. Anyway, the person goes on the system and sees certain things. The language will go there, it's not the labourer's language.

It's all about to make the actions.

Interviewer:

Okay.

Midwife:

Worsen the matter.

Interviewer:

Okay.

Midwife:

So for me, I don't think it's... Okay.

Interviewer:

Okay. Okay, so what other concerns do you have? Okay, maybe in terms of generating your monthly reports, what do you expect from such a system?

Midwife:

First, I think my challenge was you mentioned the internet, because a system like that would need internet connectivity to be able to use it.

Interviewer:

Okay.

Midwife:

Earlier one asked about that. So before it comes, maybe the facility should have a good internet connection.

Interviewer:

Okay.

Midwife:

That's once you just take the computer or phone, you can log in. Because if I'm to use my personal data, and then in relation to the reports, I think you mentioned it, the system should be in a way that at the end of the month or even at the end of the day, it should be able to kind of profile. Today we have this number of malaria cases, this number of motor lung condition, typhoid, anemia, so you should be dead.

Their ages, because if it's a system, meaning right from the OPD, their history has been taken, so it will look like children, adults, female, male, so that at the end of the month, there will be a path I'll just have to click or a button I'll click, and you'll get some information.

Interviewer:

So you just drew my attention to the OPD case you just mentioned. When your clients come, where do they start from? They start from the OPD or they come to the maternity unit straight?

Midwife:

It depends on what the system is. If they are coming as a new registrar or antenatal, they come here straight. We have their books here.

Once their health insurance is active, we do everything here, then now direct them to the lab for their test, and then they come back here. But if it's a medical condition, they have to pass through OPD, see a doctor. If they have to be admitted, then they come.

Okay.

Interviewer:

Okay, so there are two ways they get into your facility. Okay. Okay.

Okay. Well, so any other additions? Generally, this might not be the end. I'll keep coming, and when I need more information, we can discuss it. But for now, what other additions do you have to the questions I've exhausted?

Midwife:

My additional advice is a consent. Okay. In this situation, you said a charge is supposed to violate and regulate the system.

Interviewer:

It was just a suggestion of how, maybe.

Midwife:

Devices

Report generation

Okay, I just wanted to confirm. In a situation where an in-charge may be unable to access the system due to maybe faulty phone, maybe no internet access, and there's a need for timely response, how can that be worked on? That's my consent.

Okay. And the challenge of accessibility, is it going to be a system that's using someone?

Interviewer:

Right. Not yet developed. We are looking at all those.

No, I meant to say like an app. Yes. It can be an app, it can be a web-based application.

Midwife:

Meaning internet access.

Interviewer:

Exactly. And we are also going to consider how you can work offline if there's no internet, and then when later you have internet, how you can update the information you had, maybe when there was no internet. So there are all possibilities.

Yes, that's my consent.

Midwife:

Okay.

Interviewer:

So no, it's a very valid contribution. In a situation where an in-charge is not available or the system couldn't reach out to the in-charge, what happens to the information that comes in? I think it's something we need to consider and decide.

So this is where your input is very important, how this information should be managed so that it will serve its purpose. Because if it comes to sitting and it's only the in-charge that can have access and the in-charge is not available, the in-charge phone is off, what happens to the information the TBA is sending across? So I think it's something we need to reflect on and assume that can give us alternative options or ideas how this can be implemented successfully. So after in-charges who is on duty, that can also act on such an information after the in-charge. So it's a reflection that is very important. So in your case, what do you think is your general conclusion what's your expectations or any addition that you have?

Midwife:

I think most of my questions have been addressed. But what I just have to say is that if it's possible, it would be a very good initiative. Communicating with them and all that.

But first, we have to make sure that everyone is on board. Midwives, TBAs, they are willing. Most of us, when it comes to change, we go back, but nobody wants to accept it.

Internet connecti

Willingness

SBA 5 & 6:

So first and foremost, we have to make sure that everyone is on board with it. And also make sure that the people that are supposed to oversee the smooth running of it, do so. Because at the end of the day, if it's implemented, we can't make maximum use of it.

I don't see the point. We just wasted our time and resources. Basically, everybody has to understand that it's something new.

We all have to help each other. At the end of the day, we are looking at the clients, the patients. We want to make sure that their health is our priority. So whatever we can do to improve it. It's your first try as much as possible to talk to them. Not just the midwives, the TBAs as well.

Oh, this is something we are thinking of. What do you think about it? So if both parties are willing to collaborate on this, I think it would be a very good initiative.

Interviewer:

All right. Thank you so much for your time this afternoon. As I said, this will not be the end of it.

I'll keep in touch as and when I need further information. I'll be welcome to disturb you again for my conversation. Thank you for now.

I'm very grateful for squeezing your time to participate in this discussion.

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Interviewer:
Thank you very much, Madam [redacted] right?
Can you briefly tell me about yourself?

Nurse:
So, I'm [redacted] but I prefer to be called [redacted]. And then I'm a general nurse who works at the ANC ward. And basically I've been here for a period of two years.

Interviewer:
Two years, okay. General nurse, so what are some of the duties that you undertake here? What do you do as a general nurse at the maternity unit?

Nurse:
Okay, so with general nurses, our training is set that we can fit anywhere. So with this unit, anywhere I'm being assigned to, I'm able to work. So I'm able to do power patient, hall talks.
With maternity, we get admissions. Malaria in pregnancy cases and other conditions coming in for admissions. And then we also give family planning services to working clients and clients who have received our service and gone through our education, if they make necessary to take in that.

Interviewer:
Okay, so that's quite a lot for you as a general nurse here at the maternity unit. So how do you manage the records of these patients that you attend to on a daily basis?

Nurse:
Okay, so first of all, we have an ANC register, which each client is registered on. First clients, we register them on that book and then we start from there. Every visit, we have to go back to trace them and then do the necessary entries in that book.
So that's how we keep in track with our clients. But then we also get other clients coming in from different hospitals for our services. So we try as much as possible to still fix them in the book and then we are able to continue with them the next time they come.

Interviewer:
Okay, so even from other hospitals, when they come, what information do they come with?

Nurse:
Okay, so with the ANC book, they come registered already from that facility. So we have to take it up from there. If there were some things they didn't fill in the book and if there were some labs and stuff they were supposed to do which wasn't done, then we have to do them for them.

Interviewer:
So that means that it's paper-based or a manual process of keeping these records?

Nurse:
It's paper-based because it's just a book which we keep the record in it.

Interviewer:
How challenging is this for you? What are the issues with this paper-based records management?

Nurse:
So with the paper-based management, we have a whole lot of challenges when it comes to that book. There are new people who would come in and then they sit behind the book and then they don't enter certain information. And then the next time they come, it's difficult to trace to know what you want to find in that book.
And there are some women who would also misplace their lab results, their scan. And then when they come, it's difficult to trace them unless they go back to do a new set of results for you because you wouldn't get the info if the nurse on duty forgot to do the right entry. So you'd have to repeat the whole test again.
So I think that if it was an electronic system where everything is entered, you are able to trace it back no matter how long it takes for the patient to return. But for here, sometimes they misplace things. The paper can easily get missing and someone can mistakenly tear a part which is vital in that book. And then it's difficult to trace the information. But once it's electronic, I think any day, any time, you can only trace it unless, of course, it's been formatted.

Interviewer:
So retrieval of information or retrieving of these records itself is very challenging. And the retrieval processes for this information can also be very tedious because you have to refer back to dates and which book and the time you spend in doing all this is critical.

Nurse:
Very, very critical.

Interviewer:
Okay. The purpose of this research is looking at how we can integrate traditional bed attendance in the communities with the midwives or the health care workers in the maternity unit with some form of ICT platform where maybe it can mitigate some of these manual processes of information that you are keeping. And then also set as a platform where there can be an information exchange from the TBAs to the clinic and that will give you better information about what some of the TBAs are doing at the community level and how that information exchange can help both of you improve the quality of the health services of these patients that you both attend to.
So, have you heard about the traditional bed attendance?

Nurse:
Yes, we have.

Interviewer:
What have you heard? What is your experience or encounter with them?

Nurse:
So, what I know about them is that they are people who are trained to take care of emergency deliveries at their community level. Some have been trained, others are not trained. So, in case there is an emergency and they are called at night, they are able to conduct the delivery to save their life and then the mother as well.
So, basically that's what I know about them.

Interviewer:
Okay. Have you encountered one personally before?

Nurse:
Personally? Okay, at my village we have one TBA and she has been in the delivery, should I say, system for a very long time and she is still working actively to do her deliveries when it comes to women that deliver at home. Some actually prefer to just deliver at home.
No matter what you do, they want to deliver at home. So, she attends to those cases. Okay.
Basically.

Interviewer:
And with the patients that you've attended to maybe for the past two years as nurse or the attendee unit, what is your experience with patients in terms of TBA services they have been to? What have you heard from some of these patients about their encounter or experiences with TBAs?

Nurse:
Okay. So, what I hear from them, some of them when they come, you first of all have to take a history of their previous births, where they gave birth, whether it was a home delivery or at a hospital facility or something. So, when they tell you it's a home delivery, you ask how the process or why and how the process went through.
Some of them will tell you that at home the TBAs don't have any medications or any sterilized equipments to use, but it's always just by God's grace that some of them go through. And others will tell you that they deliver at home and then they later have to go to the hospital because they maybe overbled, which they later had to come to the hospital to seek for the services of the healthcare professionals. So, yeah, a lot from them.
Others will tell you they lost their babies in the process, but others will also come praising them. When they come with them, the process is delaying. They try to compare the home delivery with the hospital delivery and they don't see why they are doing certain things.
Okay. And all that. Okay.

Interviewer:
So, do you think the services of these TBAs are very important in the community?

Nurse:
Okay, so to me personally, I think their services are very necessary because there are cases where the woman is not able to even, should I say, follow the ride they want to use to get her to the hospital. That is probably a motorbike. She can't sit on a motorbike at the point she is in pain and some of them it's always like head and vaginas.
Once the head is in the vagina, the woman is not able to go anywhere unless she delivers at that point. So, I feel that their services are very necessary. It's necessary that the typical villages have them around so that in case of those emergencies they are able to attend to.
So, I would rather think that their services are very necessary, but they require to go through some training so that they would conduct the delivery neatly and without any complications afterwards.

Interviewer:
Okay. And have you experienced from these patients or heard about any complications that you think that usually sets in as a result of maybe their TBAs not doing the right thing?

Nurse:
Okay, so I remember there was a case, I'm not here, but once I was doing my service, there was a case that we had and they tried home delivery and it wasn't successful and they came. Later when the baby was delivered, we realized that the baby's mouth was kind of inflamed and the eyes as well. So, what I picked was that they were doing the wrong V.
Like when a woman is in labor, you need to examine her and once you go in and it's not the surface you are finding, but rather you are putting your hands in the mouth of the baby or the eyes of the baby, the baby will come out with certain complications. So, I've witnessed one like that.

Interviewer:
So, as I said, we are looking at how we can integrate so that you can both share knowledge and information on these clients that you are attending to in the community. What are some of the basic things you think the TBAs should know or be educated on from your point of view as a nurse?

Nurse:
The first thing I think they should be educated on is how to deliver a baby without the woman getting infections. To be able to do that, looking at the home setting, to conduct a delivery set that such complications will not come in, it wouldn't be possible unless they are given a set like those sterile packs to conduct those deliveries nicely and safely. So, I think that they should be educated on things to use for those deliveries, the right instruments to use for the deliveries.
And they should also be educated that once you conduct a delivery and the woman has lost some amount of blood or some quantity of blood, she should be referred to the nearest health facility for continuous check-up. Basically,

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those are the things. Just how to conduct the delivery very well and be educated on what to do when things don't go well.

Interviewer:

When they do an examination, they should quickly or as soon as possible then refer and what they can attend to.

Nurse:

There are some cases, even at the hospital setting, where midwives are available. Midwives aren't able to take care of those cases. So, I would educate them to bear in mind of certain alarming signs that they will get to know that this case is not their case.

They should quickly do something about it after the delivery in case they are not able to hold it. If the woman is not able to hold it and the delivery is an emergency, they should do the referral as quickly as possible. And if there is still time, because there are people in the community who would just prefer to give birth at their end.

So, once they know that this is a complication or after delivery, there will be a complication, they should quickly refer rather than trying to let them go through the process in their care.

Interviewer:

So, as a nurse, would you like to work with these TBAs? If it happens that you have to share your knowledge, work with them, are you willing to work with these TBAs?

Nurse:

Yeah, I'll be glad to work with them. And the reason being that they need a lot of education to be able to save lives. Because they are equally saving lives at their end.

So, I'll be very happy to welcome them and then to teach them the knowledge I have. And also embrace what they have. Because they say experience is their best teacher.

For all I know, I'm just at the health system. But they are over there and they are very experienced than I am. So, I'll be very happy to share experience and knowledge together.

Interviewer:

Okay. Would you like to have a system or an ICT platform where we can identify these TBAs, as you said, train them, identify them, educate them on a lot of issues concerning how to give safe delivery. And then provide this platform where they can give in basic information about the clients that they attend to.

And you can be able to get to work, log in and then you can see what TBA A in Nyangkala has done yesterday night. Or who she attended to and what she presented to the person. Any medication, what was the diagnosis, did the person refer.

Or you can have the contact of these patients that you can do follow-ups to. Do you think an ICT platform or any joint help your work?

Nurse:

I think that would have been a perfect idea to have that ICT system in place. To check or monitor the duties they provide to their clients. So that we are able to pick it up from there.

Because there are all these cases, you get TBA, deliver a baby and they come. And you don't know what they have given and where you are continuing from. Once there is a system in place and the TBA is able to tell you that I delivered this client and so far I haven't done anything.

You are able to pick it up from there and do the right things that you are supposed to do for the baby and mother as well. Once there is no system, they do what they can do and then the rest you are not able to track.

Interviewer:

What information would you want the TBAs to exchange with you or share with you? Mostly with the patients they would attend to or what they do at the community. What key information do you think you would want to have or know on these patients they attend to?

Nurse:

The information I would want them to report to would be the baby's general condition. When a woman gives birth at the hospital, the midwife is supposed to check the baby. The weight of the baby, the length of the baby, the head circumference of the baby.

And then the general condition of the baby, whether everything is normal or not. And then the midwife also reports on the mother, which is the vital signs of the mother. And then whether the mother bled profusely or it was a moderate quantity of blood that she lost.

So I would want them to report on the quantity of blood that's estimated quantity. They can't actually get the exact, but they should be able to tell the quantity of blood that the woman has lost. And how the baby responded when she came out, whether the baby did cry or not.

So those are necessary stuff that we'd want to now put on paper when you meet the baby, the first contact.

Interviewer:

And how would you want to receive this information? Do you think the ICT platform should have a voice-based integrated system that when you log in, you can listen to? Because one of the concerns so far is education.

And most of them cannot read or write, but then they use mobile phones. They have mobile phones that they do sometimes make calls. And that a little bit of training on the voice, placing phone calls can be easily achieved.

Do you think the voice method would be helpful?

Nurse:

I think the voice method would be perfect for the uneducated ones. Because currently, looking at my village situation, I think those around that do the home deliveries, they are not educated, but they can record. So if there is that part of the system that can give them the opportunity to record, that would be very helpful.

Because the background of the TBAs are not really that. The educational background is not to understand, they can write or probably give some reports. So the voice will do.

Interviewer:

And compared to the patients that both of you attend to, in terms of feedback, most of them have today listened to. Some of them are having some of your contacts, some are not having. And some of them just think that once they come for the review, and they go back on the due date before they can come back.

But then I ask, so when you have emergency cases, how do you get help again or information on what you have? For example, one woman said sometimes some of the medications they do come for, and they get back home and they start to take their medication. Some do get some, shall I say adverse reactions or some form of changes.

And some will stop taking it because they don't want to continue experiencing those changes they've seen or those adverse reactions. And if they're not able to come back till the due date, what do they do? So the feedback is something that I think must be very strengthened, not just the review dates, but when they are home, you also have work to do, and it keeps them busy.

So if they pick or they experience any form of challenges with their health or the pregnancy and they want to get feedback, do you think the system should incorporate a way or a form that they can reach you out, irrespective of their personal duty? They should be able to get back for further information.

Nurse:

Yes.

Interviewer:

Or they must just wait for their due date before they come back.

Nurse:

Okay, so what we always tell them is that some come for AAC and they are supposed to come back in a month's time, others two weeks and others one week. So we tell them that within the period we have given them to come back for AAC, if it so happens that they are not feeling well, they can come back and then see a doctor. But then others will never come back until they are actually coming back for AAC visit.

So there's a portion that in the AAC book, we have contact number of the midwife in charge. So when you pick your book, all of them have, when they

pick their books, they have the contact number of the midwives. Others will not call, and others will even pretend as though there's no contact.

They'll tell you that they don't know what to do, so they have to wait until then. So I think that we here would be glad that it's incorporated, and if you are doing the electronic system, you have something like that, so that they are able to call for any information, be it sickness or whatever, they just need to know in their pregnancy period.

Interviewer:

And do you think a mobile app or a website, how would you want, let me ask this question first, what other features do you think such a system should have? You know, you have been working here for some years now, looking at your clinical workflow, what features do you think this system should incorporate that would really help you as a nurse and the patient at the end of the day?

Nurse:

Okay, so with the system, I think that the system should have, I don't know how to put this, but if we are incorporating an electronic system into this assessment, it should have a place for emergency contact. So that the nurses are able to be called upon when it comes to emergency. And then there should also be a list of contacts for all our clients, so that the nurses are able to also contact some of their clients randomly to just check on how they are doing.

So if there's a place where you have contact of clients and contact of nurses, you are both able to contact each other in any case of emergency. That's what I think. It may be probably a reminder, like it should be like a reminder kind of thing to them.

Some would also even forget their day off until it's also, if there's a reminder. Okay. So that the nurses pick up to call those people.

Interviewer:

Okay. Or if the system can also send the reminders to the patients automatically. Messages or something, yeah.

Messages or voice notes, whatever. Okay. In your opinion, do you think nurses or midwives or the units here are limited in a way with the devices you need to be able to work if there should be an ICT platform for you?

What are the challenges do you think you face if we should present you an ICT platform that you can interact with both your patients and then face traditional bed attendance? What do you think would be your limitations? What challenges do you have?

Nurse:

What I think would be the limitation would be that most nurses here haven't gone through that kind of system before. So in case we are presented with that system, it would be something new to us. So I think that there will be a

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challenge if we have not gone through pre-education or we haven't taken through the system, like through education and what to do or not.

There will be a challenge. It will be very challenging for us. And then with the number, if such a system is introduced, meaning you would require a very competent person who would always be behind it.

Okay. Meaning the person has to be dedicated to doing this. So you would have to get that dedicated person.

Interviewer:

You should get somebody who will manage the system. Yes. Okay.

So sharing information. Do you think we are looking at health, people's health information where they know how crucial or vital it is when it comes to patients' health information, the privacy of health patients' information. Do you think sharing information with this TBAs or the TBAs sharing information with you on a platform about your patients could pose any challenge or illegalities or exposing your patients or your clients' information?

What do you think of that?

Nurse:

Okay. So we as nurses, we have learnt that patients have their right to information. And then any nurse that discloses any information of our patients without their consent can be sued or whatever.

So with the system incorporating TBAs sharing information on a common platform, I think that if the information is going to be shared with the details of the patients, some patients will be offended to see certain information of TBAs on that common platform. So I would prefer... There are cases you can report but withhold the name of the client and then maybe backdoor, just give one person that info rather than just put the whole client's name and everything, which when everyone just look out, you can point to know that this is the person they are describing or giving the information about.

So I think that if that is actually going to be done on a common platform, it will create that kind of problem.

Interviewer:

You need to look at that.

Nurse:

You need to look at the privacy side of it. Okay.

Interviewer:

So definitely when we present you such a system, you will need some devices to be able to work as well. Do you have any computers here we can leverage on your personal devices for you to be able to do some of these services?

Nurse:

Okay. So over here, we don't have any computers for that. So if such system is going to be introduced, unless we get those computers that will be used for it.

Otherwise, staff could use their personal devices, but that will be a challenge because if you are using someone's device and then a person is running a shift and probably gets engaged in something, once you are off shift, sometimes you remove your mind off duty. So certain things you don't want to attend to because you are off duty and then you have your own personal things to deal with. So if you have to depend on personal devices, it will be challenging.

That will be challenging. Okay.

Interviewer:

So you think it should be devices that is owned by the facility so that in that sense, when you are on duty you can access those devices and then leave it behind?

Nurse:

Yes, you hand over to the next person. That would be appropriate. Once it's my personal thing, when I'm going home, I'm sending it home.

But once you get those devices and they are acquired by the hospital, every nurse would hand over to the next shift and it will continue that way.

Interviewer:

Internet connectivity. Do you have Internet access here? Or personally, how do you access Internet?

Nurse:

Okay, so personally, I use my own router. But there was this connection they did pass. I think this island is not strong.

Those who used it before said it's not strong. They ever came to connect us with this Wi-Fi, but it's not strong. It's not working.

It's off and on. Okay. But I haven't used it before, so I don't know how it is.

Interviewer:

So you have a phone and you use your personal smartphone to access Internet? Yes. Okay.

What other information do you think we need to facilitate this kind of project to make it a success? Apart from questions that I've asked, what do you have to add?

Nurse:

Okay. To be able to make this whole thing a success, it will all depend on the willingness of the staff and then the cooperation between the staff and then you guys. So if there's this mutual communication on what you guys are bringing on board and then the staff are ready to embrace it, I think it will work very well to the betterment of the facility as well.

Interviewer:

Okay. So you are willing to embrace such a system if it's available?

Nurse:

Personally, I am. I'm willing to.

Interviewer:

Okay. In terms of your report generation, I think I had pointed out that you do send your monthly reports on your services and you generate this also from the paper-based system. Do you think the system should incorporate some kind of automating your reports that you generate manually on a monthly basis?

Nurse:

Yes, I think that would also be very nice if we have that electronic system in place to generate our reports, to make the burden less for me, the staff, because you have to sit down, open the whole big book to look for information. But once the system is in place and then I write a report, I think the system will be able to just generate it and grab it to go. So I think if there's a way that can be incorporated as well.

Interviewer:

So, Madam [redacted] I know we have exhausted the questions I have in mind at the moment, but I'll keep coming here until maybe we see how this project goes. So thank you very much for now. And as and when we transcribe this information, I'll let you have a look at it again to see if there was something maybe we misinterpreted in your responses, then maybe we could correct that before we do anything with that information.

So thank you very much for your time today. And we've closed, but we still need time to answer these boring questions from you. Thank you so much.

Nurse:

You're welcome. Thank you.

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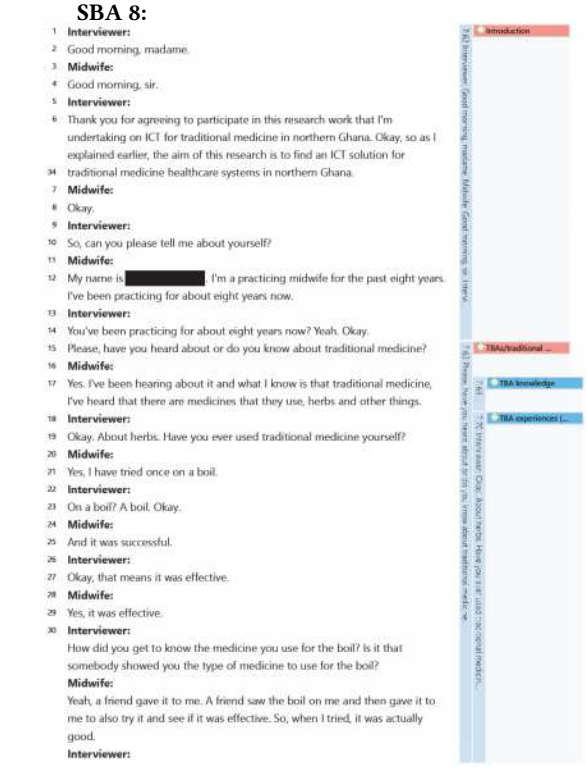
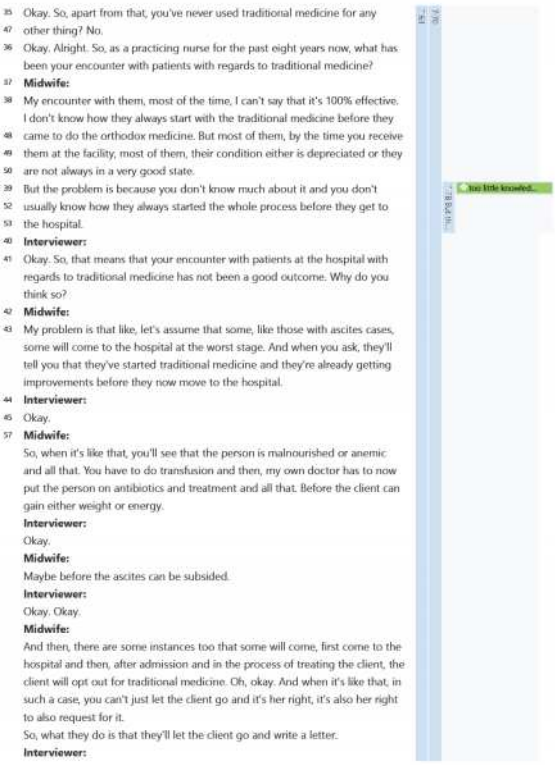
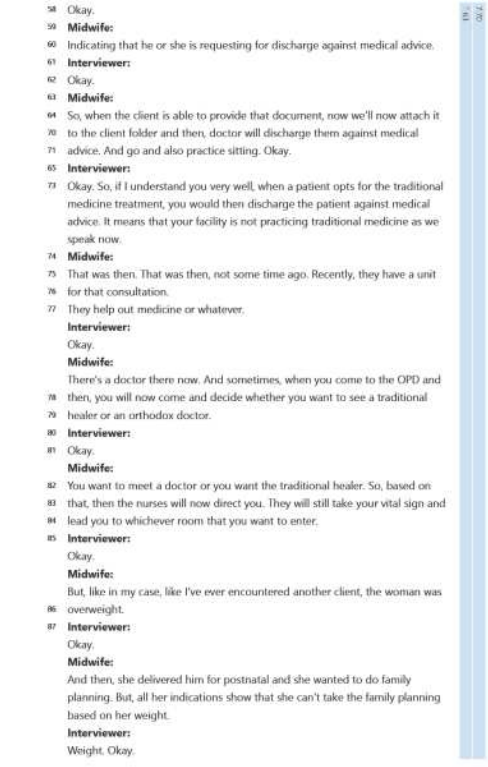


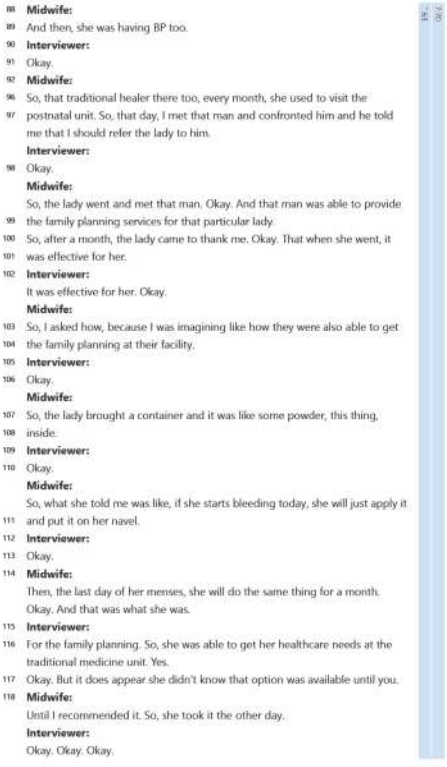
Interviewer:
Good morning, madame.
Midwife:
Good morning, sir.
Interviewer:
Thank you for agreeing to participate in this research work that I'm undertaking on ICT for traditional medicine in northern Ghana. Okay, so as I explained earlier, the aim of this research is to find an ICT solution for traditional medicine healthcare systems in northern Ghana.
Midwife:
Okay.
Interviewer:
So, can you please tell me about yourself?
Midwife:
My name is [redacted]. I'm a practicing midwife for the past eight years. I've been practicing for about eight years now.
Interviewer:
You've been practicing for about eight years now? Yeah. Okay.
Please, have you heard about or do you know about traditional medicine?
Midwife:
Yes. I've been hearing about it and what I know is that traditional medicine, I've heard that there are medicines that they use, herbs and other things.
Interviewer:
Okay. About herbs. Have you ever used traditional medicine yourself?
Midwife:
Yes, I have tried once on a boil.
Interviewer:
On a boil? A boil. Okay.
Midwife:
And it was successful.
Interviewer:
Okay, that means it was effective.
Midwife:
Yes, it was effective.
Interviewer:
How did you get to know the medicine you use for the boil? Is it that somebody showed you the type of medicine to use for the boil?
Midwife:
Yeah, a friend gave it to me. A friend saw the boil on me and then gave it to me to also try it and see if it was effective. So, when I tried, it was actually good.
Interviewer:



Okay. So, apart from that, you've never used traditional medicine for any other thing? No.
Okay. Alright. So, as a practicing nurse for the past eight years now, what has been your encounter with patients with regards to traditional medicine?
Midwife:
My encounter with them, most of the time, I can't say that it's 100% effective. I don't know how they always start with the traditional medicine before they came to do the orthodox medicine. But most of them, by the time you receive them at the facility, most of them, their condition either is depreciated or they are not always in a very good state.
But the problem is because you don't know much about it and you don't usually know how they always started the whole process before they get to the hospital.
Interviewer:
Okay. So, that means that your encounter with patients at the hospital with regards to traditional medicine has not been a good outcome. Why do you think so?
Midwife:
My problem is that like, let's assume that some, like those with ascites cases, some will come to the hospital at the worst stage. And when you ask, they'll tell you that they've started traditional medicine and they're already getting improvements before they now move to the hospital.
Interviewer:
Okay.
Midwife:
So, when it's like that, you'll see that the person is malnourished or anemic and all that. You have to do transfusion and then, my own doctor has to now put the person on antibiotics and treatment and all that. Before the client can gain either weight or energy.
Interviewer:
Okay.
Midwife:
Maybe before the ascites can be subsided.
Interviewer:
Okay. Okay.
Midwife:
And then, there are some instances too that some will come, first come to the hospital and then, after admission and in the process of treating the client, the client will opt out for traditional medicine. Oh, okay. And when it's like that, in such a case, you can't just let the client go and it's her right, it's also her right to also request for it.
So, what they do is that they'll let the client go and write a letter.
Interviewer:



Okay.
Midwife:
Indicating that he or she is requesting for discharge against medical advice.
Interviewer:
Okay.
Midwife:
So, when the client is able to provide that document, now we'll now attach it to the client folder and then, doctor will discharge them against medical advice. And go and also practice sitting. Okay.
Interviewer:
Okay. So, if I understand you very well, when a patient opts for the traditional medicine treatment, you would then discharge the patient against medical advice. It means that your facility is not practicing traditional medicine as we speak now.
Midwife:
That was then. That was then, not some time ago. Recently, they have a unit for that consultation.
They help out medicine or whatever.
Interviewer:
Okay.
Midwife:
There's a doctor there now. And sometimes, when you come to the OPD and then, you will now come and decide whether you want to see a traditional healer or an orthodox doctor.
Interviewer:
Okay.
Midwife:
You want to meet a doctor or you want the traditional healer. So, based on that, then the nurses will now direct you. They will still take your vital sign and lead you to whichever room that you want to enter.
Interviewer:
Okay.
Midwife:
But, like in my case, like I've ever encountered another client, the woman was overweight.
Interviewer:
Okay.
Midwife:
And then, she delivered him for postnatal and she wanted to do family planning. But, all her indications show that she can't take the family planning based on her weight.
Interviewer:
Weight. Okay.



Midwife:
And then, she was having BP too.
Interviewer:
Okay.
Midwife:
So, that traditional healer there too, every month, she used to visit the postnatal unit. So, that day, I met that man and confronted him and he told me that I should refer the lady to him.
Interviewer:
Okay.
Midwife:
So, the lady went and met that man. Okay. And that man was able to provide the family planning services for that particular lady.
So, after a month, the lady came to thank me. Okay. That when she went, it was effective for her.
Interviewer:
It was effective for her. Okay.
Midwife:
So, I asked how, because I was imagining like how they were also able to get the family planning at their facility.
Interviewer:
Okay.
Midwife:
So, the lady brought a container and it was like some powder, this thing, inside.
Interviewer:
Okay.
Midwife:
So, what she told me was like, if she starts bleeding today, she will just apply it and put it on her navel.
Interviewer:
Okay.
Midwife:
Then, the last day of her menses, she will do the same thing for a month. Okay. And that was what she was.
Interviewer:
For the family planning. So, she was able to get her healthcare needs at the traditional medicine unit. Yes.
Okay. But it does appear she didn't know that option was available until you.
Midwife:
Until I recommended it. So, she took it the other day.
Interviewer:
Okay. Okay. Okay.

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So, that means that most of the patients are not informed about the choices they can have at the facility.

Midwife:
The awareness is not there.

Interviewer:
The awareness is really not there.

Midwife:
There.

Interviewer:
Okay. Okay. So, this is one case of an example of what type of healthcare needs that patient could.
Apart from that, what are the common diseases that most patients might want to use the herbal medicine to treat?

Midwife:
Common diseases like, let's just say, some go there for this ulcer treatment.

Interviewer:
Ulcer treatment.

Midwife:
And then a BP.

Interviewer:
Okay.

Midwife:
High blood pressure. High blood pressure. Ulcer.
Yeah. And, yeah, especially the ulcer, those with the ulcer, they also said that it's happened like a cure.
It heals it. I don't know.

Interviewer:
Okay.

Midwife:
They don't feel the pain that they used to.

Interviewer:
All right. So, it means that information needs to go down very well for these patients to be able to have a choice to make for their health needs. Because when you started, you made mention of, you know, most of them coming in when they have their issues or their healthcare needs being at the, how should I put it, distress level.
Yes. Before they try to seek for the orthodox medicine. But a patient that comes in at the right time and probably request for the services of traditional healthcare healer might have their health needs met, if I understand what you've explained.
Okay. So, it means that information is one or awareness of the choices that these patients needs to have is one thing that needs to be looked into. Okay.

So, apart from that, at the family level, do you think a lot of people believe or think traditional medicine is effective? Do they accept that traditional medicine is actually effective for their health needs?

Midwife:
Not a hundred percent, but some believe that they can cure whatever disease that they have.

Interviewer:
Okay.

Midwife:
Because some still have doubts about the whole process. And what some also complain is that, like, they don't have accurate dosage.

Interviewer:
Okay.

Midwife:
So, like, assuming they just give you a bottle. So, it means you will now decide on how you are going to consume it. Or maybe if it's in the form of a powder, they can tell that you should go and measure this amount.

Interviewer:
Okay.

Midwife:
Maybe they can say that take this for maybe one week or three days. So, you will now have to decide how am I going to make sure that my things are able to meet the number of days that they gave me.

Interviewer:
Okay.

Midwife:
So, I think that's what is also hindering some people to use it.

Interviewer:
Okay. So, the dosages are actually an issue. Okay.
But at the hospital level, do you think the dosages are still a challenge? For instance, your facility, the traditional medicine facility at your hospital, do they also encounter the dosage issues?

Midwife:
I don't know much about the clinic. I only, just as I said, I only refer a client there once.

Interviewer:
Okay.

Midwife:
And I can remember, like, one man who also, I didn't sign on him personally, but a different colleague who referred him.

Interviewer:
Okay.

Midwife:

And the man too went for the rose powder, powder thing, and it was in a polythene seal.

Interviewer:
Okay.

Midwife:
So, they told her that she should always use a spoon to measure.

Interviewer:
Okay.

Midwife:
A spoon to measure.

Interviewer:
Okay.

Midwife:
And then boil it with warm water.

Interviewer:
Okay.

Midwife:
And then take it. After the water being cold, then the man should take it.
Okay.
So, and you know spoon too, you can fetch any amount.

Interviewer:
Yeah. Yeah. Because most patients will be tempted to take more depending on the severity of their disease.

Midwife:
Or maybe less is better. Instead, you take two spoons.

Interviewer:
Okay.

Midwife:
I can decide to take small, small.

Interviewer:
Because it's bitter.

Midwife:
It's bitter. I wanted to.

Interviewer:
Okay. Okay. Okay.
So, let me ask you this question again. Do you think your colleagues have enough knowledge or information on the traditional medicine unit at your facility?

Midwife:
Not all that. A lot of people still don't know that that unit exists.

Interviewer:
Okay.

Midwife:

Also, like the man that is there currently. What he is now doing is that every morning, he knows that at the antenatal level, but a lot of people come there with their family to do other services. So, he just comes around to talk to them.
So, he is now creating awareness.

Interviewer:
Awareness.

Midwife:
And he is going into communities, doing their part, so that people will know that he is around. And I think the whole, they say he is the only person there.

Interviewer:
Okay.

Midwife:
So, aside that, even though we are in the same facility there, some people are not aware that there is a unit like that. For people to also go in terms, maybe in case we don't need orthodox medicine.

Interviewer:
Okay. So, this traditional medicine healer at your facility is employed by the government?

Midwife:
I believe so, yeah.

Interviewer:
Okay.

Midwife:
And he also, he dresses like the doctors. He put on the coat.

Interviewer:
Okay. Meaning that he has a formal training.

Midwife:
Yes, he has a formal training.

Interviewer:
Training on herbal medicine. Okay. Okay.
So, what you've mentioned a number of challenges from dosage to, what do you call it, awareness and education. What do you think needs, in your own opinion, what do you think needs to be done right to improve these services of the traditional healer in your facility?

Midwife:
Okay. What I think is that there should be awareness creation. There should be posters.

Interviewer:
Posters.

Midwife:
Yeah, at least. Immediately you enter the hospital, there should be something to direct you that there is a herbal doctor here.

SBA 8:

Interviewer:
Okay.
Midwife:
In case you need such services. And then, at least, the dosages I have spoken.
Interviewer:
Yeah.
Midwife:
And there should be something at least measurable.
Interviewer:
Okay.
Midwife:
So that some people have confidence in their dosage.
Interviewer:
Their dosages, okay. Okay.
Midwife:
And then, the awareness creation, either in billboards, in post-tests, or maybe they can even enter radio stations.
Interviewer:
Okay, radio stations.
Midwife:
Increased awareness on all those media stations so that, at least, the number in purchasing their services will increase.
Interviewer:
Okay. Okay. So that brings us to where this research wants to play a key role in looking at how we can use ICT to solve some of these problems or find solutions to some of these problems in order to improve or enhance the work of this traditional medicine that people think is a very good source of information.
Because of their healthcare needs. You've made mention of post-tests and billboards and radio. I believe you are aware a lot of people are now using mobile phones and for that matter, smartphones and so on.
Social media is something everybody does now. So do you think it would be a good idea to leverage on these smartphones that are available now that a lot of people are using to pass some of this information to people on traditional medicine?
Midwife:
Yes. I think that will help a lot because with using the mobile phones, the information will even spread more faster. At least, everyone is like, nowadays we are all used to mobile phones.
Once a message is on your phone, you'll be eager to read.
Interviewer:
To read.
Midwife:

ICT platform

And as you open it, with the knowledge that is already inside there, when you read it, maybe as soon as you are having some doubts or you are not enlightened about it, then the information, you'll be given the information straight away on your phone.
Interviewer:
On your phone. Okay. So, apart from using the mobile phones to disseminate maybe information or using it to educate people on traditional medicine, on the part of these traditional medicine practitioners, what solution do you think ICT can be of help to them?
For instance, the healer that is at your facility, who goes about doing awareness creation and seeking for patients that might be in need of his services, such a practitioner. What ICT solution do you think can be of help to them to improve their work or enhance their work?
Midwife:
Like, my facility like this, if they were able to get him a, what is it, like a mic or whatever, they can mount something like an information centre. Good.
Directing people.
Interviewer:
Okay.
Midwife:
At the facility. At the facility. At the facility.
Like, in case you need a traditional health practitioner, go to room 2 or room 1.
Interviewer:
Okay.
Midwife:
Or in that order. And once he himself has taken the pain to be doing community service, some of them will try to come and have a feel of it.
Interviewer:
Okay.
Midwife:
And if they come and what they want, they are able to get it, the information to keep on spreading.
Interviewer:
Okay.
Midwife:
And then, like the OPD sets like this, if you come to pick a card, maybe let's assume that they've taken your mobile number, immediately after their card, then some information can pop up on your phone.
Interviewer:
Okay.
Midwife:
It can also be a good idea.

Information about...

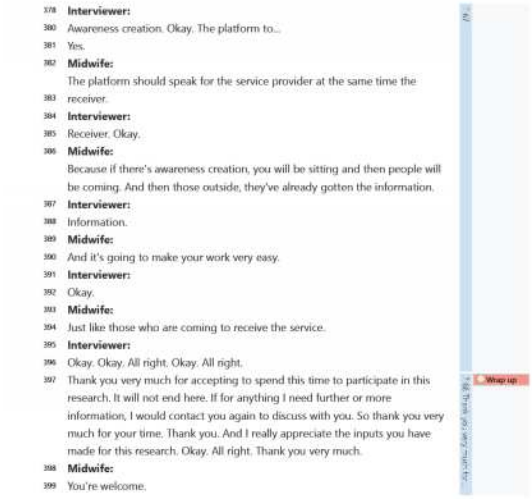
Interviewer:
Okay. At the facility level, when you get to the OPD. Yes.
Midwife:
And then maybe as soon as you have entered the herbal practitioner's room, after receiving their services, immediately get home, there should be questions.
Interviewer:
Okay.
Midwife:
Like, your first encounter with a traditional healer, how was it?
Interviewer:
Okay.
Midwife:
Okay. Okay. []
Interviewer:
Okay. Okay. That's a very laudable idea.
Because feedback is very important. And if you get the traditional medicine services at the facility, it shouldn't end there. Once they have your information and your contact number on either WhatsApp or by text message, you should be able to get information from the traditional medicine unit on these services that they render at the hospital.
This is a very laudable idea. That means that at your facility, the integration is done.
Midwife:
It's done.
Interviewer:
Yes. There's an integration of... Okay.
And do you think it's moving on smoothly?
Midwife:
Anyway, I think it's better than before. Okay.
Interviewer:
It's improving.
Midwife:
Okay. Okay.
Interviewer:
Okay.
Midwife:
Okay. []
Interviewer:
So, how is the documentation of the traditional medicine healers at the facility level? You know, the orthodox medical doctors have their patients' records, you know, properly documented. Okay.
Midwife:

Evaluation after a...
Information about...
Patient registration

Okay. []
Interviewer:
Okay.
Midwife:
Okay. []
Interviewer:
Okay. Okay. So, they document their records inside their patients' folder?
Okay. Okay. Okay.
Okay. So, as a nurse, are you comfortable working with the traditional medicine practitioners?
Midwife:
Why not? In fact, it's a nice thing to experience when you are with them.
Right.
Okay. Interior. Okay. []
Interviewer:
Okay. Okay. Okay.
Level of...
Midwife:
Curing diseases.
Interviewer:
Curing diseases. Okay.
Midwife:
So, now that they are also coming up, I think it's a very good thing. They are nice people to work with.
Interviewer:
Okay.
Midwife:
And once a lot of people get to know of it, it's going to help us a lot.
Interviewer:
Okay. So, at your facility, is he the only person there or he works with some other traditional medicine healers?
Midwife:
I think for now, it's only one person.
Interviewer:
It's only one person. Okay. Okay.
All right. So, finally, let me just find... What...
What ICT solution will you probably suggest for that can meet both the patients and then the practitioners' needs? Even though I know you are not a practitioner, but once you've encountered a practitioner and maybe the patients, what do you think ICT solution could do for both the practitioner and then the consumer?
Midwife:
It's just awareness creation.

TBAs/traditional ...
ICT platform
Awareness creation

SBA 8:



Interviewer:
Awareness creation. Okay. The platform to...
Yes.
Midwife:
The platform should speak for the service provider at the same time the receiver.
Interviewer:
Receiver. Okay.
Midwife:
Because if there's awareness creation, you will be sitting and then people will be coming. And then those outside, they've already gotten the information.
Interviewer:
Information.
Midwife:
And it's going to make your work very easy.
Interviewer:
Okay.
Midwife:
Just like those who are coming to receive the service.
Interviewer:
Okay. Okay. All right. Okay. All right.
Thank you very much for accepting to spend this time to participate in this research. It will not end here. If for anything I need further or more information, I would contact you again to discuss with you. So thank you very much for your time. Thank you. And I really appreciate the inputs you have made for this research. Okay. All right. Thank you very much.
Midwife:
You're welcome.

SBA 9:

Interviewer:
Good afternoon, Madam.
Midwife:
Good afternoon.
Interviewer:
Thank you for agreeing for me to interview you on my research on ICT for traditional medicine healthcare in northern Ghana. Can you please tell me briefly about yourself?
Midwife:
My name is [redacted]. I'm a professional midwife. I've been practicing for the past 12 years now.
And I'm currently working at the Tamale Teaching Hospital as a midwife.
Interviewer:
So you've been working for the past 12 years now. That means that you have a lot of experience on the job.
Midwife:
I guess so.
Interviewer:
As I explained to you earlier, the research is on ICT for traditional medicine healthcare in northern Ghana. That means that the purpose of this research is to find an ICT solution that can enhance or improve the traditional medicine healthcare system. Do you know about traditional medicine?
Midwife:
Yes, I've heard about it. I've heard about it. There are instances where most of our clients come in labor for taking those [inaudible].
So I've seen a couple of cases. And I've heard about other forms of traditional medicine being used for other conditions. So I've heard about it.
Interviewer:
Okay. So apart from the patients that you've come across that have used some of this traditional medicine, have you ever used traditional medicine yourself?
Midwife:
Yes. We are in Ghana and it's obvious that traditional medicine is also part of our line of treatment for certain diseases or ailments. So yes, I've personally used a couple of traditional medicines for some illness I have.
Interviewer:
Okay. Okay. So that means that you think traditional medicine is good or is effective in some way or another form of healthcare that people can rely on.
Midwife:
Yes, it's very effective. And it's also an alternative form of treatment. And that can be used.

But I think the issue is because the quantity or maybe the way we use it is not being investigated properly or is not being addressed properly. So maybe we overuse it or sometimes we underuse. But it really works.
Maybe if the government can really pay attention to that side, it can really help. But it's very good.
Interviewer:
So that means that your concern about traditional medicine is the dosage forms and the standards that comes with traditional medicine. Meaning that the measurements are not always what's probably the right measurements.
And because of that, maybe the way they apply it ends up becoming an issue.
But aside that, you think it's very effective.
Midwife:
Yes. Yes. I think so.
Interviewer:
Okay, so what are some of the diseases that are commonly used traditional medicine to treat?
Midwife:
Okay, I personally, when I have a boil, I think I go for the traditional medicine because it's very effective. When you apply, it's very effective. I'm not saying the orthodox drugs are not good, like the foreign ones.
I'm not saying that, but I personally feel that it's very fast. Because when you apply two, three days, you see the task in it comes out easily. But with the other one, you can be taking drugs for maybe sometimes for five days, seven days.
So I use it for boils and sometimes to, let's say enema, when you have constipation like this. Sometimes I go for the traditional medicine. It helps. It's very fast. And sometimes in tummy absence, maybe you have diarrhea or so, there's this black seed. When you mix it with garlic, I think when you chew it, it goes faster.
It gives you an instant relief, unlike the other formula. So I think it's very effective.
Interviewer:
Okay. Okay. So you made mention about if the government could come in to assist in the traditional medicine as an alternative.
So that brings my next question about whether you are aware of the integration of traditional medicine into conventional health care.
Midwife:
No, I'm not aware. I'm not aware of it.
Interviewer:
Okay. So what the government is doing currently is trying to integrate traditional medicine or merge traditional medicine into the conventional health care system so that people, patients that want to have an alternative option for their health needs can choose. Do you think it's a good idea that

the government integrates traditional medicine into our conventional health care system?
Midwife:
Yes, I think it will really do the health care system a big favor when it does that. Because there are several instances, let me talk from my line of work as a midwife. There are several instances pregnant women come in, labor, and they're taking this local drug.
And it's really, maybe they take it over us. Like their idea is to induce labor. But they end up coming in with more concussion and they end up rupturing.
So maybe if the government can create a side like that, maybe if we want to do reduction, maybe we can rather, because there are some cases they don't end up rupturing, but it's very effective. They end up delivering very fast. So maybe if the government can come in that line, then it can be controlled.
The amounts taken can be controlled. We can use it for induction at the labor ward. And it can really help most of the clients with post-natalism.
So I think it will do us a favor.
Interviewer:
Okay. And do you think your working relationship with traditional medicine healers will be that of a cordial one?
Midwife:
Yes. You know, the health care system is a very broad and a big place for everyone to fit in. So I don't think there would be a problem with them.
They have their line of work they are doing. And we also have them. So maybe we can blend it together.
But when you come to the health system, we have the pharmacists, the midwives, the doctors, the nurses, and the anesthetists and all those. They all come together to bring the primary goal is to ensure clients are comfortable. They are receiving the best of medical care.
So easy accessibility to medical care. So if they come in to join, I don't think it will be a problem. But we all know our roles to play.
And we do it perfectly to ensure our clients are comfortable and safe.
Interviewer:
Okay. But what do you think would be some of the challenges, you know, working with traditional medicine practitioners?
Midwife:
Maybe our challenge might be, one, the acceptance of it. Some clients are not so comfortable using local drugs. So maybe the acceptance wouldn't be there initially.
So there will be a form of resistance from clients when maybe you tell a client, this is another option for you and the person is not so comfortable with that.
And also, you know, people have the perception that traditional medicine is for the illiterates. Okay.

Yes. So I think that would also be a problem. So maybe the sensitization of it can help.
But one or two resistance from the beginning would be the problem. Like people not accepting it. Because they think it's basically for local people.
People who are not so educated. Okay. And they also feel like those drugs are not well, in a way, sterile or clean.
Interviewer:
Okay.
Midwife:
Because the way they prepare it and other stuff, they feel like sometimes it's contaminated or maybe it has one or two problems with it, like bacteria and other stuff. So it's not so clean. Okay.
So maybe the hygiene way of preparing it can also be tackled. Okay.
Interviewer:
So that means that awareness creation and education for this traditional medicine healthcare system needs to be taken up seriously. Yes. So in your own opinion, how do you think this awareness and education should be carried out?
Okay.
Midwife:
So just like any other new thing, I think the media has to come in. We need to sensitize the public through various adverts on telly, on radio, and maybe on the internet too as well. They can come in with that.
And also, we can do one-to-one education by maybe, like TTH as an institution, maybe they can come here to visit us and do an education with us, the health workers, and explain certain things to us. Okay. I think that one will help a lot.
Interviewer:
Okay. So as I said earlier, I'm trying to find out what ICT can do in all this regard for traditional healthcare system. What ICT can identify and do to assist or improve the area.
What, in your own opinion, what do you think ICT can actually come in?
Midwife:
Okay. So in my opinion, I think, one, ICT can help with that through the internet.
Interviewer:
Okay.
Midwife:
Yes. I think when you, there are a lot of people who basically access healthcare through Google.
Interviewer:
Okay.
Midwife:

SBA 9:

Yes. So I think maybe if they can infiltrate the system with options that are available for them, aside from this drug, maybe if you can try this, which is obviously something that maybe the dosage is there. Okay.
The right dosage is there. amount you're supposed to take in, in terms of how often you should take it. Right prescribed drug is there.
Okay. Maybe the ICT can infiltrate that thing into the system where the person can find alternative way of healthcare as a traditional method. Maybe they can do that.

Interviewer:

Okay. Okay. So getting online access by healthcare workers or consumers that are on, that are using the internet or smartphones to access this information could be, in that sense, do you think an application, okay, an online application could be a good idea that we could have a platform where you can get the education and all the necessary information you need on traditional medicine so that you can access this through your mobile phones?

Midwife:

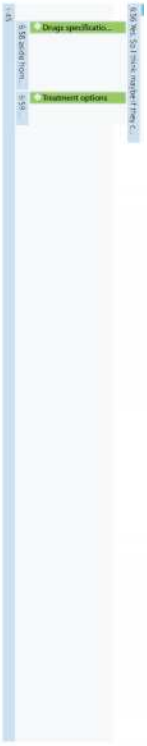
Yes. I think maybe an app like that can be generated where the clients can have access to there and it gives the consumer or maybe the clients or the patients how often I'm supposed to take, the number of dosage I'm supposed to take. It comes all together.
And the kind of sickness with what drug goes with it. Okay. And I think also now we are in the social media world, so maybe something like that can be an advertisement on Facebook, Instagram, Twitter, like something like that is there.
Okay. I think it will create the awareness for people to access it.

Interviewer:

Okay. Okay. So in your line of duty, have you ever referred or educated someone on traditional medicine or advised somebody to opt for traditional medicine for any disease?

Midwife:

Yes, I have. Especially for pregnant women. Normally after delivery, you know, we have postpartum problems.
So I normally educate clients to do a warm sit bath. And that one is locally. It's not a foreign drug.
It's just locally. We use salt. We put it in warm water.
Add a bit of aluminum. Educate the client to sit in it in the warm water. Our local, so just our local salt.
And it helps prevent vagina infections. It also helps to cure the tear or the episiotomy that the client has gotten vaginally at all the perineum to heal faster. So we do that.
And we also encourage them to maybe if they can be doing warm compresses with it. And all those things are local methods. Okay.



We educate them a lot. I refer them to do those things. And sometimes breastfeeding too, if the breast milk is really not coming that much, we educate them to apply shea butter on the breast with warm water.
It helps the breast milk to flow more for the mother. So we do that. We do that a lot.
I also do that.

Interviewer:

So that means that you really support the idea of using traditional medicine in the right way or integrating it into the conventional health care system as a professional midwife who has worked for over 12 years.

Midwife:

Certainly.

Interviewer:

Okay. All right. So thank you very much.
This will not be the end of this. If I need further information or explanation on any other info concerning this interview, I will definitely get back to you. And thank you so much for taking time for me to participate in this interview.
I really appreciate your time.

Midwife:

You are most welcome.

SBA 10:

Interviewer:
So, can you introduce yourself?
Midwife:
I'm [redacted]
Midwife in the University of Hospital.
Interviewer:
How long have you been working as a midwife?
Midwife:
As a midwife?
Interviewer:
As a midwife, yes.
Midwife:
For the facility or in general?
Interviewer:
In general.
Midwife:
Eight years.
Interviewer:
Eight years. And can you tell me some of your duties and responsibilities as a midwife at your current workplace?
Midwife:
Okay. Currently, I am a line manager. So, I manage the activities of other midwives and also lead in antenatal care and provision of delivery postnatal services and child welfare clinics.
Interviewer:
Okay. What do you think are the main challenges you face in your work as a midwife?
Midwife:
The challenges there? In relation to? Or general challenges?
Sometimes. So, logistics is a big challenge.
Sometimes you don't have certain things you require to do, certain activities. And sometimes, even before you can attend to a patient, the patient will have to go through the process of getting a card or a folder. Sometimes, if the people that issue the folder at the records department are not available or the place is choked, then it delays the time that we would have to take care of the child.
Human resources are also challenging. We are not enough. There are many challenges.
This is just to mention a few.
Interviewer:
Are there specific areas in which you would like to receive more training or support in your work?
Midwife:
Capacity building in almost every aspect that we work. Family planning, labour delivery, any new activity or new method of providing care that would help improve on our service. It's a good place for training.
And as the world is moving into a technological era, any technological advancements that would help improve on our service delivery, training on it is also not a bad idea.
Interviewer:
Have you previously participated in projects or initiatives aimed at improving healthcare?
Midwife:
A number of them. Just recently, we were involved in an activity for family planning where we were trained on long-acting reversible contraceptives to provide such services to our clients. I've also been involved in training to train other young midwives in school when they come to the clinic house setting.
I've received training on malaria case management. A number of them.
Training on counselling.
Training on management of obstetric emergencies. A number of them.
Interviewer:
Okay. Now, can you tell me about the patients you handle or clients you attend to? What have you done? Can you tell me something about the patients you handle? Anything about them?
Midwife:
All right. So, this is a university community. So, most of our patients are from the university community, being a staff of the university or a relative of the staff of the university.
But we also have neighbouring communities, and the members of the community do also attend, visit our facilities when they need the services that we provide. So, we have, when it comes to the economic status of our patients, we have people that are able to, they're in the middle class. We have people that are also in the lower class, and very few in the upper class, depending on their level of income.
Okay. And the tribe, different from all walks of, all the parts of the country, because some of them are coming from down south, but because of the work they find themselves here with us. But most of them are indigenous, so they're not.
Interviewer:
Okay. Averagely, how often do you see patients or clients?
Midwife:
Averagely? How often do we see clients? Yes.
It's on a daily basis. There hasn't been a single day we don't see clients in our facility, every day.
Interviewer:
Every day. And in what way do you communicate with patients?
Midwife:
Usually we ask questions, and whatever they tell us, we document in our registers and in our books. For now, that's what we do.
Interviewer:
Okay. Can you tell me some of the challenges you encounter in interacting with patients?
Midwife:
Yes, language barrier sometimes, because we are working with people from different tribes. Sometimes the language they speak, the only language they could speak, we don't have anybody in our facility to speak. And some of them, to which they cannot speak the common language we use in the community, the industry community, has been English.
Another major problem is sometimes continuity of care, in the sense that sometimes the books that they have, it comes and sometimes it's torn. It gets damaged because it's not properly kept. So you don't know what has been done earlier for you to continue.
And because we don't have a centralized system, what about if, for example, the client had gone to a different facility for a particular care in relation to her condition she had presented to us, we don't know what had happened there, the treatment they had given for us to continue care. So basically you have to start afresh all over again. And that has been a major challenge.
And sometimes it can pose a danger to our patients.
Interviewer:
Okay. How would you like to interact with your patients?
Midwife:
I wish I could interact with my patients, both within the facility and outside the facility. In the facility, when they come with some complaints or for visits, then we attend to them. Outside the facility, even if they are away and sometimes they have problems, they could be able to place a call or lodge their complaints without necessarily visiting the facility.
And sometimes also find out if they are compliant with the treatments that we have provided. So I feel like the ideal way I would want to communicate with my patients is to be able to communicate with them, both within the facility and outside the facility. Even to the point where other relatives or people taking care of them can also communicate with us.
Interviewer:
Okay. So what do you think cultural and traditional considerations play a role in healthcare practices in your community?
Midwife:
For here, it plays a major role in the sense that women cannot even do anything in relation to their own health without their men taking major decisions for them. For example, if a woman is sick, until the husband gives her permission to come to the facility, it might be very difficult for her to come to the facility for treatment. For here, we cannot take care of our patients without considering the cultural background of the people that we talk to.
Even the food they eat and the kind of communities and the buildings they live in are all influenced by the values and norms in their community, which they strongly oppose. So we cannot actually take that for granted. Okay.
Interviewer:
Now, what do you know about traditional bed attendants in your community?
Midwife:
They are unskilled or, let me say, untrained. They are not professionally trained. They are not professionals, but they do provide bed assistance to women that are in labor and are pregnant.
Sometimes they also help manage minor illness, but they are not trained. They have not gone through formal training. Let me use that word.
Some of them are trained by other TBAs, but formally they haven't gone through that required training and have not received the required skills in providing such care.
Interviewer:
Can you tell me some of the duties and responsibilities of the TBAs?
Midwife:
Honestly, I can't say much about it, but what I've heard – I cannot say these are their duties or their responsibilities, but what I've heard is they do – some of them, it's kind of an inheritance. They inherited from other people in their families who had some knowledge on how to manage such cases traditionally. The people who live there are one of them, so they go to them, and then they also provide such care for them.
So basically, that's what I can say.
Interviewer:
Okay. How do you interact with them, the TBAs, in your work?
Midwife:
With my little experience I've had with TBAs, sometimes when they are faced with – let's say they see a patient and the situation of the patient is beyond their level or they've tried all that they could, but the client is not being relieved, sometimes they come with them. So for me, I see them to be – I don't see them to be a threat, I see them to be collaborators in our work, so I take my time and ask them what had happened, what was presented to them and what they had done. And then I take it up from there, and I've always encouraged that they bring their patients to us as early as possible, and sometimes I do suggest that when the clients come, they should just come along with them, they shouldn't just keep them there until the situation is worse.

SBA 10:

So it's not a bad relation, since they are able to adhere to it, I think it's a good relation. But with currently in UDS, I've not really had an experience with a TBA yet, but my previous workplace, this was the experience I had with them.

Interviewer:

Okay. And can you describe some of the challenges you've had interacting with them?

Midwife:

Personally, I have not had any challenges with them, but some of them complained that when they come to the facility, some of the skilled midwives are not nice to them, but I haven't experienced that. But this was – I've had one or two of them talk to me about it, and so because of that, they are scared to actually present their cases, but I haven't experienced that yet.

Interviewer:

So in your opinion, how would you like to interact with TBAs?

Midwife:

I feel like there should be a collaboration between skilled midwives and TBAs, because whether we like it or not, the people – TBAs are part of the people that we take care of. They believe in them as part of their cultural background, and so we cannot totally do away with them. No matter what, they are usually the point of call for our patients.

So I believe skilled midwives should rather have a good relationship with these TBAs so that when cases like that come, they are able to come with us freely without the fear of there being

Interviewer:

What do you think are important services that TBAs provide in the community?

Midwife:

Immediate – I know they provide delivery, I think conducting of labour cases, management of minor illness, yes, using medical – herbal treatments.

Interviewer:

So what kind of technology do you use in your workplace?

Midwife:

For now, we are still on the paper-based, but we are being informed there's some progress on getting us the electronic health management system for us to use.

Interviewer:

Okay, so how comfortable are you with using technology in your work?

Midwife:

I think it makes it easier for us to access. As I said earlier, paper-based, sometimes we lose vital information because it's not well stored, it's damaged or it's torn. But if it's electronic data, it's easily accessible and everybody is able to access it from different points.

It brings about some integration in our healthcare. I think it will make our work easier. At the same time, it will help improve on the management of our patients.

Interviewer:

Do you have a phone?

Midwife:

Yes, I do have – is it a personal phone or a web phone? Or just a phone?

Interviewer:

A personal phone.

Midwife:

Yes, I do have a personal phone.

Interviewer:

What kind is it?

Midwife:

It's a smartphone, Android.

Interviewer:

Okay. And your patients, do they have phones?

Midwife:

Yes, almost everybody we attend do have a phone. I think almost everyone, because we do take their telephone numbers in. Okay.

The majority of our patients do give us telephone numbers.

Interviewer:

And what kind of phones do they have, the patients?

Midwife:

With an estimate, I could say the majority have smartphones. Very few, we see them having analog phones.

Interviewer:

Okay. With the TBAs, do you know if they also have phones and possibly their type?

Midwife:

I cannot tell.

Interviewer:

So, currently, how is patient data managed at your clinic?

Midwife:

As I said earlier, we use a paper-based currently. We still use a folder system.

Interviewer:

Okay. And some form of electronic record-keeping system currently in place at your work? Do you have any electronic record-keeping system?

Midwife:

Not yet.

Interviewer:

What do you think are the main challenges and needs in managing patient data?

Midwife:

Constant electricity, internet connectivity, logistics specifically, the computers or the tablets, whichever medium they will be using. If they aren't available, then that will be a challenge. Okay.

Interviewer:

Are you familiar with MoTeCH?

Midwife:

If I get it, it's mobile technology.

Interviewer:

Okay. So, can you say something or give a little explanation?

Midwife:

Okay. I know in other facilities, there are mobile technology devices or softwares that help in managing healthcare. And it is becoming the order of the day.

Very few facilities are still using the paper-based like my facility. A lot of facilities are transitioning to electronic health data management systems.

Interviewer:

What do you think about MoTeCH generally?

Midwife:

It is a good solution.

It is a good thing, it will make work easier as for the healthcare providers and also help reduce the time wasting or the time that it takes for a patient to see a provider.

Interviewer:

What are some of your main worries about using MoTeCH?

Midwife:

That the battery of the device won't go off, there wouldn't be interaction with electricity and network connectivity.

Interviewer:

What are your expectations when you see MoTeCH? What are your expectations when you see MoTeCH?

Midwife:

To improve on the healthcare of our patients and reduce the time. I think those are the major ones. There could be other ones, like we could have data of a patient for a long period without it being destroyed.

Interviewer:

Are there any features you would like to see in MoTeCH besides the current features? Are there any features you would like to see in MoTeCH besides the current features?

Midwife:

Alright, what I have seen is that they are not able to communicate with the patients outside the facility. So I wish a new model that will come should give providers and patients the opportunity to communicate even outside the health facility.

Interviewer:

How do you see your role in the implementation of the project? Come again? How do you see your role in the implementation of the project?

Midwife:

My role is to charge the devices that I use and to enter the data correctly.

Interviewer:

Can you share some of the key challenges in engaging the community in health interventions?

Midwife:

If you don't recognise their traditional background, it becomes very difficult to pass on health information to them. The challenge has always been how to send the information across to them that would be culturally accepted.

Interviewer:

When is the implementation of such an intervention successful? When would you say it is successful?

Midwife:

It is successful when whatever you are going to communicate or educate to your patients, it becomes successful when there is an improved health outcome in that particular indicator.

Interviewer:

Finally, what do you need in such an intervention?

Midwife:

A culturally sensitive intervention, an intervention that is accepted by the provider as well as the community and even the patient. I think that would make such interventions a success.

Interviewer:

Thank you very much.

Midwife:

You're welcome. Thank you.

SBA 11:

Interviewer:
I've started the recording, okay, so we are starting. Can you share how your experience was with the care you received during maternal period?
Patient:
Yes, I can, during childbirth and then after childbirth, the midwives were, I mean, they were helpful.
They assisted in everything.
Interviewer:
Okay, that's all?
Patient:
Yes.
Interviewer:
Okay, did you make use of care provided by TBAs or SBAs? The TBAs, that is a traditional bed attendant or a skilled bed attendant like the midwives and those at the healthcare facility?
Patient:
Skilled midwife.
Interviewer:
Okay, so what was your experience like?
Patient:
With my experience with the instructions they gave me, I did follow those instructions and at the end of the day, it helped me.
Interviewer:
Okay, so in your opinion, what were the most positive aspects of the healthcare you received before, during, and after childbirth?
Patient:
Yes, I remember during childbirth, I had a tax and it's like they gave me instructions and they gave me some drugs to take and after following those instructions, I think I recovered fully, yes.
Interviewer:
Were there any specific challenges or concerns during this period regarding healthcare?
Patient:
Yes, the challenge in my case was that it was my first time and holding the baby to breastfeed was a big challenge for me and then due to that, my child was diagnosed of jaundice and I believe if more education was done before the childbirth and even if there was some small education after that baby, it would have helped.
Yes, so that was my challenge.
Interviewer:
Okay, do you think the integration of MoTeCH into healthcare would have affected your experience?
Patient:

Introduction
Conventional heal...
Experiences
ICT platform

Yes, it would have affected my experience.
Interviewer:
Okay, so in what ways?
Patient:
Being a first timer and with this, these days, we don't have the family around us and it's like you don't also have the experience and you don't know how it will look like even when it is due for you to give birth. You don't even know how it will look like.
So with this MoTeCH, it would have been a guide. Yes, it would have been a guide. I mean, every step of your pregnancy.
Interviewer:
So you deliver and even after delivery.
Patient:
Yes, you know what to do.
Interviewer:
Okay.
What improvements in maternal healthcare would you wish for future mothers?
Patient:
For future mothers, I think with, is it with regards to the MoTeCH?
Interviewer:
Generally, so based on your experience.
Yes. What would you wish?
Patient:
I would wish that when they go for A and C, they should try their possible best to educate us.
Yes, it would really help.
Interviewer:
Okay. Do you think the integration of, okay, I think we've answered that.
Do you currently have access to care provided by traditional midwives or trained midwives?
Patient:
Trained midwives.
Interviewer:
You are currently receiving care by trained midwives.
And how have the experience been like?
Patient:
So, honestly, they've been very caring. Yes, and they are always available unless you don't ask your questions.
They are ready to guide you and then teach you. Yes.
Interviewer:
Okay.

Information about...
Education option

Do you think MoTeCH could improve communication between healthcare providers and yourself?
Patient:
Yes, it would. Because with MoTeCH, distance is not a barrier.
It's not a barrier. So wherever you find yourself with MoTeCH, you can easily get access to a trained midwife without necessarily meeting them one-on-one or face-to-face. Yes.

Interviewer:
What do you think about the idea that MoTeCH would play a role in coordinating care between healthcare providers?
Patient:
Yes, coordinating care between health providers. With MoTeCH, it would simplify their work in the sense that wherever you are going as a client or a patient, you need not to carry your A and C book.
And even if you forget of it, with MoTeCH, they can easily continue with wherever you stop.
Interviewer:
Do you have specific suggestions for improving women's healthcare using technology solutions such as MoTeCH?
Patient:
Yes.
With this technology, more education can be done. And it's like, even if one cannot read with the videos, I mean, using the local language and things would encourage a lot to also learn from it.
Interviewer:
Do you see any potential challenges or concerns in using MoTeCH in the context of maternal care?
Patient:
For me, I don't think there is a major challenge, which would be internet or network challenge. Apart from that, I would not say that a lot of people are illiterate. Today, even children who cannot even talk, they can easily use a smartphone.
So I think MoTeCH will really help. It doesn't matter the person's level of education or anything.
Interviewer:
As far as there is internet connectivity, you are good to go.
How do you think MoTeCH can contribute to engaging women in decision-making process regarding their healthcare before, during, and then after childbirth?
Patient:
MoTeCH will really come to support or would really help in the sense that there is no need for the health or the trained midwife to try in convincing the

Contact/communi...
Access to patient ...
Language
Internet connection
Illiteracy

client. But the same community, the people in that community, their own comment, they'll become witnesses.
And when they hear their own people, I think they'll be convinced.
Interviewer:
What role would you like to play in promoting awareness and acceptance of MoTeCH within your community?
Patient:
So I can become an advocate from my experience with MoTeCH, yes.
Interviewer:
When you say advocate, so you will tell people In my community, yes. Based on your experience? Experience, yes.
What information and support will be valuable to you in the maternal period?
Patient:
Information that will be valuable to me? Yes, I think more education should be done.
It doesn't matter whether the person have already given birth before or not. The education should continue.
Interviewer:
How do you see MoTeCH's role in providing maternal support?
Patient:
Yes, MoTeCH will play a major role in maternal support in the sense that it will be in stages. And whatever or wherever you have a challenge, yours is to just search. And then I think your questions would be answered.
Interviewer:
So how do you feel about the idea of shared care between traditional midwives and trained midwives supported by MoTeCH? The midwife has the facility, the health facility, and then the TBAs in our communities. They and then the midwives sharing information.
How do you feel about this whole?
Patient:
So naturally as human, our challenge is change. We don't want change.
And also the traditional midwife is part of them. They have learned to trust the traditional midwife.
Interviewer:
That's in the community members?
Patient:
Yes, that's the community members. So I think when there is a collaboration between the trained midwife and then the traditional midwife they will come to also accept the MoTeCH.
Interviewer:
Are there certain aspects of maternal care that you would like to retain, even if MoTeCH is integrated?
Patient:

SBA 11:

Yes, the MoTeCH definitely serves as a guide, but there is this one aspect. The care, the attention, the love that they give is very important and it means a lot to patients.

Interviewer:

As in the midwife?

Patient:

The trained midwife, yes. It means a lot to patients.

Interviewer:

So you love for that not to change, even if everything is going to be based on technology.

You so wish that they maintain that one. What sources of information do you trust most when it comes to maternal health advice?

Patient:

Yes, when it comes to maternal advice, some use experience, but you see, with those midwives, they have been trained. That is their profession. So advice coming from them is very important.

We should be taking serious.

Interviewer:

So personally, you would trust information coming from? Yes, yes.

From a trained midwife. Yes. How do you think MoTeCH can help raise awareness about maternal care within your community?

Patient:

It's all about education and then communication.

And when we mention or when we talk of communication, meaning that they should understand what you are saying.

Interviewer:

Okay. Thank you.

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Wrap up

SBA 12:

Interviewer:
Okay, good afternoon and welcome to today's session.
Midwife:
Good afternoon.
Interviewer:
Can you introduce yourself?
Midwife:
My name is [redacted] I'm a midwife at the University for Development Studies, Myankwala Campus Clinic.
Interviewer:
Okay, how long have you been working as a skilled midwife?
Midwife:
For two years now.
Interviewer:
Okay, that's nice. What are your duties and responsibilities as a midwife in the clinic?
Midwife:
Wow. So, my responsibilities generally involves providing care for women. There's women that are planning to conceive, so pre-conception care, antenatal care, labour, postnatal, family planning services, child welfare clinic services.
So generally, those are the duties or services I render as a midwife.
Interviewer:
Okay, that's nice. What do you think are the main challenges you face while working as a midwife?
Midwife:
Right now, the main challenge I can think of is the fact that we are understaffed. When it comes to midwives, we are very few, so it makes the work a bit difficult because we are not many. The kind of care you want to give to a client or a patient, you might not be able to do so because there are many and you have limited time.
So when you are caring for them, their quality of care is kind of reduced. You don't get enough time to attend to patients as you would want to.
Interviewer:
Okay, thank you. Are there specific areas in which you would like to receive more training or support in your work?
Midwife:
Yes. Personally, I would like to receive training on family planning services.
Interviewer:
Okay.
Midwife:
That's a major area I would like to receive more training on.
Interviewer:
You want to reduce people's family planning?
Midwife:
Yes.
Interviewer:
Have you previously participated in projects or initiatives aimed at improving healthcare?
Midwife:
Yes, I have participated in one training. I think it was malaria case management training I attended last year.
Interviewer:
Can you tell me about the patients you've handled?
Midwife:
Generally, we attend to students and community members. Although the clinic is in the university, we have community members also come in. They are not necessarily students, just because they live around.
Whenever they need healthcare services, they come in. Apart from students, community members, lecturers, other workers around the campus come to the facility for healthcare services.
Interviewer:
That's nice. On an average, how often do you see patients?
Midwife:
Every day. Seven days a week, 24 hours. Every day, we have patients coming in.
Interviewer:
In what areas do you communicate with patients? In what way do you communicate with your patients?
Midwife:
Mostly, physically, when we meet, we talk verbally. On very few occasions, we talk on the phone. If a client or a patient has a concern, mostly they have our phone numbers.
They call us whenever they have a challenge. We talk on the phone, but apart from that, mostly at the facility or the clinic. Okay.
Interviewer:
What are the challenges in interacting with your patients? What are the challenges in interacting with patients? Okay.
Midwife:
One of the challenges would be the language barrier. The community mostly speaks the local language. All the students come in.
To some extent, the maternal and child health units, we mostly have the community members or the indigenous come in. For them, they speak the local language. It's sometimes a challenge communicating effectively with them using their language.
When you speak English, it's difficult for them to understand. The only language they understand is Dagbani. I think language barrier is one of the challenges we encounter at our end.
Interviewer:
Okay. Any other challenges? Language barriers?
Yes.
Midwife:
For now, I think that's just our main...
Interviewer:
How would you like to interact with your patients? How would you like to bridge that gap of communication and stuff like that?
Midwife:
Well, for now, in my little way, I think I'm trying to learn their language so that communication can be more effective. Okay. Yes, so in little ways, we're also trying to learn their language while they also pick a few English terms.
Interviewer:
Alright. To what extent do cultural and traditional constitutions play a role in healthcare practices in your community?
Midwife:
To a very large extent, it plays a role because right now, it might sound weird, but somehow, they still have this superstitious belief or cultural beliefs when it comes to healthcare. They have certain beliefs. For example, if they are pregnant, they believe you shouldn't report to the clinic early.
You should hide their pregnancy so that people don't see it in court with their evil eyes. So, yes, they have beliefs, cultural beliefs that in one way or the other affects them health-wise because we all know that once you get to know you're pregnant, you're supposed to start antenatal clinic. Yes, you should start visiting the antenatal clinic.
But because of this superstition or this belief, they stay at home and mostly report in the third trimester.
Majority of them, you only have a few reporting in the first and second trimester, but majority will come in the third trimester. And by then, the care you are giving, it's more or less you are doing it because it's your duty. So, that's just one of the beliefs.
There are a lot. The foods they eat, even medications you give to them like their daily supplements.
They have a lot of beliefs regarding them.
Interviewer:
Yes. Wow. So, what do you know about traditional birth attendants, TBA for short?
Midwife:
I know there are untrained birth attendants in our communities, mostly the rural communities. They help women, I think mostly in childbirth, but they are untrained. They've not had a formal training or education regarding assisting pregnant women in childbirth.
Interviewer:
Okay. And what are their duties and responsibilities? Don't you know?
Midwife:
Okay. So, as I said earlier, they provide some kind of care to women who are in labor. And there are instances where they also manage minor conditions.
Interviewer:
Alright. How do you interact with TBAs
Midwife:
Personally, I don't know any TBA.
Interviewer:
So, you haven't interacted with any TBA in your years of practice?
Midwife:
No.
Interviewer:
So, you can't even tell any challenges that may come out of interaction?
Midwife:
No. I've not interacted with them.
Interviewer:
Alright. So, how would you manage to interact with TBAs?
Midwife:
Well, I believe they are important people in the community. Because our women tend to even trust them more than their trained midwives. So, if I have the opportunity, I would really like to talk to them, hear about their work, how they do it, and all that.
Yes.
Interviewer:
And what do you think are important services that TBAs provides?
Midwife:
Important services?
Interviewer:
That they provide the TBAs?
Midwife:
So, the major one would be assisting women in childbirth. Then, managing certain minor conditions, medical conditions. Although they are not trained, but I've heard of TBAs managing some form of medical conditions regarding pregnant women.
So, when they are sick, instead of coming to the hospital, they go to a TBA and she treats them. If I can put it that way.
Interviewer:
Okay. And what kind of technology do you use in your work?

SBA 12:

So, we're moving to a different section. So, I asked what kind of technology do you use in your work?

Midwife:

Currently, I don't use any technology at work. As far as my work is concerned, no. I don't use any.

Interviewer:

Okay. Alright. So, you don't have computers or anything? More than devices that help you to work at work?

Midwife:

Oh, I have a computer. I use...

Interviewer:

Provided by the facility?

Midwife:

No, no, no. Not by the facility. It's personal.

Okay. So, if it's technology, I use some form of technology, but with regards to my work as a midwife, at my work post, no. Okay.

Interviewer:

So, do you have a phone?

Midwife:

Yes, I do.

Interviewer:

What kind?

Midwife:

It's a smartphone. Oh, okay. Alright.

Interviewer:

And do your patients have phones?

Midwife:

Yes.

Interviewer:

What kind?

Midwife:

The majority of them also have smartphones. And a few have this... How do you call them?

Should I call them... The other phones I do not have internet connection. Banner phones or something.

Interviewer:

Banner, yeah. Most of them I do not have.

Midwife:

Or analog. Those that you do not have.

Interviewer:

Yeah, analog. Okay. Alright.

And how is patient data management? Do you have a data management system at the facility?

Midwife:

No. My facility, we still use the paper base.

Interviewer:

Oh, okay. So, you do the paper based system of management. Yes.

Okay. Alright. And in some form of electronic record keeping system currently in place, do you have any form of electronic record keeping system currently in place?

Midwife:

No.

Interviewer:

And what do you think are the main challenges and needs in managing patient data?

Midwife:

Well, with the challenges, because we use the paper base, it simply means the patient's data can easily be destroyed in the event of a fire outbreak or flooding or even sometimes rodents. So, yes. The main challenge about the paper base is that, one, data can be destroyed.

Another challenge is finding patient's information. So, let's say if you attended to a patient two or three days ago, when the patient comes, you have to go back to the records, search for the folder. And it's always challenging because the time you could have used to attend to the patient, you spend most of the time looking for the patient's documents before you attend to him.

And by then, maybe it's a critical case or it's a condition that needs immediate attention. But you have to go and find the patient folder because you need to know the history of this patient, what medical services have this patient been receiving before reporting with another complaint. Sure.

Interviewer:

So, are you familiar with the term MoTeCH? Have you ever heard of it?

Midwife:

Yes, I have.

Interviewer:

Oh, okay. Alright. Please explain what you know.

Midwife:

Okay, MoTeCH, I think it's an abbreviation for mobile technology for community health, if I'm right. Okay. It's generally a system of record keeping, patient's record keeping.

It makes work easier. It makes continuity of care easier, faster. Yes.

Interviewer:

Okay, that's nice. So, what do you think about MoTeCH?

Midwife:

Well, I think MoTeCH is a good initiative. It helps health workers attend to their patients effectively. They are able to give efficient care, quality care.

And the fact that data keeping or patient's records are safeguarded on the app, it makes work easy. So, yes, MoTeCH is a good initiative.

Interviewer:

What are your main worries about using MoTeCH?

Midwife:

Main worries? That would be internet connectivity and then constant power supply, like electricity. Okay.

Yes. If these two... Okay.

Please go on. Okay. So, I was just saying, if those two are the main concerns, because you need some form of internet connection to be able to use it or to update patient's records.

Okay. And definitely, since it's on a tablet or a phone, you have to charge to keep it active. Yes.

So, if you have internet connectivity and also electricity, well, it will help.

Interviewer:

Okay. So, are there any features you want to see on MoTeC besides the current feature?

Midwife:

No. I can't think of any now. Okay.

Interviewer:

And how do you see your role in the implementation project?

Midwife:

Implementation? I think my role will be to help patients accept it and, yes, my patients and then my colleagues. I think my role will be helping everyone understand the concept and they should be willing to accept it because it's a good thing.

It's going to make work easier. Okay.

Interviewer:

What are some of the key challenges in engaging the community in health intervention?

Midwife:

Challenges? Well, change, how do I even put it? Mostly, people are scared of changing.

So, I think the challenge MoTeCH might face or, yeah, it will be people accepting it. So, I think generally a major challenge will be how to convince the community that it's a technology that is going to help everyone because where we are, change is difficult to accept.

Interviewer:

Okay. When is the implementation of such intervention successful?

Midwife:

Okay. I would say it will be successful when we're able to, so generally this whole MoTeCH should be, the aim is to safeguard patients' information and at the end of the day, we should be able to give quality care to a larger number

of people. So, I would say it's successful when we are able to achieve these things.

That's, one, keep patients' records safe, two, reach a larger population because since it's technology, meaning it can be accessed anywhere, so wherever the patient is, she doesn't necessarily have to be at my facility or my clinic for me to render care. So, wherever she is, the health provider should be able to also access the patient's records and continue with care. So, I would say it's successful if patients are able to receive care wherever they are using MoTeCH and also if a larger population, yes, we get to attend to a larger number of people.

Interviewer:

Alright. So, what do you need in terms of information? What?

When you get to a larger number of people, what do you need to make sure?

Midwife:

Well, I can think of one. If it's going to be on a tablet or an app that health workers will have to download, I would wish that it's affordable. Everyone should be able to access it on their phones and also, yes, as I earlier on mentioned about this network, internet connectivity and also electricity.

Interviewer:

Okay. Alright. Thank you.

Doctor 1:

Interviewer:
Good morning. Good morning. Morning, Doc.

Thank you for agreeing to participate in this research on ICT for traditional medicine healthcare in northern Ghana. I think I discussed this with you some time ago, that I would like to interview you on this particular subject, to which you said we could schedule a date. And thankfully today we've got the opportunity to discuss this research, even though it's going to be an interview, but it's more or less like a discussion that we are going to have, not an interview per se.

So the purpose of this research is to find ICT solutions for indigenous traditional medicine in northern Ghana, as I did mention to you the last time. So can you tell me a bit about yourself?

Doctor:
So thank you so much. I think I was happy when you told me about this interview, because I also want to make some contributions to the society. So I think that's a good place.

So I'm Dr. [redacted]. I'm currently a first year family medicine resident in the Tamale Tichin Hospital with Ghana College of Physicians and Surgeons. I think I've been working as a medical doctor since 2018.

I attended UDS and I did all my house job and employship in Tamale Tichin Hospital. So I've basically been in Tamale for all these years. So I'm currently with the family medicine department in the Tamale Tichin Hospital.

So family medicine entails primary care. So we see all cases, all ages, all cases, unlike other units that are more specific. So we see every case and then we are in charge of either we are handling it or we liaise with other departments like orthopedics, surgery and others and we can further refer the patients over there.

So that's a general summary of myself.

Interviewer:
That means that family medicine actually positions you to actually have an encounter with all kinds of patients that come to the hospital. That means that you've got a lot of experience when it comes to all kinds of diseases and treatment therapies and all those interventions with your patients.

Doctor:
Yes, that's true.

Interviewer:
So that means that my topic on traditional medicine will be an interesting one because you definitely have exposure or expose patients that have either used traditional medicine or in one way or the other with your patients. So what is your take on traditional medicine?

Doctor:
That's very interesting. So like what I was telling you earlier, I don't think traditional medicine is bad because I mean that is where medicine originated from before orthodox medicine came in. Let me put it that way.

The plants or the natural organic things we have around us are all medicinal. Fruits have vitamins, minerals and fruits and vegetables and that's why we are encouraged to take them. So they are all good but the only problem, especially in Ghana, is how it is done.

In my opinion, it is still being done the same old way and there is no improvement, no research. Maybe it is ongoing but that I'm not aware but generally there is little research being done. And so we are having issues of inappropriate dosages, inappropriate frequency of medications, issues of one medication being able to treat every kind of disease.

And issues of not even knowing drug-drug interactions. So maybe the patient is already on a different drug and you put the patient on this without finding out from the patient. So all these affect the whole thing when it comes to traditional medicine.

So in my opinion, it is not bad. It is a good thing but I think that a lot of research, a lot of work needs to be done in that area.

Interviewer:
Okay. Because of your experience on the job in family medicine, you have a lot to contribute in this area. What is your experience with patients when it comes to traditional medicine?

Doctor:
Okay. So usually, it depends. Sometimes some patients come in, first like with you, they haven't gone to their traditional medicine or traditional attendant yet.

After treatment and they get better, they go home and then their family members try to influence them. I think most of the time, the patients don't even go there on their own accord. It is their relatives or senior members in the family.

So it's like they have no option. Then they stop whatever treatments you are giving them, whether it's working or not. And sometimes, the medications we put the patient on, sometimes it takes a while before you see the effect.

Or they see the effect all right but they want it faster. So they think I can start with the orthodox medicine that's from the hospital. Then I can now switch to traditional medicine.

There are some patients to whom whatever happens to them, they go first to their traditional healer because they think that either the hospital is too expensive, that's one of the reasons. Or they think that they know their traditional healer. Probably a person that's within their community, speaks their language.

And they've heard other people say, oh, when I went there, it worked. So they go there and they are given all these medications and others. And as I said earlier, some of these medications, research has not been done.

So for now, we are having a lot of cases of people having liver diseases. We have a lot of chronic liver diseases. And when you dig in and find out, you realize they had a certain condition.

They've been on herbal medication for years.

You understand?

So after that, when they now realize it's not working, then they now come to the hospital. And then it's now your work to try to help the patient. And when it's gotten to the terminal side or you cannot do anything about it, then they'll tell you that it means your medicine is not working.

Meanwhile, you started from the bad side before coming. You understand? So that has always been the problem, especially when it comes to fractures.

You have a lot of them going in for the bone setters and all. And the truth is that a lot of them are very good at what they do. But in the orthodox setting, what we do is before we even touch you, we need to know what kind of fracture it is.

That will influence what kind of intervention we are doing. Whether we are even going in, whether we are just immobilizing, making sure that we are putting maybe just a POP or we are just leaving it and then we'll have to do a surgery. But they don't have such things.

And to them, every fracture either needs to be immobilized, pulled or, you know. So sometimes it becomes worse. So I've seen patients that have had a disjoint fracture.

It didn't heal. It didn't heal well. So it healed, but it's crooked because it wasn't set well or something.

So they come with a history of, oh, three years ago or five years ago. I went to the traditional and then they have kept it down. When it's not getting worse, it becomes septic.

It becomes something else. Then they now come to the hospital. So those have been some of our experiences.

I've also had certain good experiences where they've gone to the traditional healers who have seen them and then they tell them that at this point, I don't think I can do much. And they refer them to the hospital. And I've had some bone setters setting the bones well.

And it was done well. Then because it was an emergency setting, there was no health facility closer to them. That was the first point of contact.

It was done well and then they were now referred to the hospital where there was now a continuity of care. So we've had some good. But when they are being kept for a very long time and they are being given concoctions, medications, it becomes a problem.

Another area is in children, especially children with chronic conditions like sickle cell. They tend to make scarification marks on them to give them some hair-bound medications. Sometimes these scarification marks get infected because the wounds are not being managed well.

They just put the medication: morning, afternoon, evening, without making sure that the wound is accepted. You understand? Just recently, two weeks ago, I was on the pediatric ward.

Doctor 1:

We had a child who had sickle cell. We were managing in the ward. The mother sneaked the child out to the traditional medicine for them to do scarification marks.

And we didn't know. The child was not in the ward. The child was spiking fever.

So we were now wondering why. So we decided to examine the child. That's when we now saw all these scarification marks coming.

And that was the reason. And the wound was infected. So now we have to dress the wound.

We have to reverse or try to bring the temperature down. It was a lot of work for us. And we have to constantly counsel the mother.

And she was telling us it wasn't her. It was her family who were pressurizing her. So these are some of the challenges that we face with it.

So it's not bad, but the way it is done, there is no communication or continuity of care. There's no communication with us. And so it becomes a gap between us and them.

There's a gap, and there is that point where they say, don't bring them to the doctor. They can't do anything about this. And sometimes with them, it includes spiritual aspects to the traditional medicine.

And so it's like, this one, if you go to the doctor, they can't do anything. Let me handle it with the medicine and the spiritual aspects. And you know Africans, we are all spiritual.

Interviewer:
So from your narration, I could see this communication gap even between you and the patients that you handle here when it comes to the traditional medicine usage, which I think maybe, do you think enough education is done for patients that you admit and work with in terms of traditional medicine usage?

Doctor:
Yes. So especially here in Tamang Chin Hospital in the north, where we know that a lot of the patients would first go in for traditional medications before even coming anyway. And where we have even realized a high prevalence of liver diseases and even kidney diseases, secondary to taking these traditional medications, we educate our patients very well.

Especially patients who have chronic conditions where they have to take long-term medications, hypertension, diabetes, kidney diseases, we educate them. Before a patient leaves my consulting room, I make them understand that this medication you are taking, you can't mix it with any other medication. You will damage your liver, you will damage your kidney.

So we try to give them all those advice. But the issue is now when they go home, the family. So they are being influenced by the family through the traditional health methods.

Interviewer:
So as you mentioned, trust and familiarity and accessibility to these traditional medicine healers are most of the reasons, and coupled with other factors like cost, as you mentioned, influences most patients to opt for these traditional medicine services either before they come to or after the formal or the conventional hospital care. Now what do you think we can do to bridge this gap?

Doctor:
So for me, I think that what I said earlier on, that traditional medicine isn't bad. And so I think there should be some integration between the two because the truth be told, we don't have health facilities in every village. We don't have health centers or even CHIPS compound in every single village.

And so there's a gap in delivery of health care to the people. You understand? I think I was telling you some time ago about the orthopedics department in TTH where they decided to liaise with these traditional home centers.

Where I think they even had training for them. They even teach them some things and they also learn some things for them. And they liaise with them in such a way that because they have already even taught them some of the factors, and they made them understand that when you see this type of factor, don't even touch it.

Let the patient come straight to the teaching hospital. I think it helped. It helped.

So first is that communication gap has to be bridged. We need to work together because as I said, we don't have every health facility in every village. There are certain women who are in labor.

They have to travel from one village several miles before they are able to get to the health center. If they have traditional birth attendants who are well trained, who have good knowledge, are able to recognize bridged presentation, are able to recognize a malpresentation, are able to recognize a danger sign and can quickly say that I can't handle this because I don't have the equipment for this. Let's take you here.

It would help. So that gap has to be bridged where we both work together, where we both share knowledge. Because I know they have certain knowledge that we don't also have.

I mean, orthodox medicine will not agree to it. But me as a person, I would attest to the fact that they might have certain knowledge that we don't have. So that gap needs to be bridged.

That notion of pride between the two healthcare is causing a problem.

Interviewer:
So that means the way forward is integration.

Doctor:
Integration and research. Especially in their area. Because a lot of research is being done in the orthodox setting.

But for them, there's little research. I think they have so many medications which are organic. And that's the important thing.

Organic things are better than synthetic products.

You understand?

If I can get an organic medication, that would work for me. If we have a doctor, I would prefer that. To take in synthetic things into my body.

Because of the side effects and all. But if more research is done into the medications that are given, to know their frequency, their dosages, how it is being metabolized in the body. For all we know, some of the medications, the roots of administration, it's still a problem.

Maybe it's not supposed to be taken orally. It's supposed to be given IV. Or it's just supposed to be topical.

You understand? So everything is either wrong, either you are not taking it right, you are not taking the dosage, you are not using the right roots. You know?

That is it. So if all these things can be done, plus the communication, I think it would work.

Interviewer:
So that means that standardization of this traditional medicine is actually an issue which covers the dosage, the rights, frequency, the routes, and all those. Which a lot of consumers actually have concerns irrespective of how effective they think this local traditional medicine has.

Doctor:
And for all you know, they might have some medications that can cure certain diseases that we still don't have orthodox medications.

Interviewer:
Okay. So this whole integration, do you think conventional health workers are ready or are willing to work with?

Doctor:
That is the problem. I think that right from medical school, we have been taught that traditional medicine, especially in the African setting, the Ghanaian setting, or the northern setting to be precise, because I schooled in the northern region, is not good at all. The same way they tell their people, oh, don't go to the orthodox, don't go to the hospital, they can't help you.

They just walk around and they don't do anything. They just give you expensive drugs and it wouldn't work. It's the same mind they also have.

I think that one, even if something like that, like an integration is going to be done, the health workers need to be sensitized on it.

Interviewer:
Okay.

Doctor:
The problem is because we keep seeing bad cases from them, we don't believe that they can do something good.

Interviewer:
But that doesn't mean they are not doing something right.

Doctor 1:

Doctor:
That doesn't mean they are not doing something right, because they are actually helping to expand. I think some health workers would agree, some wouldn't. Those that wouldn't agree, it would take a while, but they would need to be sensitized to include them into all this.

Interviewer:
Because in Ghana currently, the literature actually reveals about 70% of the Ghanaian population resorts to traditional medicine. So I don't think if they're not doing something right, we'll have this high percentage of the population resorting to traditional health care.

Doctor:
I think even for that, one of the reasons could also be because of familiarity with and the fact that in their setting, these people have been there for several years.

Interviewer:
Yes.

Doctor:
Orthodox medicine is just coming in. So these are people they trust.

Interviewer:
They trust, exactly.

Doctor:
They have trusted since, and they have actually seen results before.

Interviewer:
Yeah.

Doctor:
So that is a reason why they would want to go in. This person is their tribe, speaks their language, stays in the community with them.

Interviewer:
Yeah.

Doctor:
Plus the spiritual aspect attached to it.

Interviewer:
Yeah.

Doctor:
That is that.

Interviewer:
So that means that there's going to be a big challenge.

Doctor:
It's no doubt, yes. It's going to be challenging, but if we handle it fast on both sides, before the integration, that is when it would work.

Interviewer:
Okay.

Doctor:
So first, Orthodox health workers need to be sensitized or need to be made aware that traditional medicine is not bad.

Interviewer:
Yeah.

Doctor:
It's just that there are a few lapses.

Interviewer:
So let me quickly, in your training, did you actually take any courses on anything relating to traditional medicine in the course of your training?

Doctor:
Yes, we did. Especially even in my training now as a resident, we even had a course on integration of traditional medicine. We were even made to understand how some of the things, for instance, even acupuncture.

Interviewer:
Yeah.

Doctor:
That's traditional medicine, but not for us.

Interviewer:
Yeah.

Doctor:
But a different setting. So you see how some of these things, at least some little research has been done, and because of that, even health workers would even refer you and say, okay, why don't we try acupuncture?

Interviewer:
Yeah. China.

Doctor:
In China or even Ghana, there are places here that it's being done. You understand. So when we get to have that confidence or we see the results ourselves, then we will be more confident to even let our patient go.

So yes, we've done it in our training. We have been taught some of the ones that have been evidence-based, because now medicine is evidence-based. There's no evidence that this drug doesn't work.

There's no way I'm giving it to my patient. I don't want to kill my patient. So there should be evidence.

That is why I'm talking about the research. There should be there to show that this thing is working or is not working.

Interviewer:
So currently, the government of Ghana is trying to integrate the traditional medicine into the conventional healthcare system, and as we speak now, most of the government facilities are having what we call the traditional medicine unit, where patients can have the option or patients that think they need traditional medicine for certain kind of diseases can have the options to choose. Are you aware of this integration? Have you ever referred maybe a patient to such a facility?

Doctor:
So I'm not aware. I haven't heard of anything like that till I think just this morning when we were having a little discussion. I wasn't aware of anything like that, and this is what I'm talking about.

If the government is starting something like that, generally, all health workers should be sensitized, should be made aware. You see, because it needs time. It needs time for the orthodox health workers to even think of accepting, because already there's the mindset that these traditional medicines don't work or cause harm rather than good.

You understand? And so if we are not sensitized and this is being introduced, there will always be a friction. So I'm not aware, and so I don't even know which of my patients to even refer there.

So that is a lapse over there. The government should try and sensitize not just the hospitals that they are going to send these patients to, but every health worker needs to know. I don't know how they are going to disseminate it to us.

Interviewer:
So education is important?

Doctor:
Education is important. And education on the fact that they are introducing this into the health care system. It also lets us know which aspects or which category of patients that these people would see.

Would they only be only bone setters? Would they be with traditional bed attendants? What category?

Interviewer:
There should be a clear-cut policy so that we know what their role would be.

So I think the few health care workers have interacted with, they've shared similar concerns on the awareness. And it seems to be a challenge with this whole integration that we need to look into if we can have a successful integration of traditional medicine. Now, we made mention of research, research, research, research.

And I think technology has really pushed orthodox medicine or the whole conventional health care system to a very efficient and high-level performance in terms of treating diseases and all that. And the purpose of this research is to find ways we can use ICT or any technology that we can actually come out with to support or enhance this traditional medicine health care system to bring them to a level where at least the quality of their services, the standards, the integration as we are talking about, they could leverage on that ICT solution to improve this sector. So in your own opinion, what do you think we should be looking at in terms of ICT solutions for this traditional medicine healers or the whole health care system?

What ICT solution can support them?

Doctor 1:

Doctor:
So, how do I put it? The whole research is ICT-inclined, okay? So for instance, with them, most of the drugs they have or most of the drugs they use, some will never even tell you the composition of their medication.

If I pick a drug here, in the orthodox setting, every drug in it is listed. This has this milligram, that's the quantity, everything is there. But some have what they call their secret recipe or whatever that is inside their drug that they are giving you, that we have...

Interviewer:
Their secret ways of...

Doctor:
Doing their things that we have no idea about. So, for ICT contribution to this, first has to do with the training. They themselves need to understand their medications, as I said earlier on, the quantities, how to prepare.

You see, sometimes it's not even the medication that is a problem, even the hygienic way, how they prepare it, it's not even hygienic. So the kind of water they use and other things, that is a problem. So ICT coming in here is one, education.

Interviewer:
Okay.

Doctor:
Education. Educating them on their medications, even certain... What should I say?

Certain machines or instruments that they can use to even test the medication.

Interviewer:
Okay.

Doctor:
You understand how... Whether it is... I remember during the COVID, there was this medication, I don't know if I can mention, called CoA, that they said could be used for the COVID.

Interviewer:
Yeah.

Doctor:
I'm convinced it could have worked, but there was a rumor that they said they were contaminated.

Interviewer:
Yeah.

Doctor:
And because of that, the government withdrew that agreement to use them for the COVID-19, you understand? So if there is one, this education with them, provision of certain machines or instruments that they can use in doing what they have to use. Communication is important.

Most of them are not educated, so most of them cannot even use mobile phones, they can't use tablets, they can't use these things to even communicate or to even, we are talking of research, to even keep data.

They can't even keep data. This patient came to see me, this was the symptoms the patient had. What is different about this patient to this particular patient, the number of females that came to me, the number of males that came to me.

Interviewer:
Patient records management, it's a problem.

Doctor:
These are one of the things, and can I even think of more?

Interviewer:
Patient records management, education, and then the sensitization, and even the tools, machines that they can use.

Doctor:
And because most of them are not educated, it's difficult even to train them to use these machines, to even make the work faster and even easier for them. You understand? So these are about a few I can think about.

Interviewer:
You mentioned a very key, valid issue I was having in mind from the beginning, I almost forgot, COVID. During the COVID, do you think the traditional medicine played a key role in keeping the population healthy or preventing the, what do you call it, getting the spread of the disease?

Doctor:
I think the little I heard about, I think they did play a key role. We heard about some of them encouraging patients to use, to inhale bald neem leaves and all those things. And some people, we had some patients coming to the hospital, let's say later, for something else.
And out of curiosity, we just ask, okay, did you ever get COVID? How were you managed? And you can hear some patients say, oh, we use this, we use that, we use ginger, we use all these things.
So I think it did play. But I think that we didn't, or I don't know whether such research was done. I think extensive research has not been done in that area because COVID was an airway disease, a respiratory disease, which yes, involves or might affect other organs because of how violent it was at that particular time.
If we do more research to find out, we realize that they might have even helped, especially in the rural areas where they didn't have, everyone was isolated. They didn't even have access to health facilities. And they might have already been doing certain practices that even helped prevent the infection.
For me personally, as a doctor, I believe that yes, they might have contributed, just that we haven't had that data to have evidence to prove that. So I will not dispute that it didn't work. Aside them, even people generally at home decided to even go the traditional way.
So people were boiling ginger with pineapple and others to take, to help prevent and even treat the COVID.

Interviewer:
So education, sensitization, communication, and records, patients records, management, the key points or areas you think we need to look at with any ICT solution we could come out with. What do you think could prevent this whole integration of traditional medicine into the conventional system? You think there's something that can prevent the integration?

Doctor:
Of course, the lack of education. The lack of education, the lack of sensitization. Because if they don't understand, if something I don't understand, I'm not getting myself involved in.
Because already, as I said, they already have that mindset that the orthodox medicine is bad. And they are the only people who can solve every disease in this world. And that is because it has been passed down from their fathers, fathers, fathers.
And that knowledge has been passed down. And so if they don't have new knowledge with evidence that this can work, if we work with you, it can work, then they will not join. If they are not made to also feel that they are important or they are, because we also look down on them.
The orthodox medicine also looks down on the traditional medicine. And so they in turn also look down on us. But if we make them feel special, make them understand that they work.
So we need to admit the fact that they are also making some contributions to the society. But if we downplay their work, make them feel they are useless or make them feel they are the cause of every other, every problem, there's no way they will join us. So first we need to encourage them, first acknowledge the fact that the work they are doing is good.
Encourage them, then educate them to include them. And that is how they will join us. That is just how, if we don't, if we don't acknowledge or make them understand that we see the importance of their work, especially in the rural areas, they won't join us.
And I'm telling you, they have certain knowledge that we don't have, which we need.

Interviewer:
Because the few things that they are doing right needs to be acknowledged, you know, and like be like leverage on that to encourage them to do other things right in order to promote.

Doctor:
So let's not talk about the wrongs first. Yeah. Let's talk about the rights.
Or you are doing well. You are at least helping us share the bones. You are doing this or the traditional birth attendance.
There are a lot of them who have successfully delivered babies, breech babies, footling breech babies. They have been able to do it. That is because they were taught.
A lot of them have been able to even do the maneuvers to turn the babies. They've been able to do all those things without ultrasound, without all the CTGs machines that we used to, because our medicine is evidence-based. You need to have this done before you move to the next step.
They use their knowledge or experience to do their work. And so we need to acknowledge them. That's why they are doing this.
They've done well. And that is what will make them join us or make us have that kind of integration. If we keep attacking them, there's no way they'll join us.
If we go to them telling them that you are doing the wrong thing, that is why we want you to... If you come telling me...

Interviewer:
We will teach you the right thing.

Doctor 1:

Doctor:
No, no, no, no, no.

Interviewer:
They'll ignore you.

Doctor:
They'll ignore you because they also have their pride and ego.

Interviewer:
So do you think social media is something that is a very powerful tool now in terms of communication?

Doctor:
You see, social media is skewed. It's skewed towards those who are educated or it's skewed towards those who... Some people might not necessarily be educated, but...
How do I put it? Just are able to find their way around it. There are some people who don't even know how to use a simple smartphone.
And so they are not on social media. They don't know what is going on with social media. So for social media, yes, it has an influence, but to a certain kind of people, not to everyone.

Interviewer:
Okay.

Doctor:
Not to everyone. If you go to the village, the village traditional birth attendant doesn't have
WhatsApp.

Interviewer:
Yeah.

Doctor:
So if she had WhatsApp or she could easily even take a picture, you know, the record I'm talking about, even take a picture of what she is struggling, send to a doctor she knows and says, what do you think I can do? You do.

Interviewer:
Okay.

Doctor:
But a lot of them are refusing the social... Or they are refusing the new things out of pride because they think the traditional way or the old way is the right way. So that is also a problem that would have to bridge.
Because if we are going to integrate them or include ICT, all these things need to be handled because they need to be trained. They need to be trained. If we are going to collect what they should be part of data collection and all, they don't know how to input on tablets or even paper.
They are not educated to take. It's a problem. So it's huge.

Interviewer:
Well, I know this conversation will not end here. I would have to come back again. I know which I know we would do follow-ups on these issues for more information and more like ideas and contributions or clarifications in this research work.
So we are not... Even though we'll end it here, but it doesn't mean that that would be the end of this interview. I could come back anytime we think we need more clarification on this traditional medicine integration and standards. You really have a lot of information on it that could help us on this research. But for now, I would say thank you very much for your time because I know you have to get back to work. And thank you so much for making time to participate in this research interview.
And I'm really grateful for your time.

Doctor:
Thank you too.

Interviewer:
God bless you, Dr. Reyna.

Doctor 2:

Doctor:
Okay, good morning, I'm Dr. [redacted], first year family medicine resident at Tamale Teaching Hospital. I've been working for the past three years.

Interviewer:
Now, okay.

Doctor:
At ETH, at Tamale Teaching Hospital.

Interviewer:
At Tamale Teaching Hospital, okay. Thank you very much, Doc, for the opportunity to interview you on my research.
I think we met somewhere last week, or the last two weeks, and I told you if it was possible for me to interview you on the research I'm conducting on ICT for traditional medicine healthcare system in northern Ghana. And we decided to schedule a date for us to meet, and thankfully we are here this morning. I know you are quite tight, so I wouldn't want to take much of your time.
As I mentioned to you, the research is to find a sustainable ICT solution for traditional medicine healthcare system in northern Ghana. What can we use ICT to help or solve in the area of traditional medicine to improve their work or enhance their services for a better healthcare system? So research is purposely for this reason.
So as a medical doctor or a resident doctor, I know you've come across or you have some experiences on traditional medicine. What is your take on traditional medicine?

Doctor:
It really depends. It depends on the condition in which they usually manage the patient. For instance, so in my practice, as I said, I've worked for like three years.
We know that the liver is the organ that filters most of our waste product, right? So we realize that most of the herbal medications they take are not really quantified as to how much they should take or not. So usually sometimes they take in excess, and it ends up damaging their liver and other things.
So my worry is usually the quantity they take, and it ends up affecting their liver. So usually by the time they come back to the hospital, they're in the deplorable state. So usually that's always my worry.
So that's with the internal organs. And also when it comes to the external factors, like when it comes to the orthopedic aspect, like fractures and other stuff. So usually we have different type of fractures.
We have the open and the closed ones. So usually with the open ones, we have, you know, the olden days, our old, old grandparents do well, like the bone setters, they usually do well with the open fractures. But the closed fractures, the open ones are managed differently from the closed fractures.
So usually we have different ways of managing them. So usually that's my take on it. We don't manage them the same way.

Interviewer:
So personally as a medical doctor, have you ever used traditional medicine personally or at the house level too?

Doctor:
At the house, I can't. So maybe as kids.
So, you know, grandparents. So as kids, yes. You know, grandparents sometimes, you may be vomiting or something, and they will give you this, oh, drink this, drink that, and it will stop.
Okay. Yes. But maybe at the preschool age, six, school grade, yeah, between six and eight years.
Now when I remember, I was giving. Okay. And it actually helped.
Okay. Yes. Okay.

Interviewer:
So that was going to be my next question. Do you think traditional medicine is effective in using it as an alternative source of health remedies?

Doctor:
Yeah, it helps in some cases, as I told you.
Because it cured whatever I was going through, but I didn't know how it did it. Okay. The only problem is for us to find the active ingredients.
Now that constitutes whatever component was given to me.
And how effective it can be prepared free of germs.
And how well it can be bottled. And then the quantity, then should I say, that's the meals, right? We have dosages.
We require dosages that should be given. So for me, maybe I was underdosed or giving the right dose for him or her. Because it actually worked.
So for me, I think it's good. Okay. We just need to know the quantity to give. And then which drugs should be given for which illness. Because if this person is vomiting, the same medication is given. If this person has headache, the same medication is given.
One medication covers a whole wide of illness.
So I think it's good. It's good. More studies have to be done.

Interviewer:
Okay. So with your experience at the clinical level, what has been your encounter with patients when it comes to traditional medicine? Have patients been, has patients ever approached you to request for maybe on traditional medicine they want to use?
Or have you ever also tried maybe referring a patient to traditional medicine remedy?

Interviewer:
No. No.
No. I have never done that.

So if I see a patient and I know that medically there is a cure, I would never refer a patient.

Interviewer:
Okay. Yes.

Doctor:
If actually there is a medical cure for it, I really don't refer a patient to alternative. No, I don't. Okay.
Especially when it involves vital organs as I told you.

Interviewer:
Yeah.

Doctor:
I really don't. And also as I told you, most of them come in a bad state. Yeah. I don't.

Interviewer:
And why do you think maybe they don't seek for the conventional healthcare from the beginning and they resort to traditional medicine and when maybe they have complications then they now come to?

Doctor:
There are a lot of myths surrounding some illnesses.
For example, we have boils.

Interviewer:
Okay.

Doctor:
We have some liver pathologies, some skin manifestations, even like sickle cell disease, let me say.
Most of them have some skin infections. Some start with getting small, small boils on their body and other things. They have a lot of skin infections.
So people have this assumption that whenever you have a boil and they inject you, you die.

Interviewer:
You die.

Doctor:
So from the beginning, they don't come. So they start the alternative from the beginning. And also they have at the back of their mind that when they come to the hospital, it's very expensive.

Interviewer:
Okay.

Doctor:
And seriously, when you are even going to compare the alternative medicine to what we do in the hospital, it's more expensive there compared to this place. Okay. It's expensive.
Yeah, because almost every day if they go, there's an amount they pay. Okay. This is what I have heard from patients.
Okay. There's an amount they pay when they go. There's an amount they pay every day when they go.
So to me, it's because of the myth they have. And also when you look at conditions like hypertension and diabetes, what I've realized is patients hate to hear that this condition cannot be cured. Okay.
What patients always want to hear is that when you take this thing, everything will go. So if you go to an alternative medicine and they tell you, oh, if you take one gallon of this, your hypertension will be cured.

Interviewer:
Yeah.

Doctor:
Compared to if you go to a doctor and the doctor says, this medication, this hypertensive medication, you are going to take it till the day you die.
Compare.
So this is what moves them away from us. One is the myth about certain illness and the fact that most of the conditions are lifelong. Okay.

Interviewer:
You made mention of costs.

Doctor:
Yes, costs.

Interviewer:
We're thinking, or the general perception is that traditional medicine is cheaper.

Doctor:
No it's expensive.
No it's expensive. No it's expensive, yes. Okay.

Interviewer:
No it's expensive.
Okay, so that means that times have changed.

Doctor:
Yes, time has changed.

Interviewer:
Or the services involved has probably led to some factors increasing the cost of the traditional medicine services.
As compared to...

Doctor:
Before. Okay.
Initially, it was free. Yes. The alternative, it was free.

Interviewer:
It was free.

Doctor:
Usually they give it to you, whatever you have. Then? You can just, oh, it's true, a token of appreciation to them.

Doctor 2:

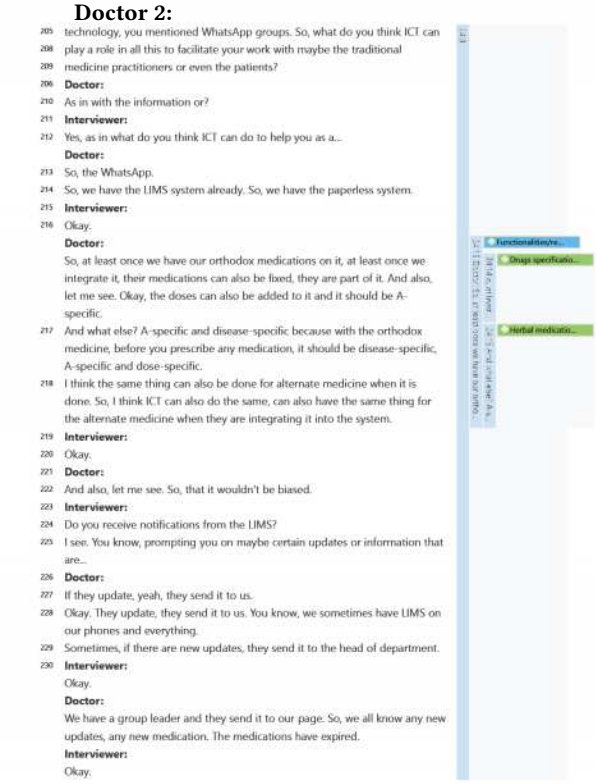
Yeah. But now, most of the time, the services are free. And now it's expensive.
Interviewer:
Okay. So do you think during the COVID, traditional medicine played any certain role among the people, let me say, in Africa or in Ghana, in terms of boosting their immune systems to, you know, prevent getting the COVID? Do you think you heard stuff concerning...
Doctor:
I heard a lot. Okay.
Yeah, I did. I heard. Yeah, I heard a lot.
Okay. Yeah, I heard a lot about that.
Interviewer:
Because this was a situation where even the advanced world was still struggling to get a remedy or... Yes. So, you know, the medical domain had come to a standstill with COVID when there was no solution for the COVID virus.
And, you know, people had to resort to other remedies to prevent or boost their own. So do you think our traditional medicine healthcare system played a role in protecting the people from acquiring?
Doctor:
I think it did.
Because those who claimed they followed suit with those remedies actually didn't get COVID. Okay. Yeah, because it was on news, on radio stations.
Yes, people, a lot of people were advertising them. Okay. Okay, according to them, actually they didn't get COVID.
So I think it did play a role for some segments of people.
Interviewer:
Just that we don't have the scientific proof.
Doctor:
We don't have the data.
We don't have the proof to show. Yeah, to show. Yeah.
Okay. So it's just verbal information we have, but we don't have the data to actually prove. But it did help.
Because we have some home remedies they were showing, garlic, all these combinations. And it's really helped. Okay.
Yes, and it's really helped. Okay.
Interviewer:
So in terms of information, do you think information is very, there's a gap, you know, with information in terms of what traditional medicine can do and how it should be done among the people, among, you know, patients that wants to resort to?
Do you think there's enough information for this category of people? If not, why?
Doctor:

I don't think there's enough information.
Because to me, I think the traditional medicine, let me say, can do a lot.
Alternative medicine can do a lot. But there's a gap.
Because if you are prescribing medication to someone, because for most of them, some are going to school, as you said. Now they want to integrate it. Because I know in Kofanochi, we have, they have their own section.
Interviewer:
Traditional medicine units. Yes.
Doctor:
So they are trying to integrate it. You are awarded a bachelor's degree and all those things. So definitely they would have done anatomy, physiology, and all those things.
So you know that hypertension cannot be cured, right? It can be managed or controlled. So as you are giving medication to a patient, and you let the patient know that, oh, this particular condition, oh, you cannot, you are not going to cure it, it can be controlled.
Definitely the patient will stay with you. You get it. Oh, the patient will stay with you and continue to, because definitely most of their medications work.
Interviewer:
Yeah.
Doctor:
Because I had a patient who was still taking their medication and adding our medication to it. And the patient came hypertensive.
Interviewer:
Okay.
Doctor:
So it means that the medication was working because both medications were lowering the BP. So it means it was working. So it means even one hand can actually work if it was controlled well.
So I think that there is actually a gap. So they could go better further by explaining the conditions to the patient and explore better by doing more studies on the medications. Research.
My part is about the ingredients they are using, the dosage. Dosage that is not lethal, that will not kill. That is actually my focus.
Because even before this orthodox medicine, our great grandparents were using.
Interviewer:
Okay.
Doctor:
Even when you look at, when you take some of the constituents of these medications, you see neem tree and other things. Yes, they take extracts from all of them. But they take a percentage to do that.

They don't take everything. So there should be a research on it. And also when patient comes in, they should openly explain everything to them.
My job is the knowledge. Yeah. Okay.
Explain to them. Okay. Yes, explain to them.
Interviewer:
And that comes to the integration aspect. Are you aware of that whole integration process by governments of integrating traditional medicine into the healthcare system? I know you did refer to Confuanoche, meaning that you had something about it.
Doctor:
Yes, I had it during our induction ceremony.
Interviewer:
Tamale Teaching Hospital here, are you aware?
Doctor:
I had it.
Interviewer:
You had it. Okay. So that means that there's lack of information or inadequate information. Was it sensitization or education on what policies are being implemented with regards to traditional medicine?
Doctor:
Yeah.
Interviewer:
So that could be a challenge.
Doctor:
A huge challenge. A huge challenge.
Because seriously, most of the cases we see here, they actually present late. And if you are going to go through, when you go to the past medical, you should realize that the patient has taken a lot of herbal medications before coming. Fine.
When you go to the, if the herbal medication was even taken wisely, it wouldn't have caused that harm. If the exact dosage was taken, it wouldn't have killed the patient or ticked the patient into renal failure. No, not at all. If the right dosage was taken, it wouldn't have killed the patient that much.
Interviewer:
Okay. So I think that is the whole reason why government wants to integrate so that this, you know, medications can be properly researched or the medication that is given here can be standardized for patients.
Okay. And the dosage forms can be looked at, the routes, you know, to use for these medications and the active ingredients and what illnesses they can be. Okay.
So what do you think can be done for the smooth integration? Because here's the case, in this teaching hospital, the Tamil teacher, you are not even aware. Not even aware, yes.

So...
Doctor:
At least there should be a memo, at least.
Interviewer:
Should be a memo or information circulating.
Doctor:
Yes, circulating. At least we have, every unit has head of department. At least they can circulate the memo to each of the head of department.
I mean, currently now we all have WhatsApp groups.
Interviewer:
Okay.
Doctor:
At least you can circulate it to each of the groups. We all have access to it. We get access to it, we read it.
If there are questions we ask, then we have an idea of it. I'm sure very soon, we have a main conference room. Usually every Wednesdays we have morning meetings.
Interviewer:
Okay.
Doctor:
I'm sure there will be a particular day where we can have... Yes, morning meeting to brief everyone about it. Okay.
I think that should be the best way to go about it. Because usually at the morning meeting, all the doctors, all the teaching hospitals are supposed to be there. All the units are supposed to be there.
Interviewer:
Okay. So, will you be willing to work with these traditional medicine practitioners or healers if the government should integrate? Because there's this kind of friction between the orthodox workers and the traditional.
Do you think integrating you guys can actually facilitate your work?
Doctor:
Yeah, once there's an understanding and we all know our limits as to where I can work to or this is my limits, this is how far I can work to. I think we can work together.
We can work together. Yeah, we can work. We can work.
Interviewer:
So, I see that. I think information is quite a challenge going forward with the integration of traditional medicine. And also, even from the traditional medicine practices, information is a challenge going down to the patients or even communication between the traditional medicine practitioners and conventional health workers.
That is where this whole research is also trying to look into what can be done to enhance the communication, information flow. We are in the era of

Doctor 2:



technology, you mentioned WhatsApp groups. So, what do you think ICT can play a role in all this to facilitate your work with maybe the traditional medicine practitioners or even the patients?

Doctor:

As in with the information or?

Interviewer:

Yes, as in what do you think ICT can do to help you as a...

Doctor:

So, the WhatsApp.

So, we have the LIMS system already. So, we have the paperless system.

Interviewer:

Okay.

Doctor:

So, at least once we have our orthodox medications on it, at least once we integrate it, their medications can also be fixed, they are part of it. And also, let me see. Okay, the doses can also be added to it and it should be A-specific.

And what else? A-specific and disease-specific because with the orthodox medicine, before you prescribe any medication, it should be disease-specific, A-specific and dose-specific.

I think the same thing can also be done for alternate medicine when it is done. So, I think ICT can also do the same, can also have the same thing for the alternate medicine when they are integrating it into the system.

Interviewer:

Okay.

Doctor:

And also, let me see. So, that it wouldn't be biased.

Interviewer:

Do you receive notifications from the LIMS?

I see. You know, prompting you on maybe certain updates or information that are...

Doctor:

If they update, yeah, they send it to us.

Okay. They update, they send it to us. You know, we sometimes have LIMS on our phones and everything.

Sometimes, if there are new updates, they send it to the head of department.

Interviewer:

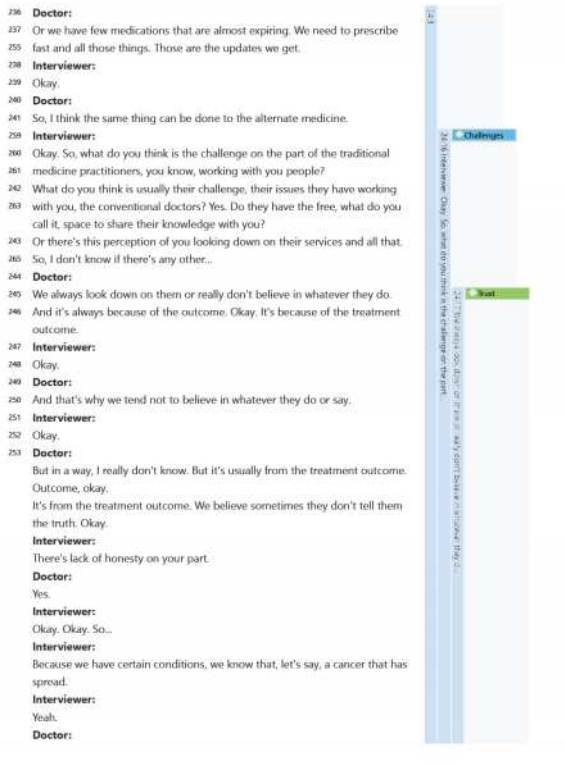
Okay.

Doctor:

We have a group leader and they send it to our page. So, we all know any new updates, any new medication. The medications have expired.

Interviewer:

Okay.



Doctor:

Or we have few medications that are almost expiring. We need to prescribe fast and all those things. Those are the updates we get.

Interviewer:

Okay.

Doctor:

So, I think the same thing can be done to the alternate medicine.

Interviewer:

Okay. So, what do you think is the challenge on the part of the traditional medicine practitioners, you know, working with you people?

What do you think is usually their challenge, their issues they have working with you, the conventional doctors? Yes. Do they have the free, what do you call it, space to share their knowledge with you?

Or there's this perception of you looking down on their services and all that. So, I don't know if there's any other...

Doctor:

We always look down on them or really don't believe in whatever they do.

And it's always because of the outcome. Okay. It's because of the treatment outcome.

Interviewer:

Okay.

Doctor:

And that's why we tend not to believe in whatever they do or say.

Interviewer:

Okay.

Doctor:

But in a way, I really don't know. But it's usually from the treatment outcome. Outcome, okay.

It's from the treatment outcome. We believe sometimes they don't tell them the truth. Okay.

Interviewer:

There's lack of honesty on your part.

Doctor:

Yes.

Interviewer:

Okay. Okay. So...

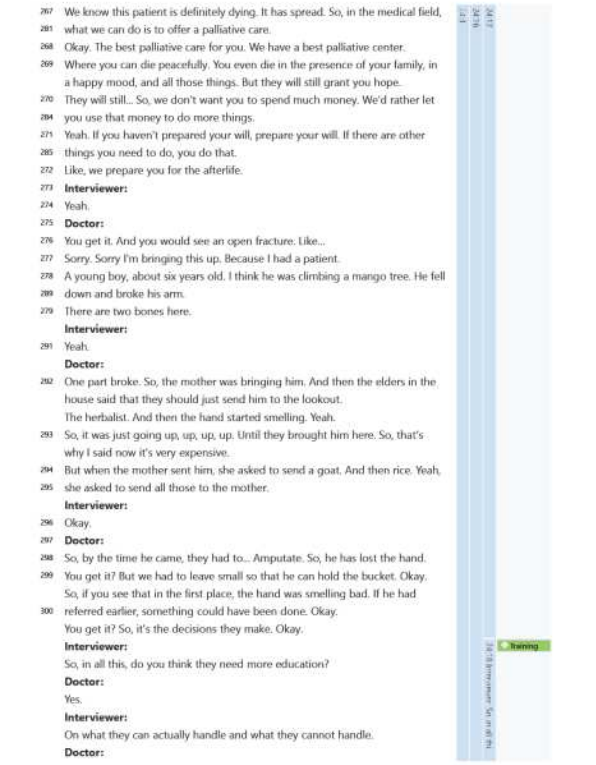
Interviewer:

Because we have certain conditions, we know that, let's say, a cancer that has spread.

Interviewer:

Yeah.

Doctor:



We know this patient is definitely dying. It has spread. So, in the medical field, what we can do is to offer a palliative care.

Okay. The best palliative care for you. We have a best palliative center.

Where you can die peacefully. You even die in the presence of your family, in a happy mood, and all those things. But they will still grant you hope.

They will still... So, we don't want you to spend much money. We'd rather let you use that money to do more things.

Yeah. If you haven't prepared your will, prepare your will. If there are other things you need to do, you do that.

Like, we prepare you for the afterlife.

Interviewer:

Yeah.

Doctor:

You get it. And you would see an open fracture. Like...

Sorry. Sorry I'm bringing this up. Because I had a patient.

A young boy, about six years old. I think he was climbing a mango tree. He fell down and broke his arm.

There are two bones here.

Interviewer:

Yeah.

Doctor:

One part broke. So, the mother was bringing him. And then the elders in the house said that they should just send him to the lookout.

The herbalist. And then the hand started smelling. Yeah.

So, it was just going up, up, up, up. Until they brought him here. So, that's why I said now it's very expensive.

But when the mother sent him, she asked to send a goat. And then rice. Yeah, she asked to send all those to the mother.

Interviewer:

Okay.

Doctor:

So, by the time he came, they had to... Amputate. So, he has lost the hand.

You get it? But we had to leave small so that he can hold the bucket. Okay.

So, if you see that in the first place, the hand was smelling bad. If he had referred earlier, something could have been done. Okay.

You get it? So, it's the decisions they make. Okay.

Interviewer:

So, in all this, do you think they need more education?

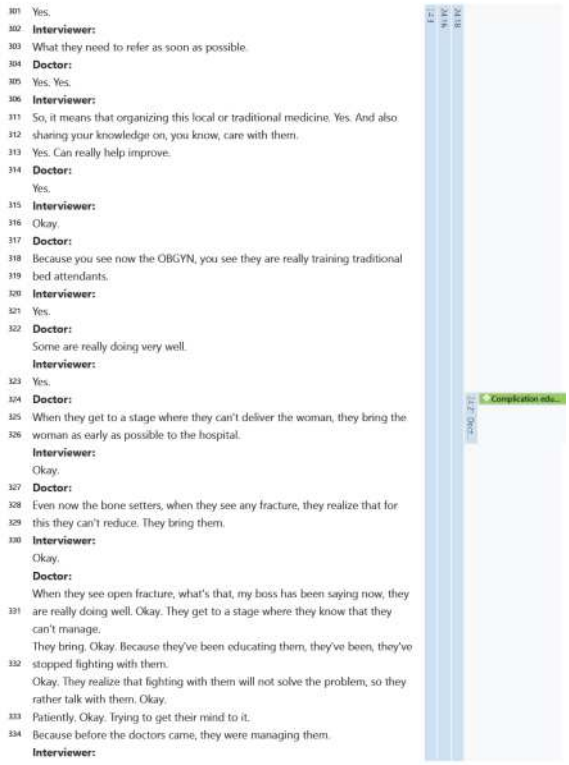
Doctor:

Yes.

Interviewer:

On what they can actually handle and what they cannot handle.

Doctor:



Yes.

Interviewer:

What they need to refer as soon as possible.

Doctor:

Yes. Yes.

Interviewer:

So, it means that organizing this local or traditional medicine. Yes. And also sharing your knowledge on, you know, care with them.

Yes. Can really help improve.

Doctor:

Yes.

Interviewer:

Okay.

Doctor:

Because you see now the OBGYN, you see they are really training traditional bed attendants.

Interviewer:

Yes.

Doctor:

Some are really doing very well.

Interviewer:

Yes.

Doctor:

When they get to a stage where they can't deliver the woman, they bring the woman as early as possible to the hospital.

Interviewer:

Okay.

Doctor:

Even now the bone setters, when they see any fracture, they realize that for this they can't reduce. They bring them.

Interviewer:

Okay.

Doctor:

When they see open fracture, what's that, my boss has been saying now, they are really doing well. Okay. They get to a stage where they know that they can't manage.

They bring. Okay. Because they've been educating them, they've been, they've stopped fighting with them.

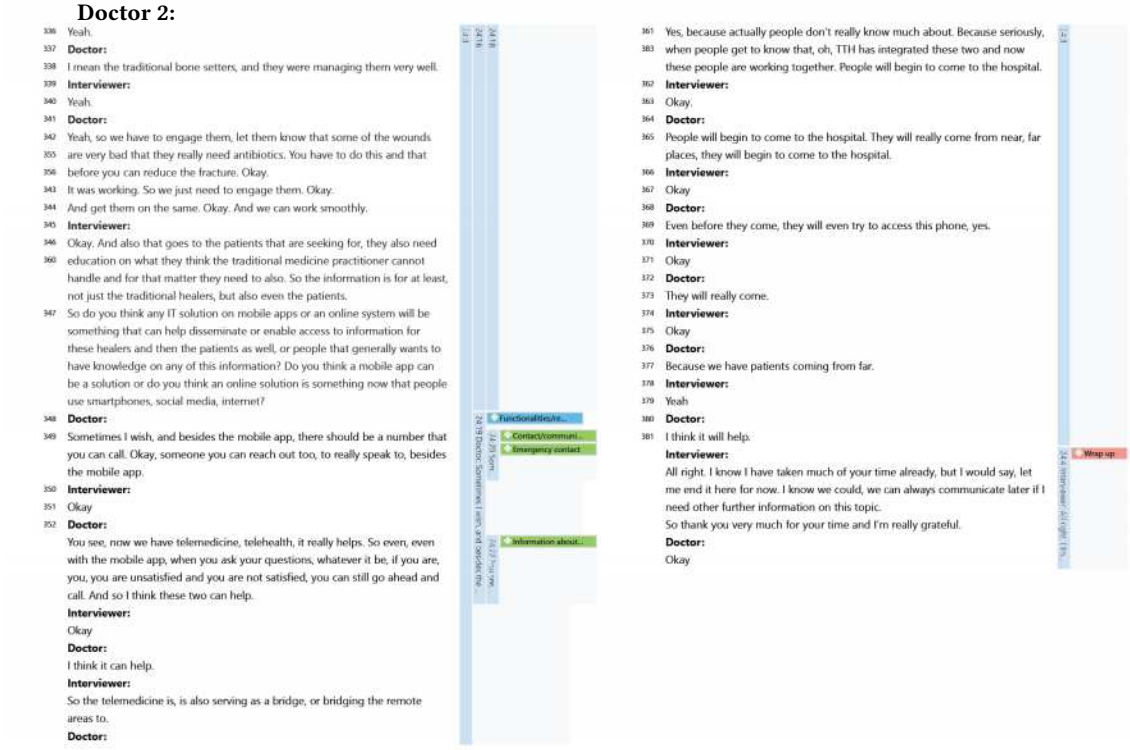
Okay. They realize that fighting with them will not solve the problem, so they rather talk with them. Okay.

Patiently. Okay. Trying to get their mind to it.

Because before the doctors came, they were managing them.

Interviewer:

Doctor 2:



336 Yeah.
337 **Doctor:**
338 I mean the traditional bone setters, and they were managing them very well.
339 **Interviewer:**
340 Yeah.
341 **Doctor:**
342 Yeah, so we have to engage them, let them know that some of the wounds
355 are very bad that they really need antibiotics. You have to do this and that
356 before you can reduce the fracture. Okay.
343 It was working. So we just need to engage them. Okay.
344 And get them on the same. Okay. And we can work smoothly.
345 **Interviewer:**
346 Okay. And also that goes to the patients that are seeking for, they also need
360 education on what they think the traditional medicine practitioner cannot handle and for that matter they need to also. So the information is for at least, not just the traditional healers, but also even the patients.
347 So do you think any IT solution on mobile apps or an online system will be something that can help disseminate or enable access to information for these healers and then the patients as well, or people that generally wants to have knowledge on any of this information? Do you think a mobile app can be a solution or do you think an online solution is something now that people use smartphones, social media, internet?
348 **Doctor:**
349 Sometimes I wish, and besides the mobile app, there should be a number that you can call. Okay, someone you can reach out too, to really speak to, besides the mobile app.
350 **Interviewer:**
351 Okay
352 **Doctor:**
You see, now we have telemedicine, telehealth, it really helps. So even, even with the mobile app, when you ask your questions, whatever it be, if you are, you, you are unsatisfied and you are not satisfied, you can still go ahead and call. And so I think these two can help.
Interviewer:
Okay
Doctor:
I think it can help.
Interviewer:
So the telemedicine is, is also serving as a bridge, or bridging the remote areas to.
Doctor:
361 Yes, because actually people don't really know much about. Because seriously,
383 when people get to know that, oh, TTH has integrated these two and now these people are working together. People will begin to come to the hospital.
362 **Interviewer:**
363 Okay.
364 **Doctor:**
365 People will begin to come to the hospital. They will really come from near, far places, they will begin to come to the hospital.
366 **Interviewer:**
367 Okay
368 **Doctor:**
369 Even before they come, they will even try to access this phone, yes.
370 **Interviewer:**
371 Okay
372 **Doctor:**
373 They will really come.
374 **Interviewer:**
375 Okay
376 **Doctor:**
377 Because we have patients coming from far.
378 **Interviewer:**
379 Yeah
380 **Doctor:**
381 I think it will help.
Interviewer:
All right. I know I have taken much of your time already, but I would say, let me end it here for now. I know we could, we can always communicate later if I need other further information on this topic.
So thank you very much for your time and I'm really grateful.
Doctor:
Okay

Doctor 3:

Interviewer:
All right, good morning, Doc.
Doctor:
Good morning.
Interviewer:
Thank you. Thank you very much for squeezing your time to participate in this research that I'm doing on ICT for traditional healthcare in northern Ghana.
As I made mention to you earlier on, the purpose of the research is to find an ICT solution for traditional medicine healthcare system in northern Ghana. So I agree that you could share your ideas with me on the subject. Please, can you tell me briefly about yourself?
Doctor:
Thank you very much. I'm honored to be part of this research.
Okay, so my name is [redacted] I'm a medical officer. I've worked for about 10 years now.
Currently, I'm with the Ghana Armed Forces as a medical officer stationed in our barracks in Kamali.
Interviewer:
Okay, all right.
nSo what is your take on traditional medicine as a medical officer that have been in service for over 10 years now? I know you've gotten a lot of experience at the clinical world when it comes to meeting your patients. What do you know about traditional medicine?
Doctor:
Okay, so I know that traditional medicine basically is preparations that have been prepared from plant extracts found in our neighborhood. But my main concern is the methods in which they use to prepare those medicines, and then the way they experience the medicine. For other medicine, it's well-cultivated and then it's used.
Every medicine and the procedure that you have to take. But traditional medicine, it seems it's an all-for-all approach. Every traditional medicine is able to cure every disease.
So that's my challenge.
Interviewer:
Okay, so I can see that the challenges are already coming up before we even discuss some of the challenges. And I think this is one of the major reasons for this research, so that we could see what maybe ICT could do in that area to support the healthcare. Have you personally used traditional medicine?
Doctor:
No, I haven't.
Interviewer:
Okay. So in your line of work, have you encountered patients that have discussed traditional medicine options for their health needs with you?
Doctor:
Yes, so I usually see patients. Some of them tell me they've used herbal preparation. But I tell them point-blank, as a practitioner, I don't subscribe to traditional medicine.
Interviewer:
Okay, so in that sense, do you think traditional medicine is not an alternative or is not an effective remedy for alternative medicine?
Doctor:
Yes, so I think for the drugs that we use, even the octolose ones, they are cut from plant extracts. But then they are prepared in a well and then save, you know, unlike ours that we have here. Now there's a program in Kearns University called Herbal Medicine.
So I think it's in line with this traditional medicine. So for those people, they've been trained in the preparation of traditional medicine. And I'm sure they will know the right dosage and the right quantity and which ones are specifically meant for particular health needs.
So I would advice the herbal doctors that are now being trained.
Interviewer:
Okay, so it means that you are not opposing.
Doctor:
No, I'm not.
Interviewer:
But the preparations and the standards, the subjects, the traditional medicine too is what you think has a lot of issues.
But if the traditional medicine bachelors, students that are training at Kearns University are able to subject these practices, you know, standardized, that means that you will not hesitate to maybe suggest or refer or use it personally if you think they are in the right quantities.
Doctor:
Exactly.
Interviewer:
They are prepared in the right way.
Doctor:
Exactly.
Interviewer:
Okay.
So I think the government is also trying to come in with an integration process of, you know, getting traditional medicine as an option for patients. I don't know if you are aware of this integration.
Doctor:
No, but now in some of the hospitals there is a unit solely for traditional medicine alternative to those who want to use it. And as I said, now the doctor of herbal medicines that they are producing at Kearns University are the ones manning those facilities. So with them, I have confidence that they'll be able to, you know, give us an alternative to the others medicines.
Interviewer:
Okay. So you think the integration is a good idea?
Doctor:
Yes, yes.
Interviewer:
Because if they get these trained herbal doctors, you know, in line with the integration, I think that would be a good thing to go with.
Doctor:
Yes.
Interviewer:
Okay.
How would you feel working with the traditional medicine doctors? Because there is this kind of perception about conventional doctors and these herbal doctors. There's this kind of agitation.
It's working together. I don't know what is your take on that.
Doctor:
For me, I think once their practice is regulated, once they have qualified personnel being trained now and they follow a certain code of ethics or a certain way of practice which is accepted universally, I wouldn't have a problem with them. My only challenge is they should be qualified. They should be well trained and fast working company.
Interviewer:
Okay. So that means that if the integration should happen as it has been ruled out, you wouldn't have challenges working with traditional medicine healers.
Okay.
As I said earlier on, the purpose of the research is to find an ICT solution and helping, as you mentioned, some of the challenges like the dosage forms, the methods in which they use in preparing them, the administration of these herbal medicines, the routes they use in administering. These are some of the challenges I think straight away you just listed. What do you think ICT can do in this regard?
Doctor:
Okay. So with ICT, it will help in proper documentation of particular herbs that will cure a particular disease. It also facilitates research into new herbal preparations that can help cure a particular ailment.
It also serves as a database for diseases and then particular herbal preparations that can be used. So I think everything that must be embraced by all. Okay.
Interviewer:
Do you think there's enough education on herbal medicine among even healthcare, conventional healthcare workers like yourself or even general population? Do you think there's enough education on as compared to how we see sensitizations and education in the area of orthodox?
Doctor:
Yeah, I think there's been enough publicity and I mean the traditional healers even do more advertisements by themselves, especially you find them in cars where they sell their own crafts. But the challenge is they are not properly scrutinized where you have one preparation being used to treat every kind of diseases. Again, because of the overdosing or sometimes the underdosing or the chemicals or the processes that they use in preparation of these drugs.
When people consume them or take them, they end up having or developing complications such as liver disease and chronic kidney disease. And then these things have been documented. I mean it has been researched that usually come from those that use these herbal preparations.
So I think more publicity should be generally towards the effects of these herbal preparations on their health. Okay. And then if we are able to replace their practice, then I think it will be of great benefits to all of us.
Interviewer:
Okay.
So it comes back to the issue of their ways of coming out with their herbal medicines that they can't quantify scientifically, they can't state how many times the frequency of dosages the patient needs to take and all that. So that means that regulation and monitoring is one key area that also needs to be looked into to address some of these challenges that the traditional medicine is facing. And aside these challenges, we know how research has helped the orthodox medicine.
Do you think enough research has been done in the area of traditional medicine?
Doctor:
I think there's still more room for improvement. Before the white man came to our shores, our forefathers were using these herbs to cure our ancestors or our parents. And they had results from the herbs that they were using.
So I think there's still more room for research. More funds should be directed towards that area to help improve their knowledge or to contribute to their knowledge base of what has been done before. I believe with this huge rainforest that we find ourselves in, there are a lot of equations that when we research about them or get to know about them, we will be able to cure a lot of diseases or do a lot of things with these herbal preparations.
Interviewer:
So I want to look at the challenges once again between the standard dosage forms, the type of diseases it can kill. And then when we look at as one component and if we look at the education aspects, the education is where even the patients themselves have to take responsibility of their own health

Doctor 3:

before taking in some of this herbal education and medication. They must have enough education on it.

Do you think coming out with a platform, an ICT platform where people can access information on traditional medicine will be a good way to go?

Doctor:

Yes, I think like on the internet, you can just enter a drug. Let's say sleep-proof fluoxacin. You'll be able to know the effects and the side effects or the drug-drug interactions among these drugs.

If we have a platform where we've entered some of our traditional preparations and the diseases that they'll be able to cure. I think it will further enhance the conversation of this about preparations and then also to improve their preparations, improve their dosages as more people will now be giving feedbacks, whether positive or negative on the use of those herbal preparations.

Interviewer:

So, do you think, now we know how social media is very influential in disseminating information. Do you think going with the social media way could be of a great benefit to people in terms of accessing information on traditional medicine?

Doctor:

Yes, now with social media, you can even be at the comfort of your home and then you'll be able to access any content that you want to. So, if you're able to put our preparations on the internet, there's a database on a whole lot of preparations. One can easily access them and then the more you access the information, the more you're able to process it and then come up with better solutions or ways to improve the preparation.

So, I think social media now is hand-in-hand with development. Once you're able to put your work on social media and it's positive, it will affect the overall population.

Interviewer:

What I want to finally ask is the emphasis on the research mandate, which is finding an ICT solution. In your own opinion, what do you think would be the best way to assist or enhance this whole traditional medicine healthcare system to improve the quality and then their services to the general public?

Doctor:

In time past, people used to write their findings or document their findings in books, on papers, even before the Stone Age, they were using stones and slicks. But now, as we are in the technological world, it would be appropriate to have a database or an ICT-based information on a traditional medicine where one can easily access this information, one can easily pick this information for research to improve the body of knowledge that already exists. And as I said earlier on, it also serves as a platform where a database on the various preparations can be accessed.

Again, it can also be used as a scientific knowledge in other parts of the world where they can learn from what we already have and we can also learn from what they already have. You know, quinine, they used to treat malaria in time past. It was from the coca plant in South America.

So I think with this ICT-based solution, we can easily access information and share real-time information with other people in other parts of the world. Okay.

Interviewer:

All right. So I will not waste much of your time again. I know you are quite very tight, but maybe I can always reach out to you later on for further information and additions when necessary.

So thank you very much for the opportunity to share my research with you and the ideas that you have given me. I know after this I would come back later to discuss with you the responses you've given and if there are any additions or changes that can be effected, I would really appreciate it. So even though we are ending the interview now, but it doesn't mean later I can't come back again for more.

So thank you very much for the time this morning to participate in this research. I'm really grateful.

Doctor:

You're welcome.

My thoughts are always open. All right. Thank you very much.

Doctor:

Thank you. All right.

Doctor 4:

Interviewer:
Good morning, once again, Doc.
Doctor:
Good morning.
Interviewer:
Thank you for the opportunity to interview you on this research on digitizing or integrating the midwives or the conventional midwives at the Nyanpala Clinic and the traditional birth attendants in the Nyanpala community.
As I discussed with you earlier on, the purpose of this research is to see how we can improve on the knowledge sharing and information exchange between indigenous traditional birth attendants and the conventional midwives that are all attending to the same patient in the community in terms of maternal and child health care services. And I earlier on said that I wanted to interview you once you are also a medical doctor in that facility to take your views and perspectives on this particular research. So to begin, we thank you once again for making time for us to have this interview.
You're welcome. So can you please briefly tell me about yourself?
Doctor:
My name is [redacted]. I'm a medical officer with the UDS Clinic at Nyanpala. I also work as a skills trainer in the School of Medicine at UDS.
Interviewer:
So how long have you been a health worker or as a medical officer with the facility or as a health worker in the system?
Doctor:
So I've been a health worker since June 2019. And I've been a medical officer with UDS since October 2021. So I've been practicing with UDS for nearly two years now.
Interviewer:
So what are some of the duties you undertake as a medical officer at the facility?
Doctor:
A medical officer is essentially a general practitioner. So we attend to a full range of cases. And then those that we can manage within our competence, we manage them.
Those that we do not have resources or the skill set to manage them, we refer them. So I see pediatric cases, obstetric cases, general consultations for adults and children alike. We attend to emergencies that we also have resources to attend to.
So aside outpatient department consultations, which we do on a daily basis, we also do ward rounds. We perform minor surgeries, attend to patients with injuries that require surgery also, we do them. And then we also provide supervisory oversight in terms of clinical care of patients.

And then with the maternal aspect, we also team up with the midwives to do antenatal care delivery. We also assist with deliveries where a midwife has anything challenging. So anything at all that is related to pregnancy, labor, we also attend to them.
We do not have a functioning theater, so we do not open. But when we identify high-risk cases that also require surgical intervention, because we do not have the resources, we also refer such patients. So essentially that's what we do.
Interviewer:
That's quite a lot. So in that sense, you attend to a lot of all kinds of cases from pediatrics to general cases. So in that sense, how do you keep the records of these patients that you attend to on a daily basis?
Especially the midwife and the woman that comes for prenatal and postnatal services and general child health and maternity care services. How do you keep the records of these patients?
Doctor:
So at the level of a facility, the patient's contact begins with a patient requesting for a folder. So it's a document, something like a booklet with the hospital's logo and the patient's details in it. So something like a registry where the patient's details are filled into it and then it is handed over to the patient.
And the patient will present to the consulting room with it. And then their history and other things are documented in it. So there's also a book, which is like a registry, in the consulting room.
That we also use in collecting some information on the patients. So the information we collect is on their place of residence, contacts, the condition, the investigations that were done, and some results. And then the outcomes, whether the patient was admitted or referred.
So there's a book where it is sort of manually entered with a pen. And then the data is also collected on a monthly basis and then reported to the district levels. So in terms of handling our data, that's how it is.
Interviewer:
So that means that it's paper-based?
Doctor:
It's paper-based. Yeah, paper-based.
Interviewer:
So, let me skew it to the purpose of this bit. What is your take on, or what do you know about traditional beds attendance?
Doctor:
So I know that traditional bed attendance, they form a part of a healthcare delivery system. In the sense that they also offer healthcare with respect to their scope, their competence, and then the trust that they have at the communal level. Because they are readily available in the communities.

But if a patient wants, for instance, if a patient is in labor and wants to deliver at the hospital, if you compare the number of traditional bed attendance in their communities to the number of health facilities, it means that people would usually opt for it. I also know that historically, at some point in time, the nation was making plans to actually formally train traditional bed attendants to be able to identify cases that they can manage, and then cases that they must refer. So, I did a presentation somewhere, and I was presenting on what I came across online as the DanFab project.
DanFab project. So it was a training program that was instituted for traditional bed attendance to help them. Because the point is that a patient in labor, sometimes if they have to travel for kilometers, and the baby is already coming, they will opt to go for a traditional bed attendance.
But if it is something that is, what we would say, not a high-risk pregnancy, usually they can handle it. But if it's a high-risk pregnancy and the woman is not referred on time, there's going to be a mortality. And maternal mortality is very high in low- and middle-income countries, like our setting.
So, in the fight against maternal mortality, something like that was instituted. So, I know that they are there. I know that they practice.
They do sort of the things that we also do, but they may not have the full scope of evidence-based information that can guide their practice. And also, of course, they cannot intervene surgically if there's any kind of complication that requires surgical intervention or supports. A classical example is preeclampsia.
Sometimes a patient needs some blood investigations. They need urgent surgical intervention to deliver the baby, to either save the mother and the baby, or the mother. So, all those things also, I know that there are challenges that on their side, they do not have those things to practice.
So, I know that they are there. I know that they are also doing what they can.
Interviewer:
And then, so that means that a lot goes into your working relationship with traditional best attendants. But then, before that, what are the challenges you face in terms of resources in your facility towards delivering health service to these women and children that needs health care? Okay.
Doctor:
All right. So, in terms of resources, there are quite a lot. Human resources, one, in the sense that if you look at delivery in itself, to conduct a delivery, you need more than one person.
Someone has to attend to the mother. The baby is born and there's a challenge. Someone has to be simultaneously attending to the baby.
Then, of course, we need other logistics as well. Certain things like a radiant warmer, oxygen delivery apparatus, other accessories that come with them.
So, in terms of staff strength, we do not have the full staff strength.

If we want to run a 24-hour service, there's a challenge on that part. Then, of course, there are other challenges that I would say that are not really on the side of the hospital. It is attitudes, beliefs, and practices from the communal level.
So, that is also challenging. Then, on the other side, I mentioned earlier that we do not have theater space. So, if we identify a patient that needs urgent surgical intervention, we would have to refer such a patient.
Then, of course, we do not have ambulance services. We depend on Tolong Ambulance to help us transport the patients that we have to our nearest referral point. Yes.
Maybe another issue is with communication. We do not have a formal relationship between traditional birth attendants in the community and the hospital as well. So, sometimes the patients will come in only when they have tried to deliver at home and there was a problem.
Now, they've been pushed to come. At that point in time, complications may already be settling in. So, as it stands now, we do not have a formal relationship with the traditional birth attendants at the level of the community.
So, in terms of delivering maternal care, these are some of the challenges that we have.
Interviewer:
Personally, as a medical officer, have you encountered a traditional birth attendant?
Doctor:
Yes. As a student, I came into contact with one. Actually, I was with her when she conducted a delivery.
Then, later on, also somewhere, I think in fifth year, I also actually saw one who was running what we call antenatal services. We actually interviewed her to know how she was practicing and the reasons why people were patronizing her services.
Interviewer:
So, in a nutshell, do you think the services of these TBAs are important?
Doctor:
They are very important. Very important in the sense that labor comes in unannounced. Labor can set in at any point in time.
And once it sets in, depending on where the patient lives, with issues like access, access to transportation, cost, among other things. Sometimes, it is natural that they would opt for a traditional birth attendant because, one, they live with them in a community. And maybe they share family ties.
And we must also give credit to them in the sense that they've been able to deliver babies successfully. Until modern day medicine became widespread and the number of facilities were increasing, they were the people on the ground delivering the service. But we can also equip them to do better.

Doctor 4:

I think even in medical practice, it's the same thing. A medical officer may be doing all he can, right? But when it comes to certain conditions, he has to refer to a specialist.

So we can't say that what the initial thing that the medical officer does is not significant. But it's just that, like I said, the resources may be a limitation on him, and then the knowledge or skills may also be a limitation. But if he's also retooled and equipped with the resources, and given the training that he needs, perhaps he can deliver in a certain way that the specialist is not absent. So I think that if the traditional bed attendants have the necessary resources, the necessary training, I mean, basic things like gloves, like, what do you call it? Ball syringes that they can use to suction babies. If they have basic things like that, there are certain things they can do and then refer the patient for definitive treatment.

Interviewer:

That's what my next question is going to be like. What do you think are some of the challenges that this TBA is opposed to in your experience or your encounter with them?

Doctor:

Okay. So for the challenges, I would say that sometimes they complicate simple issues. Simple issues in a sense that I remember the story of a woman who had twins and was in labor.

She presented in the hospital. The leading twin was a breech and it was footling. If you have a footling breech, it's an indication for caesarean section. But the woman was in labor for a long time. She was kept there for a long time. When she arrived, actually we lost the leading twin.

But for any person who has received formal training, you know that if a woman presents in labor and it's a footling breech, it's an indication. You don't even wait for the woman to say that you want to try and see whether she will deliver. So that is an absolute indication for caesarean section.

But if a traditional birth attendant sees that and still, like I said, in that case the woman was still trying to deliver. And we lost the baby because of that. So those challenges are there.

The next thing also is that I think that they either put themselves at risk of contracting or sharing infections. In the sense that what we use, we wear personal protective equipment. We wear gloves.

We sometimes wear at least a chaperone to protect yourself from the fluids that are involved. There's going to be lichol, there's going to be blood and all of them can transmit infections. So, cutting the cord, tying the cord, taking care of the baby's umbilical cord.

All these things are things that you need to address them eccentrically. And then the person giving the delivery must also observe some personal protective measures. So that one, they don't get themselves infected.

They don't also either infect the patient or transfer infections from one patient to another. So I think that is one aspect of it. Then the traditional practices, especially with the babies, also affects their presentation.

Sometimes aside the mothers, they do attempt circumcisions. And I know there are other people as well who are not maybe necessarily TBAs. Who also shave the hairs of their newborn babies.

But I also see a lot of neonatal infections from all of these practices. So, those are some of the issues that they pose. Sometimes they complicate sample problems.

Sometimes they delay the referral chain. Because the patient delays before coming to you and you have to take some time to arrange an ambulance. By the time the patient gets there, maybe the golden hour that you have to intervene, you would have lost a particular period.

So, those are some of the challenges with traditional birth attendants.

Interviewer:

So, as a medical officer, would you like to work with these traditional birth attendants?

Doctor:

Definitely. Because as I said, they are also an essential part of the healthcare delivery. And in other settings, I know that in other countries, I've seen videos that I think they have someone like, they call a doula or something. Women who assist women in labor to deliver. But the point is that they receive the necessary training and certification to do what they do. So, that's what I think.

I think they are very important. They do a lot of work that has to be appreciated. But we can establish that partnership and work together.

Interviewer:

Okay. So, in that sense, how would you like to work with these traditional birth attendants? In terms of giving the fact that most of them don't have the necessary training.

And they are only supposed to present cases that are already complicated for medical officers to now handle. In that sense, if you would want to work with these TBAs, how would you want your working relationship with them to be?

Doctor:

One, we can look at it from the perspective of formally initiating a relationship. So, I know of a recent work that was done by one of the orthopedic surgeons here in the north, Dr. Tobi. That's related to, you know, they also have the same issue with bone setters.

So, what he did was first to do research to identify the challenge. And then, I think about 90%, over 90% of the bone setters acknowledge that they are sort of a bit handicapped when it comes to their knowledge and practices. So, the next was that he was able to secure funding to do training.

Training on infection prevention, identifying cases you can't treat, identifying cases that you can refer, and other things of that sort. Applying sprains and bandages, assessing to prevent complications and all of that. And he was able to do it, he's done it also in other areas across the country.

So, now there's that partnership. Because there's that partnership, that means that, for instance, a bone setter can pick up a phone and call him and say, Well, I have this particular case, what do you think I should do about it? So, we can also establish the same kind of relationship with the TBAs, where if they have a case, they can call you.

Because as I said, I also as a medical officer, I work with, I trained and I'm a specialist, two specialists in obstetrics and gynecology. So, now I've taken some part of their knowledge. But occasionally, if I hit a dead end in managing a patient, I call and say that I have this particular patient and give them the basic information that they need.

Then they will advise me on what to do. And then when I implement it, at the end of the day, we're able to save the day. So, we can do the same, find a means of communication.

If they are, I mean, remotely, because as I said, I communicate with my boss, who's a specialist. He's in Takragi now, but I can communicate with him remotely. So, we can find a way of remotely linking up for communication.

So that, let's say, if there's a TBA in any village at all, he can call you, or she can call you, and then you discuss. Then you advise on what they should do. Or, if there's even something like a video, you show it to them, or they show it to you.

And then you direct them, do it this way, do it that way. And then it works, because I know that in other settings, there's telemedicine. You find a way of communicating so that you can direct something that is miles away.

Interviewer:

Information sharing is key. Identifying this TBAs and establishing a channel of communication, a relationship, or a network.

Doctor:

So, one example I'll cite is that, when I was doing my training in obstetrics and gynecology, we had a phone, which was for the ward. And all the facilities, other hospitals, CHIPS compounds, clinics, all the other facilities that were referring, that were in the catchment area, we had a contact. So, we had a name of someone there, their midwife who is there, and a contact.

So, if we need to communicate with any of them, we just go, we search the name of their community, and then we call, we place a call there. Because when they refer the patient, sometimes we would give them feedback on the outcome of the management. Or, if we also refer the patient, and there were certain things they could have done to either prevent a complication, save the baby, or save the mother, we call them to give them a feedback.

Then we also had an information sharing platform, in the sense that, if there was anything like a mortality, all of the facilities that were involved in managing that patient, we invite all of them. And we sit at a common meeting, then we discuss the situation, and look at where the faults were, and we learn from it, so that in the future, when we have other patients, we can correct those issues as well. So, those are some of the experiences I had from working in the southern part of the country.

Okay.

Interviewer:

So, that says, would you like to have any ICT platform that can help in this regard, in terms of this information management and information exchange?

Doctor:

Yeah, definitely.

Interviewer:

How would you like this platform to work? What features do you think such an ICT platform should come with?

Doctor:

Okay. So, I think a record session, because as we were saying, in cases like mortalities, sometimes you need records. You want to be able to trace the records of a patient, from where they were seen, what they did there. And then, even at your end, all of us should be able to have access to information, so that if we want to do independent assessments of what it is that went wrong, everybody can review that data. Then also, for the purpose of research. So, kind of a data component of it, where data can be stored.

I would also say that in the training models aspect of it, because I've looked at, for instance, I think the American College of Obstetricians and Gynecologists, I think specifically the American College, if I'm right. One of them, I guess I searched their website, either the American College of Obstetricians and Gynecologists or the Royal College of Obstetricians and Gynecologists, and I realized that they have videos. They have videos that you can go and watch on that platform.

I saw one surgery on how they're able to do a cesarean section through the vagina, instead of doing an abdominization, they make the incision on the cervix. It was interesting. In fact, that was the first time I had seen something like that.

I've never seen or heard of something like that in Ghana. But it was a beautiful learning platform, in the sense that I'm here in Ghana, but I can look at what they are doing there and learn from it. That means that I can, through that kind of a network, I can learn something that is new, something that is brand new.

So we could have videos, videos that a TBA can look at, watch. Videos that maybe would translate into a local language that a patient can watch and understand. That's something that's not so technical, but we can reduce it to

Doctor 4:

their level of understanding so they can watch, get abreast with current practice, and then be able to apply it where they are.

So I think something like that would also be much appreciated. Then the next thing is contacts. Contacts.

So like I said, in our case, we had emergency contacts. We had a list of facilities in the patchment area.

The full car person to call and their contacts. So if there's a contact section of that sort, that is if we are networking a number of communities in the catchment area of the Yankwala Clinic, then something like that would also be great. Then the next thing is guidelines.

If there are guidelines on anything at all, we can put them there. Because aside the TBAs, there are also other places like CHIPS, compounds and other places that people also refer cases to R&D. Then what else can I think of?

Maybe there's a video conferencing feature. It will develop like an application, right? Yes.

So there's a video conferencing feature where we can download and install it. Maybe you integrate that feature where you can call and have a face-to-face,

maybe a live show the person what is happening and the person guides you to do this. I think that's a feature that would be great.

Other than that, I think those features would be great if there's an application of such a sort.

Interviewer:

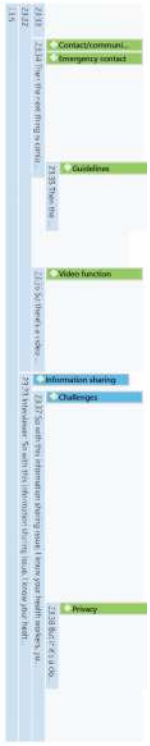
So with this information sharing issue, I know your health workers, your patient's information, your treatment, medications, and mostly information that you want to really protect. So what are the information you would like to share with this TBS that at the end of the day, it wouldn't cause or how would you want to protect this information you would want to share with this TBAs?

Doctor:

All right. So I think that should I say there's something maybe patient data. If it's about protection of patient data, that's possible.

But when it comes to the medical analysis itself, I think that unless someone wants to be very adventurous and wants to try certain things in their home when they do not have the training. So it's like watching a video. If you watch a video, sometimes they put a disclaimer that you can't attempt this at home. But if it's a close network, by working with each other, and maybe the data in itself that is collected on that platform is protected under some kind of data protection policy. I think that would be helpful. Next is that if it's an app, you know, there are applications that sometimes if you want to use you have to log in.

So yes, there's something like that. So that I mean, if it's on a phone, someone else doesn't pick it. Logging in easily and then have immediate access to patient information.



Well, if there's also a database, because the protection is not just from people having access to the information, but even protection from losses, loss of information. So there's a form of a backup feature where the information can be stored. So that if someone wants to have access to the information, they can formally request for it or apply for it.

And then the information will be given to them. So those are some of the, in terms of protection, those are some of the things that I can think of now.

Interviewer:

Yeah. So we've looked at sharing information between TBAs and medical officers and vice versa. The patients are in the center of all this information sharing.

How do you get feedback or how would you like to get feedback from most of these patients that you attend to? That's on some occasions, they go back to the community and then they also go and attend to the services of these TBAs after coming to the clinic. In terms of feedback from these patients, what is your experience on that and how, or what do you suggest?

Doctor:

Okay. So first of all, I have some experience working with communities. So I lead community engagement and involvement in research.

So I think that the first aspect of it is, I mean, at this initialization phase is we can actually engage the communities to make them a part of the planning process. So for instance, what kind of information do patients want us to have in terms of using such a proposed application in their management? So let's say a woman is in labor, I want to consult a specialist to give me information on how to deliver the baby.

That is, maybe I am going to take a video of the patient at that particular point. The patient has been undressed. One, does the patient agree that something like that should happen?

Do they find it acceptable ethically, morally, in terms of their beliefs and all of that? We can find out all of that so that we know that, I don't know, the patients, because it's a good idea. The goal is to help the patient, but if the patients find it unacceptable, then it is unacceptable.

We should be able to find a way of bridging that gap. So at this early stage, we can actually engage the patients to find out what they think about the whole process. Then the next thing is that even after it is done and the implementation is also in progress, we can also find out from the patients, because what I realize is that earlier I was looking at some research work on patients who have done surgery for stoma.

That's a different kind of thing, but I realized that their quality of life is something that is prioritized. So people are doing research just to assess the quality of life of a patient, because you may have done the procedure, you are happy that you are successful with the procedure, but the patient is not happy, or you have not found out whether the patient is actually happy about

what you have done or not. You have not addressed the problems that they have.

So in the end, you wouldn't have solved their problems, because health is defined as a state of complete physical, even emotional, psychological well-being and not just the absence of disease. So you've taken the disease away, but emotionally, psychologically, the patients have been affected. So that means that you have not achieved your goal.

So I think that we can look at that aspect of it. If we were able to successfully implement it, we should be able to find out from patients and even from the TBAs themselves. So for instance, you asked me about the features that I want to have.

I am proposing that we should have on such an app or platform that is developed. But what is the perspective of the traditional bed attendants? That's also important.

What is the perspective of the patients? To bring all of these together, fine-tune them, and then put them all together, so that if the TBA has anything that they think that should be added, they can also come up with their suggestions. I hope I've answered the question.

Yeah, yeah, yeah.

Interviewer:

So in other areas, I'm looking at the management of this platform. Okay. I know you guys are medical officers who work with protocols and guidelines or clinical guidelines and stuff.

And at the end of the day, you are accountable to the processes or the procedures you use and the results that you achieve. So with this kind of application to manage both two different healthcare systems and different expertise and patient's data, how do you think this system should be managed? Where should it be?

Who should have access? Who should be in charge, in a sense, for this system? Where should it be placed for you to have access?

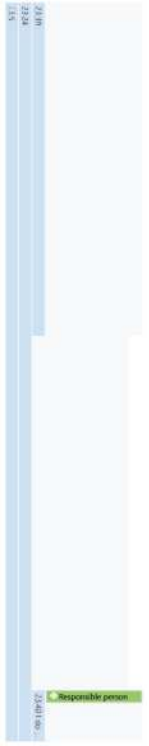
Doctor:

Okay. So what I'll say is that the idea is coming from people like you and then your team. My experiences with working with such applications, so there's something that I use in practice.

It's a platform called Medscape. It's also an application. So for instance, I've downloaded Medscape on my phone.

When I'm offline, I can still have access to a lot of information that I need from it. But I just have the application. I think it's based in the US.

It's a team of doctors also who have designed such a platform and they update it from time to time. I do not have the competence to set up something like that and to follow up with it, but I benefit from it because I have subscribed to it, I have an account and then I use it in my daily practice.



So what I think is that the two universities can partner, develop something like that, publicize it.

If it becomes widespread, doctors in the country and even outside the country can, because this has the potential of addressing a lot of issues even outside the context of the, I mean, this university, because TBAs are everywhere. TBAs are all across Africa, but is this something that we can look at in the long term that we want to develop something like that and continuously update it? Even if someone can develop an app and work with other people, maybe obstetricians.

Ghana has something like what I was saying, American college. Ghana also has a college of obstetricians and gynecologists. It can be marketed.

If they come on board, there can be a merger between those who have the ICT knowledge, which can be used to create and manage such a platform, and then those who have the knowledge aspect, the medical knowledge aspect, who can also bring up the knowledge, because like I said, the guidelines and other things that you find on Medscape, usually there's an author who does that work, but I'm not sure it's the author who puts that information.

He will submit the information and then the IT aspect of it, they will handle that particular part of it. So I think that there can be that kind of a merger. There are also other applications that I've come across recently, something like Redcap.

Redcap is a platform that a lot of people are using, but I'm sure it's an institution that is managing it. So they grant you the access. They determine how much of what you can do on that platform, but when it comes to data protection and other things, they handle it.

But I'm sure if you want access to a certain data set, you can write formally to them, and they will grant you access to that data. But in the end, it is a safe and a secure platform that patient data is protected. So we can look at something like that, something that we can all have access to, to just improve what we are doing.

That is how I see it. But I think that if we are going to look at it from a perspective or a bigger picture, there's a lot that it can do. But of course, we need to envision it that we want to look at it beyond maybe just being a project, a master's thesis, but actually working at it to see how it can help.

And then I believe that the knowledge sharing platform has already been established between yourself and the institution where the research is being supervised. But I think that the partnership can be expanded so that in the future, there's going to be even a bilateral relationship where students can even receive training in terms of the ICT aspect of it. Because now the world is changing.

The world is changing. Things like AI and other things are coming up. And they all have a role to play in every area of health, including medical practice.

Doctor 4:

It's mainly IT. It's mainly IT. Or can find a way of marrying IT and then medical practice.

Interviewer:

So I think the final, but not the final, because I know until this project is over, I will keep coming for further because you have enough information or experience than what the questionnaires here can cover. Okay. So in a nutshell, what other issues do you think having an ICT platform that can integrate such two healthcare systems at the primary healthcare level could be of help?

What other issues do you think?

Doctor:

Issues to address, right?

Interviewer:

Yeah.

Doctor:

Yeah. Okay. So I think, as I said, the patient is in the center of the whole thing. But the other benefit to the health workers and TBAs is that it will afford us the opportunity to upgrade ourselves in terms of knowledge. Because, I mean, if you also have knowledge of a particular, even a particular, sometimes just a condition, just one condition. If you have a lot of knowledge that can help you manage a particular condition well, it is satisfactory.

It satisfies you, the practitioner. And then two, you are able to meet the patient's expectations because they come to you trusting that you have the knowledge to address a problem that they have.

Interviewer:

Yeah.

Doctor:

So I think that patients are also going to be satisfied with the process. Next is that delays, unnecessary delays that leads to morbidities and mortality will also be significantly impacted in the sense that, like I said, sometimes you place a call and then right from, right from, right after the call you have the answers that you need to address a problem urgently.

Interviewer:

Yeah.

Doctor:

But if that platform does not exist, that means that you have to refer the patient.

Interviewer:

Verbally, without any...

Doctor:

You have to refer the patient. And then the time that you spend traveling, the cost, and all of that, you save the patient a lot of time. And then of course, if we have that platform for also communicating, that is healthcare workers,

TBAs, and even patients, I think that we'll be able to understand each other well, know how to be able to holistically manage a patient.

Because as I said, it's not just about the outcomes of our management, but the outcomes as well from the perspective of the patient. Those things are also very important. So, I think that these are some of the benefits.

And of course, holistically, a lot of money goes into taking care of patients on the side of a patient and even the government. Sometimes it's also even a burden on the institutions.

But if there are cases that, oh, we see this case is a low-risk case, a traditional bed attendant can handle it.

Interviewer:

Yeah.

Doctor:

So, we can refer a patient to say, oh, go to this traditional bed attendant. They have been certified in a way. It can be done.

Lastly, I'll say that now community-based approaches are being used to handle certain conditions like psychiatric conditions.

Interviewer:

Okay.

Doctor:

Patients are no longer coming to the hospital unless there's something critical, but rather they are receiving care at the level of their community.

Interviewer:

Yeah.

Doctor:

So, is this something we can even expand to say that patients can also receive delivery at the level of their community? And that it will be guaranteed that they have the basics, the basics that are non-negotiable, that they will have the basics at those places.

Okay. See, the person will wear gloves, make sure cold care is done, make sure if they finish, they will assess the patient, if the patient needs to be referred or maybe needs to be referred. I think the basics that are non-negotiable.

Interviewer:

Yeah.

Doctor:

If we can guarantee that through that partnership, those things will be available at the level of the community, it will take off the pressure. Okay. The pressure and the stress that because another thing we should also realize is that a lot of health workers are leaving the system.

Okay. So, the few that are on the ground are also getting stressed. Yeah. Because they are still having to deal with the same number of patients.

Interviewer:

Yeah.

Doctor:

So, I think that all in all, it's a very valuable project. Yeah. And we pray that it will become successful.

Okay. Yeah.

Interviewer:

All right. So, thank you so much at this point. We've exhausted the questionnaires, so we'll probably end it officially here, but further engagement or when, as in when I need further information or more information on this, I'll still come back.

And after doing the transcription for this interview also, I'll definitely make it available for you to go through and be sure all the responses you give are what exactly you actually said and we'll have a good working relationship to maybe the end of this project. All right. All right.

So, thank you so much for your time this morning.

Doctor:

You're welcome.

Doctor 5:

Doctor:

So, we also try on our own part, in our own little way, to promote research and continuous education. Because it's only in research, you also interact with people, you get data, you analyze the data, you identify the problems, and you can now institute interventions. So, we are in support of that.

And also, not just here, the Directorate is aware of his being here and all he was doing. And now we have a new Director, Dr. Bauer, who was appointed the Director of the Directorate by the University Council. And he has also been briefed, and I'm having a meeting with him on Wednesday to also tell him what's happening around this place, and all the units that are here.

So, you are welcome. Thank you. Yes.

For now, I think that's a little I can say about his being here. And I'm yet to see details, though I was told the plan, about the software. Even this morning, the notes were being briefed, and of the importance.

When we don't have data, it makes mistakes a lot. It's with data you can plan policies. So, we are very much in support of that.

So, thank you very much. Yes.

Interviewers:

So, well, generally we are from the free university in Amsterdam. That's where I'm doing my PhD and he's starting his PhD, and others are between research and affiliation.

Over the years, we've been doing a lot of research around ICT for development. As much as it is academic research, we also see it as important to actually develop things that really make an impact.

Otherwise, the research is good, but in terms of things like developmental purposes, if we don't really come up with viable things, then it's research that's not really helping so many people who actually need a lot of help.

Generally, our research is more in the area, at least my personal research is more in the area of information delivery. Reason being that there's a lot of information available, let's say on the internet or elsewhere, but there are so many people that don't have access to it.

Or in this case, there's information between places, I mean, from patient to doctor or between clinics or between doctors, which is sometimes problematic to move up and down or to move around in this new digital system. So generally, that is the idea of building systems that can help in places where there's a lack of these kinds of systems. But the main thing is that the way we do our research, we've realized that if we don't find out the problems and talk to the people, then generally you end up doing something that people don't need.

You may build something that's nice, but the people might not like it or not need it in the first place. And so the idea is to actually solicit, to find out if people are on the right track with what we are thinking of or what we are doing, and then kind of figure that out. And so, I mean, that is the research methodology that we use.

Doctor:

Okay. Welcome. Thank you.

Nice meeting you.

Interviewers:

Yeah, thank you. ICT, 4D, experts, programmers, artificial intelligence, stuff like that. Yeah, stuff like that.

Doctor:

All right, that's good. Class development. Oh, you're all welcome.

I'm happy to receive your paper because, as you've said, there's a lot of information that is not even collected correctly. It's not systematically arranged, poorly disseminated, poorly shared, and that leads to stagnation. So it's a good thing.

And we here, we, for such things, it's also like a learning process for everybody because we also get to know some of those things and also develop ourselves and develop the system. At the end, it improves the quality of service that our clients get. So it's a very good idea.

We are very much welcome. And if along the line there are any issues that you notice, you want to draw attention, that will help your work, let us know.

Interviewers:

Yes, I think the reason for this appointment is mostly rooted in Gideon's research. So I think Gideon is, if I summarize it correctly, looking for, let's say, some concrete way or concrete use case or problem that ICT can solve. And we are looking also into what connections between, let's say, the more traditional indigenous health and the formal health system, particularly maternal health.

So I think there's been a lot of brainstorming happening around it. This summer, Gideon worked with a master's student to develop, let's say, to look more into data that exists, the data that exists regarding maternal health. And of course, there are many technical ideas.

And I think in our methodology, it's always important that we do not forget, let's say, the human side of things and only focus on technology. So for that reason, I propose that we try to talk to a lot of people and interview people that are in practice and have practical experience to see whether, well, there would be all the ideas that exist, if they are actually feasible and if there is a willingness to cooperate. So if we connect, for instance, the people more on the formal health system with a more traditional health system, then from both sides, there needs to be cooperation.

And then we can try, maybe if ICT can have a facilitating role, that we need to have people on board first and know what is something that is a problem that is urgent and needs solving, but that's also feasible to solve with what is possible from the technical point of view.

Interviewers:

So in the last two months, as you rightly said, I was here every day to interview most of the midwives at the clinic and also the patients that they attend to. And also some of the community members, particularly the traditional bed attendants, because the research was focused on how we could integrate the conventional midwives we have at the clinic here with the TBAs in the community, with some form of system or an ICT platform that could bridge the communication and knowledge sharing gap. And we came up with a prototype system that we came back to evaluate it with the midwives to see if the prototype system was something that could really integrate properly into their clinical workflow.

And I think the response was positive, but the general idea is to have the broader consultations on this kind of systems if it is something that's, from your point of view, feasible to scale up or make it a more working system to benefit the health care system in this particular primary health care level to something that maybe we can scale it up and then make it more appropriate for the staff here. Because some of the challenges we came across, yes, the manual process of doing stuff here is something that's really challenging, which you already said.

The paper-based record system is something that has its own challenges. And then beyond that, we're looking at how, looking at the cultural setting of the environment, we understood most of these patients still access health care from the TBAs and they always come with some form of complications at the end. So the idea was to look at how we could bridge or integrate these local women in the communities that are more or less also performing some health care delivery services that are very vital.

Also, we can say maybe we just have to relegate them to the background, but they still play a very key role in the communities in terms of pregnant women or health care. So the idea was to look at how we could integrate those women with the conventional midwives to have a platform where they could have the opportunity to even train these TBAs and then share information. Then they could also have that opportunity to monitor and know what these TBAs are doing also in the various communities.

So basically, that was what the research was focused on. So we had to step it up to discuss or have a broader discussion at management level or some form of people that take the decisions at the top level to find out if it is something that is feasible and worth probably spending more time or more resources in finalizing such a prototype system. For the primary health care system.

Interviewer:

Maybe it is important to mention that often our methodology is a bit of an iterative one. We have some kind of problem in the world and you can try to address it with an ICT solution. What happens in a lot of cases in the world is that of course somebody behind the desk thinks of the solution and then there is a big sum of money and people go spend years to develop something and then it is there and you just need to use it.

But quite often it then turns out that there have been assumptions and there is a mismatch in what has been made and what has actually been needed. So how we often work is we try to start with a very, very minimal smart, as small as possible and verify continuously with users of is it useful, is it working or not and in that way you can adapt to make sure that you are going in the right direction continuously instead of after spending a lot of time and investing a lot of money. But that also I think in the medical domain might pose some challenges because you are working with real people here.

So messing about is not really what you want. You want to have an improvement also from the start. But it will require investment of time and effort not only from the people that develop the solution but also from let's say these pilots, users who will need to work with.

It is not something okay we have it here and you can use it now. It will be a back and forth continuously. Well I tried it out but this is not right or it is not working for me or it should be adapted.

So this requires commitment from both sides to continue on with doing it. So I am not sure how concrete your proposal in the system is but we were talking a little bit about for instance the process of handover in case of complications from the traditional birth attendance to the formal system. And what I understood, of course I have not done the interviews Gideon has, is that this handover is now often late in the process so that the complications might have already become almost critical by the time there is a handover.

And that there is often very little or no let's say background information handed over from the TBAs to the formal healthcare system. And that well I think a nice to have would be of course that you would have a more continuous communication and maybe also possibility of consultation from the TBAs and let's say preventative or less towards the formal system so that you can also have this handover earlier if it should be so. But I understood that right now this is not really happening right so I asked is there for instance a phone number that the TBAs can call and then they can quickly get a doctor or a specialist on the line.

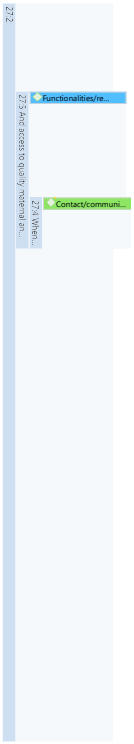
I understood that most likely it's not the case so that would be a very basic start. That would mean that there has to be someone picking up the phone and handling this handover. So that is some of the questions we have right now separately from the technical details and how to solve it is how do we best approach this.

Doctor:

Okay. That's very impressive. I'm glad we've looked at all those areas and there's actually a big gap between the TBAs and the formal or the usual, the regular maternal and child services delivery in particular.

Doctor 5:

We can't download them because it involves lives and the main goal here is to prevent maternal mortality and improve child healthcare. There's a big problem here. And the location of this facility is strategic in the sense that if you go around there are about 10 or 11 other villages around this place with a population of almost 23,000 people based on the 2019 census.
And access to quality maternal and child services is a big challenge. Sometimes because of the poor communication even at the cheap compounds when they have issues they transfer them to town. They don't even know that some of these things can be handled there.
And the delay in transporting the patient worsens the outcome in terms of morbidity and mortality. And then the feedback, sometimes you refer patients, no feedback. When the systems are in place you get your information in real time and you can also communicate as you said and then your data is collected.
If there's a problem you see a flag sign somewhere, you can't intervene. So it's very good. And I'll also use this opportunity when I meet my director on Wednesday in two days time.
I'll hint him about this research work and the whole project and he'll be aware of it. Because the director has two divisions, which is the Nyampala Clinic and the Dungu. But for now it's only here that we have delivery services.
And we have more midwives here. And we have more population here. The population of Dungu is about 15,000 people.
But their own maternity section, no labor work there. So they don't carry deliveries at Dungu. And the new director that has come has hinted me that he has plans to focus on the Nyampala Campus Clinic.
And in June I was given an accommodation here. So I now reside seven minutes walk from this place. I used to drive all the way from Dungu, 30 minutes drive before.
So sometimes when there are issues at night I come around to attend. At the time we had challenges with the number of midwives. But now we are doing 24-hour service.
This week we've had a lot of deliveries. I'm yet to check the figures. And the people want to come here because of the kind of care they get.
So in our own little way, if those systems are there, sometimes you realize that you could be here and trying to solve your problem elsewhere. Or you can just advise, you do this, you come here. But sometimes they do those things.
The TBAs, they don't communicate sometimes adequately. And intervention may be delayed. And by the time they are referring or seeking for help, the person may be deteriorated.
So the issue now is focusing on prevention of those complications to improve a better outcome for the mother and the child. Yes, so that way everybody will be happy. It's a win-win situation.



Because you find that you've intervened at the right time, on time. You save some bad situations. So I'll mention this to the director of the directorate.
And I know you also take it to the emergency management. They need to know this is what we are doing at Nyangkala. So that way too, if there are ways that can also come in, at least for them to know.
And then this week, I'm going to see the principal of this campus. There was a new principal that was appointed. We're to pay him a courtesy call.
I think in three days' time. I also mentioned that to him. Because he needs to know what's happening in his own domain.
So that it shouldn't be a case of even if the VC calls him, he doesn't know how to do it. So to put him aside, he needs to know this is what's going on. So everybody has a role to play.
And we'll make sure we involve those that we think can give us a positive response. I'll do that. So, you're welcome.

Interviewers:

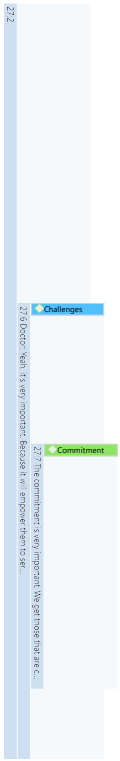
Do you think in more practical terms that you have the resources here to spend some, let's say, hours of employees on this research project?

Doctor:

Yeah, it's very important. Because it will empower them to serve better. It's not so.
Because it's a kind of retraining and it's a continuous process. Because as you are trying to do those things, even practically doing them, there are challenges you take notes on. And sometimes, particular locations have unique challenges.
So we look at ways to go around those challenges to get our goal. And the more people are involved and they are committed. The commitment is very important.
We get those that are committed or who are willing. It's giving them the enlightenment. Some, they may not know.
But if the whole concept is explained very well to the staff, here I'm sure that they'll participate fully. So it will be a success. The commitment may not be a problem.
But we just need to pass the right message. I know that. Yes.
I trust my midwives. Even this morning, they had. And they meet regularly. When they have issues concerning the services or clients, they discuss it. So I'm happy. I was even there this morning.
I was just called back. And surely she followed me that you people are around. So for the commitment, I can assure you that it will be total.
Almost total.

Interviewers

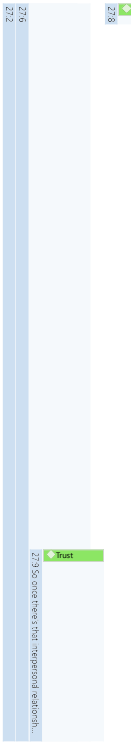
Yes. That's great news.
Do we have more questions? I just want to ask the role of the TBAs play. Trying to integrate them.



I know there are challenges. The educational background. Language.
I know that. So, I don't know. What we were thinking was developing some kind of voice service.
Okay. To integrate them in terms of communication. But I don't know apart from that, whether in your own experience, you think of, do you have any other way we could possibly integrate this woman in the community with the midwives to really bridge this gap?
So I think what you want to have in terms of information. For instance, talk a bit about the process now. There's a handover, I think, right?
Yes. TBAs and what information do you need or what information do you have now? And what would you need to know about this patient?
And what in the ideal case, in the case of an ideal handover, you would already have. Right?
Because referring those patients from the community, usually from the TBAs, they come with no form of referral system. They just ask them, okay, I think things are getting worse. Get to the clinic.
But in terms of integrating this TBAs, what would be very crucial, that we need to take into consideration in getting from or making sure these TBAs are kind of providing some information that will be very key, handing over these patients to the clinic.

Doctor:

Yes, the area of communication is a big challenge. But there's always a way of going around, because we have some meetings with locals that serve as interpreters. For the TBAs, for example, I go to Upper East.
I realize some of them have this. We need to give them that assurance and self-confidence that they're doing well. Because sometimes they may conceal information.
Once you don't understand their local language, it's a problem. They won't open up. But the clients have so much confidence in TBAs, from what I have observed over the years.
So this may also be enhanced by, if possible, paying visits to those centers periodically. So once there's that interpersonal relationship, they now feel free with you. For those who can speak the language, fine.
The voice thing with TBAs is also good. So that sometimes, maybe the patient is taking it the other way. If the rain is bad, rain season is no good.
But through that service, there can be certain procedures to at least institute before things get out of hand. Getting to meet them personally and organizing small meetings or workshops where they will do their teachings and they get to see the midwives physically, face-to-face. They know them and they interact.
You see, that acceptance is there. And they feel free to open up. When there's any problem, they will pick the phone and call.



It makes a whole lot of difference than not interacting with them. And you just start communicating. Sometimes the idea is I'm talking to a stranger.
So they will edit the information. And once you get half information, it's one problem, not it. It's very common.
They don't tell things correctly. Sometimes even when you're with them, you don't do it. So some of us are not from there.
I try to learn the language, at least the greetings after a great time. It brings about that general acceptance. Not just with the pregnant woman.
The patient generally, they see us as a stranger. We make an effort to speak their local language. They make mistakes, they laugh very bad.
They tell me the problems. And some of our midwives, our staff, are not from here. Some speak the language while they stay there.
And then I realize that people have more confidence when they know a particular person I'm talking to about a problem. Yes. So the voice services are very nice.
So that they can communicate in simple language. They can eliminate certain problems that can be identified. Which would be like, if you see this, do this.
You see that those problems are like signposts or danger signs. They can raise an alarm for interventions to be executed. Sometimes it may just be that the woman's bleeding stopped, she delivered, BP is down.
They don't know what to do. They are praying. We pray a lot in Africa here.
So we must pray and intervene. The pastor is laughing. So we tell the woman to give normal saline.
So they must know which one is normal saline. But they cannot read and write. But they should be able to identify by color.
Or can label them with particular codes. If BP is like this, this is the type you give. Those are kept in compartments.
If BP is low, come to this cupboard, take this one. So say, okay, this could be good, just for normal saline. This one, dangerous.
This clothes, this is what you give the child. Don't go and pick for your child and those things. So with time, when you visit them, you encourage them to know.
And some may be able to read but not very fluent. They may not write but be able to identify those things. I think with that, that's why it has to be interactive.
And you have to be visiting them and encouraging them. That way, at the end of the day, it will be better. Be able to achieve what you want to achieve.
That way you can get more information. Your data will be more complete. And at the end of the day, the system will be more effective.
Because you have to use what you've designed. Just as you said, if these things are not put in place, if you don't identify the actual needs, then you build something that will become useless. It will be there, but it's not functional.

Doctor 5:

Because people cannot use it. They cannot apply it. So it also involves training and retraining.
And for them to know the use of those things, how to use them, when to use them, how not to use them. Yes. So I think we're on the right track.
Interviewers:
I have two questions regarding what you said. The first is about this withholding or not sharing of information. Is this purely, let's say, a cultural thing of being with strangers?
Or might there also be other thoughts behind this? That they are afraid of maybe getting an angry response or something or being too late with referring or something like that? Or is that not the case?
Doctor:
It is partial cultural and partial religious. You see, in this place, in this part of west africa, a lot of people are moslims or [inaudible]. But sometimes the culture beliefs practices [inaudible]. For example, trying to attend a woman, a 18 year old lady who is married, her mother has 4 wives and she is the youngest wife. The man is not around to give the permission to go to the hospital. In some communities when you are about to deliver, [inaudible].
Maybe the TBA doesn't has the skill or the capacity.
See an obstetrician or a midwife who is more experienced to suspect what is maybe contracted virus. So you end up taking herbs. Then when I was the lawyer of your husband, he has a mother-in-law talking now.
I took these herbs and within six hours, I pushed the baby out. Now, this is contracting against resistance. There's a risk of rectal uterus, risk of postpartum hemorrhage and birth trauma.
[]
Yeah. Yeah. And if you're not lucky, intervention is not fast, you'll be bleeding. Maternal mortality. Most of the maternal mortality is because of delay in taking a decision by the head of the family. It's a big problem.
But these days, it's getting a little bit better. But we talk to them and we encourage them sometimes. When they come here sometimes, even for a scan, we're going to scan them.
We bring the man inside to see. They don't believe that those things are real. Yes.
They believe in praying. And a woman deliver like, if you don't deliver this, give spiritual connotations. But now they're beginning to accept it.
It can't be achieved in one day. So, the same way, some of the TBAs may be a bit careful not to give certain information because they've not gotten clearance from the family. TBA means, okay, let's refer to this, no, leave the woman there.
The man may afford it. He may be able to afford it. He has the money.

27:6
27:2
Culture/religion
27:13
TBA experiences (...
27:14 For example trying to attend a woman a 18 year old lady who's marri...

But he doesn't see the need why he should send his wife away when all the other women have been delivering. Or her first two children, she delivered very well. So, why is it now?
She has been delivering. TBA, do something. Now, they're caught in between doing the right thing and what they think is right and pleasing the man.
Maybe they're from the same village. Sentiments come into play. So, but constantly talking to them and telling them why they should not have that sentiment.
Because they feel that after these kids they'll still be in the same community. So, they'd rather please the man. Yes, of course.
Please the man than her. So, that has to disappear.
Yes. So, you are telling them on the phone, refer the woman. You are not there.
She says, okay, okay, I've heard you, doc. Or, okay, madam, I've heard you. Then she tries to explain to the man.
But they may not have the right words to explain to them. So, they have to be taught how to communicate the message to the local people. Yeah.
Then they'll accept it and then they'll transmit the patient to where the patient is supposed to be. Yeah. So, that is a major problem.
That communication gap comes in different ways. Yes.
Interviewers:
And so, do I understand correctly that, well, if you take this scenario, you just explained the example scenario, then at the point of referral, the TBA will explain to the husband what is going on. Or the husband's relative.
Doctor:
If the husband has to even talk to us, we do that sometimes. Several times we use the weighing cards, the ANC cards, to call the husband's numbers. Because what the wives tell them, sometimes they don't even believe it.
Interviewers:
Yeah. So, in the handover process, do you get information that say, obviously, when somebody comes in, probably you physically examine and you know what's going on, but is there, let's say, a transfer of how long it's been going on already or, let's say, technical data to you?
Doctor:
No, they don't. Usually they don't even tell you. Nothing.
Even if it's been there for, let's say, at least two days.
Interviewers:
And why is that then that they say that they reduce, let's say, the severity of it?
Doctor:
Sometimes they don't even understand. They lack insight. Of the importance of specific dates.
Interviewers:
Okay.

27:14
27:2

Doctor:
And then the second reason is that they think they will scold them. That's the reason. They don't like to be scolded.
So, generally, in this area, 90%, 9 out of 10 will tell you it's three days ago, three days. It's like a uniform. They sing it.
Interviewers:
Okay.
Doctor:
So, sometimes you have to go and examine and know what I'm seeing more than three days. Tell me the truth. Actually, it's one week.
They start shifting. But it is mainly fear rather than mistrust. Fear that you may scold them, let's say, three days.
So, there are instances we'll call the husbands. There are instances we'll talk to the women. Sometimes, some of the women are abused at home.
The man will say, go to the hospital. They want to admit you. Don't agree. It's not me. Meanwhile, she has issues to be sorted. And she may need to follow up.
He sees that's a waste of time because he wants her to go back to the family. When he sees him, she's like...
Interviewers:
So, in this case, the only... Let's say, the TBAs can basically also not speak freely.
Doctor:
Yes. They may not speak freely, but they can be empowered to use better techniques to communicate the message to the husband. And they should not give up. They should actually be resilient in explaining.
Even if the man is a chief. You see, there is an aura some people carry that intimidates some of the TBAs.
Interviewers:
So, if now, hypothetically, we would have something in place, let's say, the TBA would be able to communicate to you directly what is going on. And for you, it's just imaginative, right? And you would, of course, conclude, okay, this needs intervention.
Now. Two days ago. And, I don't know, I'm just imagining how now, and I don't know, you would be able to call the husband by phone or visit him or something to tell.
Doctor:
That's very important.
Interviewers:
We know this is going on. What would happen then?
Doctor:
That's very important.
Interviewers:

27:14
27:2
Fear of TBAs
27:15 So, some...

Would it also be rejected? Or would it cost more?
Doctor:
No, no, no. For the few, I have had calls to speak to some husbands that way and they cooperated. If the TBA, let's say, puts through a call to the husband, can I talk to you?
They give the phone. Then, somebody else, me and me, not on the other side, is not interpreting. Yeah.
They cooperate. Sometimes, they don't even trust the TBAs. You don't know why.
Yeah. When those instances actually happen, because they may think the lady just wants them to spend money and they want her to do something. She's trying to say, when you go to the hospital, the guy is not interested.
Yeah. But when another third party speaks on the phone from somewhere through an interpreter, it helps a lot. So if there is a gadget or a communication link, if such cases, other cases similar to that or around the client arises and the husband can talk to, or the relatives can talk to, it helps a lot.
And then sometimes you may have to explain to them the reason why she should not be brought on a motorbike. Yeah. She should be in a car or at least a tricycle with support.
Or if you get an ambulance. Well, some ambulances have their own problems. We call them.
We don't pick their call sometimes. It's a big challenge. I had a nasty experience over the weekend.
Two cases. Full-on calls. They even switched the phone off.
I want to make a formal report about that. I want to teach them that there is a problem. So sometimes it's, OK, when the decision has been taken, they delay in conveying the patient.
Yeah. OK, now there's a means of transportation that the road is bad. Or where they are, it has rained and the car cannot pass.
Yeah. Water. You have to use a boat to cross to the other side.
So those are challenges. In certain instances where movement is a problem, we don't have an ambulance here. So what do we do to that client that's on the other side that can't come to you?
Now the husband has agreed to come. They are ready to come, but no means of transportation. Because some of these cases you get them are in the hinterlands.
Interviewers:
So this also requires a lot of work from your side to arrange. Yes, yes.
Doctor:
Both sides. Both sides, yeah. Yeah, both sides.
But sometimes, OK, I've got an ambulance, but the ambulance can't go because there's no bridge. And there's a river. You have to cross the bridge.

27:2

Doctor 5:

OK. So, you see.

Interviewers:

OK, so this is a very [] thing. Another question I had is, so... Do you have to attend to the patients?

Doctor:

No, let's go on. Don't worry. If there's an emergency, I'm on it.

There's an emergency. Oh, OK. OK, OK.

So, no problem. It's not an issue. Let's go on.

OK.

Interviewers:

I was wondering, because, obviously, this happens a lot, and this also, regarding the issue of trust and, well, information and sharing and things. What are things that... Are there things in place, let's say, that you already have, let's say, proactive relationship with communities or with TBAs or do these kinds of things?

Is there, let's say, sort of, I don't know how to call this, community manager or somebody who is concerned that I handle often with that village so I know the people there that work here?

Doctor:

Yes, yes. What happens is that we have some... We have a schedule here, a schedule that we do what they call community outreach.

I think it's on a weekly basis so they go, they take them who are working in conjunction with some community health nurses. They even go to the villages to speak to these women, give them health talks and they're from this institution so they are aware. Some of those health talks, what has led to some of the people coming here to seek A&C care and sometimes they even access them at the community level like on market days or they get an appointment, they assemble at a particular primary school or at a particular location.

The nurses usually go in twos, sometimes four people or even areas that are difficult to access where the cars cannot go. They use motorbikes to reach them. They even give vaccines to them and vaccinate their children when they come and come, yes.

So that gave us a platform to get to them, talk to them, encourage them, discourage them from delivering at home. Over the past one year we noticed an increase in our A&C attendance. A lot of them are coming now.

Sometimes we see more than 50, 60 women on Mondays, even new registrants. So the response following the community outreach has helped a lot. We also talked of using the electronic media, the radio stations to do some jingles but I thought of that, about putting up something so that there's even an FM station on campus here so we need to get clearance from the director and this is the message we are passing.

If it means using the university relations to do that, then they will carry out these messages and the people will get to know. Because sometimes most villages won't see television set but in an average home there's a radio. Some even use not even the Android phones, the small phones have.

Doctor:

Even on their farms they put them so they can hear the news.

Interviewers:

It's interesting how we do a lot with information sharing and combining simple phones and local radio stations but an interesting take I get from this is that your aim then is to have as much of the deliveries be here as possible so that if something happens you're already here. But would that scale? Are you able to take in every pregnant woman to deliver here?

If everybody would do that would that work? I would imagine there's an enormous ratio between let's say people that choose to be in a clinic and people that used to do it at home. But if nobody would deliver at home anymore and everybody would deliver in a clinic would that work?

Doctor:

No, but you know interestingly they have what they call cheap compounds and they're in every sub-district there are many of them around so they also have midwives posted to those places and the community nurses so they seek attention there they attend their ANCs most times it's when they they tell issues that they think are like for example a scan if a scan there was a time I was going out to do I used to go every Tuesday I'll pick up a scan machine put it in my car I'll drive to Bulao it's a community between this place about 7km away from Nyapala there's a road that links here to the main road so I go there to carry out scans for the women because they used to go long distances to do scans so we took it to them so they pull the patients together even for the new ones and they're doing scans when I go there most times I do between 15 and 25 scans when I go there so what I did was that I used to get most of the pregnant women like if the weather is hot if the water is a bit cold there's always water in my car just a bag of pure water Voltec about 30 pieces I'll take it there for them and I realized that where they were having there was no place to even buy water and if I get a young person I mean somebody who's maybe in the first trimester and has just passed from urine and I'm trying to do a scan I won't see anything because the bladder is empty you know the bladder needs to be full to push up the uterus so I don't have to waste my time I give them two sachets of ice drink it and wait while I'm scanning others when you feel I'll do a scan for you so I realized they were coming I did about 28 scans so they were coming but along the way I had to stop because some doctors left here and went back to TTH and I was the only one with one PA so I couldn't cope so because of the work pressure I stopped going to that committee and a lot mentioned there were these two cases that I saw later I did a scan I saw three heads triplets they were quadruplets they lost one of the three and they are boys she drove a CS so such cases you don't wait for labor one of them was bridge one was Kefali so you can imagine such presentations so they had a CS and they survived there was one that saw twins one was bridge one was Kefali so those are some of the things that encourage women to go to particular places so they may be used to that place because it's within their community and that's the essence of those two compounds so if you don't have any special issues you don't need to refer them elsewhere but then there are some that are just around this environment because they don't know about the place and they get to know about the place and so can go to places where

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So, later it was increased to 20 Ghana cities, but same place in town, about 80 Ghana cities. Some place 100 Ghana cities. So, it's actually affordable.

You can imagine the cost of transportation to town to go and get this kind of car. So, they saw it as, oh, this is fine. So, they were coming and they were paying without complaining.

So, we're using that money to replace the gel and the sonoprint. Each one can take about 100 patients, blinds. So, that's what we're doing.

Interviewers:

And do the TBAs also encourage you to go?

Doctor:

Okay, where I was going, I didn't come across any TBA. It's a local setting anyway, but they were having qualified midwives. But I believe there are some TBAs around there.

I never got to meet them. So, if they are there, even the TBAs, you see, knowing presentation is very important. They don't need to know the details of the spandex.

Knowing that this is a bridge presentation, if you put it here, you see something like this is a head. It's a whole lot of difference. Sometimes they may not know, but they are trained to palpate, but sometimes palpation may not give you the right information.

Women have different habitus. What if the woman is obese or she has some other comorbidities? You palpate and you're palpating a fibroid, you think it's a head.

Why the head is this way? And then she goes into labor and then the fibroid is obstructing. At that point, it's 1AM.

So, what do you do? She's 9CM. She's pushing or fully dilated.

But because you didn't know that she had a coexisting fibroid, you allowed her to go into labor. In that case, the case was a cesarean section. Or placenta is down.

They wouldn't know. But I know because most of them are illiterates or they can't read and write. It's a challenge.

But the ability to pick those kind of cases that will potentially lead to obstructive labor, it will help a lot. They can be trained on those basic things. But additionally, if you want to give them those kind of machines, can they maintain the machines?

Won't they spoil the machines? Can they maintain those machines? Won't they spoil them?

These things are expensive. Of course. So, the best thing I was thinking is for maybe obstetricians to think of ways.

I've not seen their curriculum, the training they go through, how to detect those problems.

Interviewers:

Also, if I take from this, maybe there are some criteria or edge cases where you need to be extra careful and refer anyway. So, there's one way that referral, everything goes wrong. But on the other hand, there's also maybe an opportunity in, let's say, information exchange or, let's say, limited diagnosis. Let's say, in which you can decide, OK, this is something you should definitely, already now, before delivery, go to the clinic to have further examination of care.

Doctor:

Because once they know that referral is part of treatment, it's very important. Sometimes it has to do with the psyche. What should I refer?

It means I've failed. No, you've not failed. It's part of treatment.

But you're limited in resources and sometimes even the expertise. So, once they know their limits, you see, a safe TBA is that one that knows when not to even attempt the delivery. That's what I think.

So, how will they be able to know which labour not to allow to progress and refer if you save a lot?

Interviewers:

I think also, so in the case of, let's say, bridge position or something, if you would, I'm just making something up. I'm not the expert enough in the knowledge. But let's say there would be some reason for the TBA to refer to the clinic to do a scan or something like that.

Not near delivery, but somewhere in between. I guess also there needs to be some communication back in the meantime when the patient comes back to the village for the TBA. What to watch out for and these kinds of things.

And to understand what has happened here that is communicated effectively back also to the TBA. Or is this not really an issue?

Doctor:

Well, that's very important. But there are some issues that may be a problem, but not related to delivery. For example, a woman who comes, she's blood group O negative.

The husband is positive. She delivers the first child. And there was cross-reaction.

Doctor 5:

There's some incompatibility. And it's there in the folder. Does she know what that means?

Is she aware that the next pregnancy they have to take anti-D, immunoglobulin or not? So, some of those things, we have to spell them out clearly and let them know. Sometimes, if they're even equipped with Android phones, they could snap certain results, send them on WhatsApp.

Or have them transmit the results and we interpret for them and advise accordingly. But sometimes you go to those results, those tests, elsewhere, bring them, but interpretation is another challenge. So, they can't give information what they don't even understand.

So, in order to allow or to push them into those things, they can send images. You know, just take a screenshot. If they can use those phones.

Most people now use Android phones, at least for WhatsApp and TikTok or Facebook. Some, we have the Android phones just for phone calls. If you have a result, this is where the camera is.

Take it and then send it. Yeah. And it will help.

So, it's okay. Fine. This woman, before delivery, or if she's hep B-reactive, to let them know that the woman is hep B-reactive, this result is supposed to give the child an injection to prevent transmission from another child.

And then when should that injection be given? What is the time limit? How many hours?

Okay, after delivery, must that injection be given? Do they have it there or do they have to not send the patient? But sometimes, once they deliver safely, they feel it's okay.

But there's a follow-up on that child that needs to be done. So, how to transmit that information to educate the parents? That's an injection.

So, usually when you discover those kind of things during the ANC, you prepare the mind of the father to prepare. All these things cost between $900 and $1,200. So, they prepare and save towards it.

So, the man needs to know that in three months or four months' time, that will procure his injection. Yeah. And there's a reason why.

So, sometimes, if they are aware to alert their relatives on how to transmit the information, or if they could not do such, if the information gets to us or to the next level, we cannot give them feedback and also educate the husband. You see, it depends on communication. And that will save a lot.

To protect that child that is innocently coming into the world, the mother also had to be reactive. But nothing was done. Only for the child to grow up.

And there are so many of those cases here. It's almost endemic. So many of those cases.

And many other conditions too. That may not be directly related to delivery, but the care during ANC visits. You know.

2:7:2

Reminders

2:7:19 Qua...

And then, you see, having to disseminate information to the communities is very important. Because I've realized one thing. Most people don't know that once you know you're pregnant, there's also registrants that are at the ANC. They wait only six or seven months. As a norm. As a practice and as part.

So, what I tell them sometimes, when they come here, I go there to tell the husbands that the next delivery, if you allow your wife to stay till seven months, and she doesn't get nursery care, the children won't do well in school. They'll be dull. You'll lose your school fees.

So really, I say yes. And they start thinking. So, maybe it will help. Because sometimes you tell them a negative thing that will happen in case you don't do this. But if you tell them sincerely, look into their eyes, they believe you. Yeah, they believe.

So, when they come, they always look for that particular person to talk to. So, more so are people able to communicate with them, to show that empathy. Once you show empathy, they believe you.

Yeah. So, that's how we've been able to make some of them, even leave their communities to come here. And this is, I've been going for community outreach.

Yes. Excellent. They need those things, but sometimes they don't know where to go for those things.

Yeah. And the man doesn't even understand. But when they see you in the community, they are happy.

Sometimes you go there, speak to the assemblyman, maybe the local chief, and some of those that are opinion leaders. They introduce you to them, you talk to them. And they believe you.

Yes. You can't just go to any community and start talking. Nobody will listen to you.

You have to get the opinion leaders to inform their people. You give a date before you want to talk to them. Yeah.

And then they take you from there. Yeah.

Interviewers:

I think in the ideal world you would have a regular, let's say, interaction between the TBAs and the clinics, right? So that every pregnant woman gets at least a scan in time, and so that you can...

Doctor:

Yeah, that would be very nice.

Interviewers:

You don't have an early warning of things going wrong, and that then the TBAs can, let's say, help. Also, I know how to handle it and communicate with you if there is a development, something like that, right? That's how I imagine it.

Interviewers:

2:7:2

Contact/communi...

2:7:20 Interviewer: I th...

The relevance of the TBAs doesn't always come across as equal. Sometimes they're not that relevant in cases. As in, during.

They're not always there. The TBAs? Yeah.

No, they're always there. Oh, they're always there.

Doctor:

Oh, yeah. In fact, they're there. The people even go to their house, even at night.

Yeah, okay. They live in the community. So even if they have a center where they attend to them, from what I have observed in other places, when there's an issue at night, you see the husband will get up with the wife to the TBAs' house.

So they are very close. Yeah, they have a very high trust relationship. Yes, there is that.

So they trust them a lot. The challenge is when it has to do with spending money sometimes. That's when the men start pulling back.

Yeah. So they need to understand why it has to be like that. So the guy will say, No, this one has been delivering for the past.

She has three deliveries. Why now? Do something.

They're interested in learning.

So you just need to have that patience to explain to them why and give illustrations and explain to them. Then, you see, they pick you up. So you must convince them.

You have to talk to them. Sometimes first talking is not enough. You tell them, Okay, if there are other issues, we'll come back next time.

You go back and talk to them. They believe you. Sometimes they may believe a pinch of salt, but when they see the results, it becomes one that accepts it. Yes. It's like that. So a very strong factor is the language of communication. Yes. Even if you're talking on the phone, when they hear you speak the local language, there's more acceptance.

Interviewers:

So we are working on, for instance, on a system to be able to recognize words in the band. So we tested it this weekend. We have now an AI model that can recognize yes and no and one to nine.

Okay. As a start, we want to expand it with more words. It works quite well. Maybe you can give a short demo. So we're working on this. It's more from a technological side, of course.

I think in this use case, there definitely has to be some, I mean, technology has to be fully supportive, let's say, of the human element. So we cannot replace humans at all. Because a computer is not going to convince anyone of doing something.

Maybe it can give information and that can be convincing, but still, I think this stress relationship is very important.

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2:7:2

Interviewers:

So we tested it out with men and women and even children a couple of years old who were murmuring very quietly into the thing and it almost worked every time. So we are very happy.

So it's able to understand.

Doctor:

So now I say yes. Yes. So how do you know that's one?

Interviewers:

You can just press to confirm. That's just for the test. Okay, I understand.

Interviewers:

I understand. So it uses examples. So if it's right or wrong, you can also tap, let's say, the check mark or the red cross and then we store that.

Interviewers:

Okay.

Interviewers:

And then when we go and train the computer again, it has extra examples to learn from and the more examples you have, the better it gets.

Doctor:

That's right.

Interviewers:

So we are working on expanding this and of course we have done in the past a lot of work with speaking it. What we do is we have, if you have an app on maternal health, then we will first of course think about what is the information you want to exchange and then we translate or formulate first phrases and parts of phrases and words that are relevant to be able to say everything you might need to say and then we translate it and record it and then when we want to say, let the computer say something, we basically collect the right parts, put them in order to form sentences.

Doctor:

Yes.

Interviewers:

So it's a very basic way of working but now we are also able to understand words. That's a new development that's possible for basically any language in the world, I guess. And we work a lot in other cases with local radios to actually collect small data on an individual basis by phone or regular phone call or smartphone and then if it's something that is useful for the whole community to know, for instance we did market prices in the past, then we send this data in spoken form to the radio station and we will transmit to that whole community.

Doctor:

Wow.

Interviewers:

Doctor 5:

Well in this case probably I'm not sure whether it will be relevant to spread data of a certain person to the whole community but I think more educational information and discussions about this could be also, which are already considered in those cases. So a bit outside of the real ICT system but it can be perhaps used in combination maybe to think about.

Interviewers:

Do you have any more questions? It is your research.

Interviewers:

I think for now I don't have more questions. First of all most of the key questions I wanted to, I think some of them he already brought it up before. We woke him up.

I'm still there. But I think from his point of view on how we can get this TBAs integrated approach must be very strategic to get it working, not just trying to get a platform working and then maybe they pick a phone and then they call him. That might not probably be successful at the end because they need to have that connection with the people from the other end they are going to work with.

So I think we need to look at a strategy and see how getting them physically interacting to exchange knowledge, knowing each other, building that trust before if maybe they find themselves in their various communities and then they need to reach out when they have these emergency cases. Then when they pick up their phone or whatever means they want to connect with their wives they know they are speaking with this person at the end of the day or they are communicating or they are reaching out to this group of people from the other end. And that would really work much more better than...

Interviewers:

I think what I would propose is to make this system let's say a human system first. And so we leave out all the digital stuff and just try out this communication and just it will be work for somebody that somebody in person really goes very actively have this personally built relationship. And then try different means of data communication.

Try it out and see how it goes and what you encounter. And from that if it's something that works. And only I would say just start in one place, one village. Perhaps the village that is according to your judgement might be the best suited or most open to it. And then if you... And this will be quite a lot of personal work and also you will have to be on top of that person to really know exactly how it is going.

What is the information being exchanged and if there are any trust issues or discrepancies of knowledge or something then that of course needs to be addressed or circumvented in some way. And if you have something that works there then it can also perhaps hopefully be replicated in another village. And then I think it would be interesting to start to add maybe digital elements to it.

2:7:2

Commitment
Willingness
2:7:2 So I think we need to look at...

So to scale it up. Because otherwise I think if it's all the issues there are, then adding a lot more issues with digital technology and with phones right from the start, it will make you so slow in getting something.

Interviewers:

But then the possibility is that, well I don't know, but the possibility is that that already exists somewhere. Because definitely there will be some TBAs who already trust this place, who already are in communication.

Interviewers:

So that step may already be passed. Then you can see if you can...

Interviewers:

If there are people like that then you can work with them at the beginning and see how it goes. See how they do their work and what... Possibly there can also be a transfer of trust where if the TBAs have contact or connection with each other and a system begins to work with one, then definitely or most likely some of them will trust because it works with another, not necessarily because they have already been...

Doctor:

Practical evidence. Yes, exactly. Yes, that's true.

So definitely get on board. Once it works for this person and I know it works, then get involved. I think there has to be...

Interviewers:

There will have to be certain protocols that... Work with the TBAs,, particular cases they have.

For instance, as we're speaking about certain cases that they should not even try to start to... Induce labor. Induce labor.

And so I think from the part that is not actually going to be my... I see it's not my expertise, but I think from the midwife's point of call, they need to develop some protocols that would address these challenges that the TBAs really shouldn't be handling. And maybe when there's that opportunity, they can train these TBAs with this set of protocols on how to handle each case, each particular case, when it comes to bridges, when it comes to bleeding, when it comes to whatever.

All those complications. All these complications. Maybe they have to come up with an educational...

Guidelines. Guidelines to...

Interviewers:

I guess this knowledge is already there, but not formalized.

Interviewers:

Formalized for the TBAs. Getting this information to the TBAs is another... Challenge.

Challenge. They need to model it in a way that will fit into getting these TBAs to understand these guidelines. So for me, that wouldn't be...

2:7:2

Guidelines
TBA training
2:7:2 There will have to be certain protocols that. Work with th...

But from what he explained, I think that is the first step of cutting off the delays and getting these patients to the clinic at the right time to avoid most of the mortality cases. So...

Interviewers:

So let's cut some delays by leaving him and doing his work. I think that's too far away. Yeah.

Interviewers:

Do you have any questions?

Interviewers:

The last one had to do with the electronic records management system. I know they have their own particular cases, but I think maybe from what he has already explained, it is something that maybe if we go on with it, they would gladly accept it and maybe use it here. Would the electronic records...

Automating the records... At the maternity, yes.

Doctor:

Oh, why not? It would be helpful. In fact, we have...

I made a proposal, I wrote a proposal to management on some of the requirements to develop this and elevate it to a primary hospital. As required by the requirements set by IFRA, that's the Health Facilities Regulatory Agency of Ghana and the National Health Insurance Agency or NHIS. You can see we're still using folders, which is actually a challenge.

And we have so much data that sometimes we miss. Records are not adequate. You see, she came for that book.

Sometimes they're busy. Patients come in here. I see the patients, but no nurses here with me.

Except if I want to examine the client, sometimes they know the use of a chart program, but the numbers are not enough. And then sometimes, if there is a particular process, they may sit out there three or four of them, it's not busy, but they forget that somebody has to come here and stay with me to make the entries. So we miss a lot.

I see 25 patients, we see 18 recorded there. So if you want to get a number of patients that actually pass through the consult room, then go to the medical records where they've been here for a while. So the records here are inadequate.

And at different points. So they checked and saw, okay, we need to get these systems. So they brought this one three months ago.

It's new. But there are other points at the history table. You need to have one there at every point.

So if the maternal is going to have something like that, it means you've reduced the work for the institution. But now the issue is, okay, when they now get maybe the software, they decide to use that which is used by the Ghana Health Services, which is easy to operate from what I had, or any other software to install, I know it will be easy to integrate what has been put there

2:7:2

Access to patient ...
Herbal medicatio...
2:7:2 Interviewers: The last one had to do with the electronic records mana...

in the alternative. If I sit here, I can go there and I know what's happening there from the consult room or from the records.

So that I don't need to have somebody to make manual entries here for me. And then even when I prescribe a drug, I can monitor what happens in there. Even if the one comes from ANC, I can be monitoring what's going on because it's integrated networks.

So from here, I can know which drugs are not in stock or the stocks are falling.

So sometimes you're here, you're right there, oh, it's atherosclerosis and it's painful. Patients will come here, they're not writing drugs anymore, and there was no systems in place to check and monitor those things.

So if something were put in place and there was anything that would help in getting a collection and then it's a welcome idea, we will accept it gladly. And they also transmit the information. The school is ready for that.

But sometimes, even when you have, they know that this is needed. Things are slow here because it has to go through a process of procurement. There's one department called procurement.

They move at snail speed. Even when your supplies are down, you need drugs. They handle as if you're handling stationeries.

So they have to come to the reality that in the healthcare system, though we are working around that to change it, we've written to the VC. He called us for meetings. So now there's a new director who was on last week.

So those things are going to be changed. And that idea of procurement in this has been a problem. So they are going to invite the director of procurement.

I'll be there too. The other medical superintendent will be there. Our director. And I think the principal is going to be invited. And all the major stakeholders.

So that we understand that when anything comes from the health directorate, you don't have to keep it and let it delay.

You work on it as soon as you can. Sometimes it's every person. Sometimes it's just one child.

Interviewers:

Yeah.

Doctor:

So it's attitudinal. We are hoping that that attitude will change. They are yet to understand that when it comes to health.

But most of them feel, oh, these 10 years I've not been to the hospital. But recently one man was sick. One prof.

I'm not mentioning him. He went to Dungu. And they couldn't run some basic tests for him.

He had to go to town. He was complaining. So I told my brother, why didn't you remind him that?

Our prof. I said, you feel offended. I said, if I were there, I would have told him. So he went to town. And they wasted his time. At least two years.

2:7:23
2:7:2

Doctor 5:

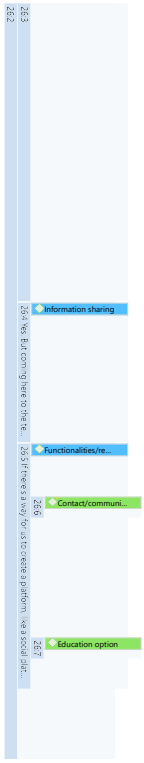
And the basic investigations. Like full block counts. Like you just take the blood.
Within 10 minutes. Five minutes already. He spent hours.
So they are not complex. It's good. I pray.
I hope that the big men who take decisions should be having those problems.
Yes. Yes.
So we really appreciate it if that can be done for us. And I assure you that we'll put it into use. And so that when you see yourself, you're happy that, yes, we didn't waste your effort.
And time. And resources. And all those things.
It's painful when you put up something and it's not being used. But here I know we'll use it. Yes.
Thank you very much.
Interviewers:
Okay.
Doctor:
Thank you.
Interviewers:
So thanks in advance. Yeah.
Doctor:
Thank you.
Interviewers:
Yes. Now the work only starts.
Interviewers:
Yes.
Doctor:
So I don't really have any questions for now. Okay. But the message you brought is well understood.
Yeah. And yes. It's me.
Oh, come in. How are you? Oh, thanks.
Yes. So. Good afternoon.
Good afternoon. You're welcome. Thank you.
So we also hold our own meetings to discuss with the maternity unit. Yeah. And we also have a unit head's platform where we meet internally or if there is an urgent meeting, we meet.
I also brief them. They need to know. Well, they want to know what I just come here to do.
They know. Uh-huh. And then I also tell our specialty to my director to know this is what is in the pipeline.
Interviewers:
Yeah.
Doctor:
And then he needs to be in the know so that it won't be strange for them to say, oh, this has been going on. He didn't tell us. Yeah.
Interviewers:
No surprise. No surprise. Yeah.
Doctor:
So some surprises are not pleasant. Yeah. We should be getting over it.
Okay. Yeah. So I think I have to also find him when we choose a director.
Okay. Not today. Okay.
We have to take time. Okay. I'll first mention it to him.
He needs to know who I'm talking with. Yeah. As you can.
Uh-huh. Okay. Check the maternity unit.
Okay. So that... Yeah.
Any type of support. Any type of support. Yeah.
Because you don't know where this may go. Because the school, I don't know.
You see, this present VC we have, from my little interactions with him, anything helps.
He's supportive. We've written things. I've written about four.
I've made four requests. He granted them within one week. Mm-hmm.
Which is unprecedented. Then his close friend even told me, I know, this issue of upgrading this place. They have been saying some things, and they are seeing it, actually, that we are losing clients, and we're also losing revenue.
And you see, some of these big guys, once you have a program that will bring attendance, you will see they don't do good fame and revenue. Yeah. So I wrote a proposal.
They want to do... It was in my time that this was instituted. This was instituted.
They echo it. It was like nobody is there to blow their trumpet. So they blew it themselves, so that the trumpet doesn't get rusty.
You know? So... And the man has said in Italian that he wants in the next 12 months that this place should be a permanent hospital.
So... And very soon, they are going to leave the ban on employment. It was for like two years they had no employment.
But what I have noticed in Ghana is that every election cycle, they employ.
And after that, it stopped. And I have...
All the time. You flee from Bolga, or what?
Interviewers:
Mm-hmm.
Doctor:
Okay.
Interviewers:
You're welcome. And I will be here before two. Good afternoon.
Doctor:
This is my colleague. This is Ernest. He's our physician assistant.
So he assists me for afternoon shift. Yeah. So...
So gentlemen... Okay, lady and gentlemen. You are saying gentlemen and ladies.
So lady and gentlemen. Good morning, first time. We are very, very grateful.
I'm personally very, very impressed. I didn't know it's such a big thing you are doing. But I think I'd like to encourage you to, if there are any issues, just feel free to walk up to me and...
Okay. And I think we should exchange. I don't have your contact, so...
Okay. I'll give my contact, so that even if I'm not at work any time, just give me a call. Right.
If you need any information or any help anywhere, I will be willing to give you any assistance you need. Okay. Because what you're doing is...
I mean, it's your job, it's your work, it's your project. But we are going to be the grand beneficiaries. Because at the end of the day, I want something that, if put in place, should stand the test of time.
So that even when we leave the scene, we'll be remembered that, oh, there was one man I met. He came, a PhD student, he brought this here. And we'll not forget that.
I'm from Nigeria, but I've spent 11 years in Ghana now. So, and I feel very much at home. You know, this saying that, don't play like home, is not always true.
So, I'll stop at that. Some people who are coming free, they love the place. So, home can be helped.
So, anywhere you're comfortable, it's home. So, thank you very much. Thank you.
Yeah.

Doctor 6:

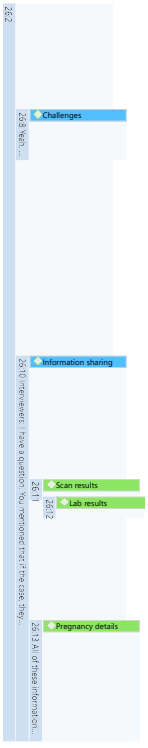
Interviewers:
I think maybe, let me just recap, maybe Frances already spoke to you a bit about what we wanted to meet you to discuss. Yeah, well, who wasn't? First of all, let me introduce.
So this is Gosa.
Doctor:
Okay, hi.
Interviewers:
This is Andre. Okay. And then this is Bram.
Okay, hi. All from Netherlands.
Doctor:
Okay.
Interviewers:
So, yeah, actually I'm colleagues of Frances and we do research mostly in ICT for D, ICT for development. Okay. And since last year I've been having a project around your area, which is maternal and child health care.
Okay. And I was looking at how we could integrate traditional birth attendants in the communities with conventional midwives, with some form of ICT platform to improve their communication and information exchange. Okay.
And overall improve the quality of maternal and child health services in the communities where they don't have much facilities or resources to serve the needs of these women in the communities. So this is the whole broader idea. Okay.
Looking at how we could intervene with some form of a solution. Okay. The best way we could integrate these women or these TBAs, we call them, that are serving most of these women, especially in the rural areas or in the communities that are a bit remote.
Okay. Before maybe getting most of these women to the bigger facilities or where they could access health care from these conventional midwives. Okay. So we decided that maybe once you are also an expert in the area of maternal and child health, you've over the years maybe have some experience with working with maybe some of them or maybe from the patients that you attend to. Okay. What your experiences are and in your own observation or suggestion what could be the best way to help this project of maybe designing something that could bridge the gap for communication and service delivery for these patients in the rural communities.
But if Andrea had some. But generally that is the whole idea. But maybe as we discuss, other issues could maybe come up.
Okay. Yeah.
Doctor:
That's fine. Well, I think it's a nice project. I'll give you as much as I have to give.
Your questions are welcomed. Yeah.

Interviewers:
So, I don't know. What is your experience with most of these traditional beds attendance?
Doctor:
Okay. Well, TTH Tamil Teaching Hospital is a teaching hospital. It's like the bigger facility of all the hospitals we have in the northern sector of Ghana.
Yeah. So, it's very rare to have a bed attendant comfortably coming into the teaching hospital. If we find them coming here, then they have a very bad complication that they will have to surpass these smaller hospitals like the health centers and the district hospitals and just walk up here.
Okay. So, there's a system that usually works. Usually from the bed attendant, if they have to call on somebody to attend to them, the nearest place would be the health center.
Then from the health center, if they cannot handle it, they move to the district. If district cannot handle, move to regional. If regional cannot handle, then the teaching hospital comes in.
But it's just one or two of them who are bold enough to, you know, walk up into the teaching hospital and then bring their issues like that. So, yes, we've met them, but not directly because they know that this is a teaching hospital and a lot will be required of them. They don't have that confidence to, you know, boldly walk in and get it.
But, yes, more of these informations are captured in the health centers because they deal more with the traditional bed attendants.
Interviewers:
Okay. So, I have a question regarding that. So, if, let's say, there would be some incident in a remote area, then, hypothetically speaking, if there's some complication or something, it would get worse enough so that the TBA decides, okay, we need to hand this over to a local hospital.
And then, can it be that there's like this chain of referrals before they end up here? Or how does this usually, or is the triage at the regional, let's say, the first step often enough that if it's really severe, they directly refer to you?
Doctor:
Okay. So, most of these villages and communities, they don't have ambulances. So, if they have a complication, they will have to look for a facility that has an ambulance.
And that would be the district hospital.
Interviewers:
Okay.
Doctor:
And once they get there, if the district cannot handle it, they will quickly move them to the district hospital for us to handle. Okay. Yeah.
Interviewers:

So, maybe the few that you said boldly accompanied their patients to the teaching hospital, maybe there are a lot more that wish they could probably come forward like that.
Doctor:
Yeah.
Interviewers:
So, what do you think is stopping the challenge that they wouldn't want to come forward?
Doctor:
As I said, teaching hospital is a teaching hospital. We have a chain of doctors, residents, medical officers, consultants who would always want things to be done right. Okay.
Most of these traditional bed attendants, they don't really go according to how things are done, maybe because there haven't been a lot of checks on them. Okay. So, when they violate some of these protocols, and then they know that the woman's life is at risk, then they will take that bold step to bring the woman to the hospital themselves to ensure that everything is fine. Yes. But coming here to the teaching hospital would always demand a lot of information from them, which they are not able to answer to that. But regardless, once it's a maternal health that is involved, we sure don't want the woman to die or the baby to die.
So, we just get into it, but we still demand for information from them. Yes. So, that's how it has been with we and the traditional bed attendants.
Yeah, I think that communication gap can be breached. I mean, we can close up that gap. Yes.
If there's a way for us to create a platform, like a social platform, where we can have some of our educated midwives, experienced midwives, and then also have some of the TBAs on, so that if they have challenges, they can easily communicate onto that platform. Then we easily respond to them. Yes.
Otherwise, it's usually very difficult to actually, I mean, get a hold of them, because they are in their homes, they are in their communities. Until there is a retained placenta or there is a CPD, they are not stepping out. Even if when there's a CPD, they'll try as much as possible to deliver.
And when they deliver and they have a very bad PPH, then that is when you now think of bringing them here. Yeah. So it's very difficult.
I think if we can create that platform for us to be able to at least communicate and teach them some few things, so that they know when to immediately stop what they are doing, and then bring the patient to us to continue management.
Interviewers:
So would that be as a sort of a training, not in the emergency situations? Because now when you meet them or when they come here.
Doctor:



Okay. So for traditional birth attendants, I know at the district levels or the community levels, they go through some trainings. Yes.
Some of the midwives from the health centers, you know, try and meet up with them and teach them some few things. But of course, the literacy level is a bit lower. So they may not get up to the maximum information that they will need to handle situations, but the little that they get is what they used to do.
Yeah, things. So unfortunately, that is where the problem is. The literacy level of some of these birth attendants makes it very difficult for us to effectively teach them what they are supposed to know.
Interviewers:
Do you notice any culture or language barriers?
Doctor:
Oh, well, for us here, some of us have language barriers because we are not all from this part of the country. Yes, people are from different parts of the country and then they find themselves here working. So yes, there is sometimes language barrier, but those who are indigenous here, they are able to easily communicate with the people.
Yes, so very often we try to communicate with the people, with their own people, so that it makes it easy for us to send out information. But when that is not available, of course, communication also becomes a problem.
Interviewers:
I have a question. You mentioned that if the case, they are brave enough to come here, that you demand some information from them. Could you elaborate a bit about what kind of information this is?
Doctor:
Okay, so we know that some of these women that usually seek attention from these birth attendants, they don't really go through our normal antenatal services. We need that. They don't do scans.
We need that. They don't do some of these lab investigations that are basic for anyone attending antenatal clinic. We need all of that because, I mean, once you are going to examine someone and the person probably has an infection like HIV or Hep B, you cannot just easily touch the person.
You need to protect yourself. So all of these things are quite important, so we ask for all of those things. And then also, the follow-up visits.
We are supposed to be doing follow-up visits if a woman is pregnant and is attending the antenatal. All of these informations are really important for us as obstetricians here. So when they come like that and they are unable to give us the information, it makes it difficult to date the pregnancy currently because it could probably be a preterm we may be dealing with and we don't know.
It also makes it difficult for us to know whether the baby is normal or not because, I mean, we ask those scans. They are coming in just like that. Or



Doctor 6:

perhaps the baby was probably too big and they were just handling it because it was a pregnancy and the woman has to deliver.
So issues of PPH that occurs after a big delivery, we are not able to obtain that because they don't even have the skills to weigh the babies when they are even born. So some of these issues, some of these informations is what we need from them, but they don't have it. So we are not able to get all those informations.

Interviewers:
So if I understand you correctly, you are basically doing this investigation after the fact. You try to figure these things out afterwards or how do you usually do this?

Doctor:
How do we manage it? Well, once they come in an emergency situation, we very much ignore some of these things because it would be difficult to obtain those informations. Ours is to just try and save the woman's life.
Once the woman is stable, then we can retrospectively do some of these investigations and find out what the problem is. It's very difficult actually.

Interviewers:
Yeah, I can imagine.

Doctor:
It's very difficult, but eventually that's what happens.

Interviewers:
If they end up here, it is always an emergency.

Doctor:
We just have to save their life.

Interviewers:
And probably when they end up here, it's gone quite far already. Because otherwise they would have gone to a district hospital or a clinic.

Doctor:
Before it gets here, it means that it's really that bad. They cannot really handle it at their level.

Interviewers:
So in the ideal world, you want to give them the information so they don't end up here.

Doctor:
Ideally, yes, that should be it. We want them to be able to handle these little issues at their level. And for issues that are above them, like a pregnancy that has a previa, because they don't have scans to detect or pick up a previa.
So situations like that, we should be able to alert them that this is how it should be like. They should immediately bring the patient in and always time about it. Yes, so if we are able to equip them, I think it will really help in regards to patient management.

Interviewers:
I have a question. I have two questions. So if somebody comes in, is it usually only the patient then?
And then the TBA stays behind?

Doctor:
So ideally, when a referral is coming here, they need to be escorted by someone. A midwife, a nurse, a clinician, and in some cases TBAs. They are supposed to come with someone.
But very often we find the women coming on their own. And you ask them and we are told that they ask them to come here. And that's it, yes.
It's very few occasions that you find someone escorting them, like a TBA escorting them. But for those who are closer to us in the peripheries, we keep giving them the information that they're bringing in a case to have to be accompanied by a midwife because anything can happen on the way and all of that, yes. But for the TBAs, sometimes they can just say by word of mouth, please come to the teaching hospital and that's it.

Interviewers:
Yeah, okay. And is there ever the case that there's maybe like a telephone contact with a TBA, either after the woman has arrived here or maybe ahead of, before they refer?

Doctor:
So that is also another major problem because some of them don't even have cell phones to begin with, so getting in touch with them. And they ask the women to come here without even telling them that, oh, this is your number, you can contact us on this.

Interviewers:
So they have no...

Doctor:
It's not like that, just go and that's it.

Interviewers:
So you are on your own in that case.

Doctor:
Yes, basically on your own.

Interviewers:
If the referral comes through another hospital or clinic, how does that referral process look like? Is there also information sent along with the patient?

Doctor:
So when it's coming from our peripheral facilities in town, they are supposed to call us through our emergency line, which they all have. So they call, they inform us of the case, how far the case has been managed and what they think they cannot manage. And then we would also ask them to come with whatever things that we think they should come with, or we'll give them instructions on how to maintain the person in stability until they get here.
So they are supposed to always call us so that we can make preparations for them. So those around always call, they try to call us.

Interviewers:
If there's any data, it travels by paper or it all goes by phone?

Doctor:
Yes, so after the call, they'll have to write every other information on the paper. So all the other information that we need will be on the paper.
Unfortunately, sometimes they are not elaborate on the kind of information. Some of them are really elaborate, some it's just a scanty information, but we still have to work with that.

Interviewers:
Okay, and is there sometimes the case that you treat someone here and they get sent back to recover at home and that there's a handover back to TBA or that there's information given back to somebody?

Doctor:
Okay, so for us, before we allow them to go, we usually would want to counsel them and counsel them very well. As part of our counseling, we try to let them understand that it would be best if they continued or they do their visits in a proper health facility. Following the complication they had because if you've once had a complication, it's a higher risk for you to have that same complication the next time.
So that's always the counseling we like to give them so that they don't end up with a TBA again and then going through a bad experience. But then we still have to try and get word to the TBA, which is always difficult. So the nearest place would be the health center.
And if they have health promotional programs that they do, like going into the communities or gathering the TBAs to educate them, they can do that on their level.

Interviewers:
Yeah, okay.

Doctor:
That's what we do.

Interviewers:
And do people often take this counseling too hard? Or is it the case that they sometimes...

Doctor:
Unfortunately, a few of them do. Some don't because they don't have the financial capacity to visit health centers. They prefer to continue with their TBA, which is very economical and comfortable.
So some hear to it, some don't. Okay.

Interviewers:
If a woman comes by herself, is there a way to find out if she worked with a TBA, what she was administered?

Doctor:
Yes, we usually ask them. That is, those who are stable enough to communicate. Or if they came with relatives, we'll ask them, what were you given?
Were you given some drugs? Some of them are actually given local drugs to induce labor and help them deliver and all of those things. So we ask all those questions.
If the woman is not stable enough, we'll have to ask relatives. If those informations are still not gotten, we'll try and still stabilize the woman and then ask retrospectively what was done for you, what did they give you, all of those things, yes.

Interviewers:
Do you think if there was a platform where TBAs and health care workers work together or communicate, that it would be easier to transmit that information?

Doctor:
Yes, if we have platforms like that and if the midwives or health care providers are able to earn the trust of the traditional birth attendant and they don't feel like they are being intimidated, yes, it will make the communication very easy. Because some of these birth attendants are actually seen as doctors or surgeons to their people around. So if there's someone who has a certificate to operate on a larger scale or in a higher institution, comes and is now beginning to direct your ways and all of that, they feel intimidated.
So we need to be able to ensure that they have won their trust. Then we can put them up on a platform and make communication easy for them.

Interviewers:
And how do you think it's the easiest to earn their trust? Is it to go by in person?

Doctor:
Yes, go in person and keep doing the talking. I think that would be the best way. If the midwives in those various communities are able to reach out to these birth attendants, create a relationship with them, keep communicating with them and trying to teach them and not make them feel intimidated. Once they are able to establish that, it will be easy for them to always lay ears with them. There are a few of them who would always understand. And then if they have challenges, they will always contact their health care provider or the midwives or whoever.
It can be done.

Interviewers:
And do you think that, let's say, maybe that's less the case here, but at the other clinics or at other hospitals, there is enough capacity or that there is enough being done to reach out to these TBAs?

Doctor:

Doctor 6:

Well, I think they are trying their best at their level because, of course, you need human resources to do that. And most of these rural communities don't have enough of the health care workers over there. So if they are stocked up with enough human resources, definitely they can do it.

If you have more hands, other institutions teaming up with them to organize some of these campaigns and talking to these birth attendants, it can work out. They just need more numbers so that they can do it. Because you can go to a facility and there are just two midwives running most of the services there.

And that same midwife is expected to go to the community. It's terrible. Meanwhile, they are taking the same income as their colleagues who are here, and they have numbers.

So they will need more hands to be able to effectively do that.

Interviewers:

And do you think that there is financial capacity in the system to get these hands? Or is that difficult?

Doctor:

At their level, I don't think so. Because they are dealing with low-income NS over there. So it's not like they will get a lot of money to stock up their IGF and also be able to do something for the community.

It will be very difficult at their level. So they will need that financial capacity too.

Interviewers:

When you studied to become a doctor, are you taught about the TBAs and the traditional workers as well and how to approach them or work with them?

Doctor:

Please come again.

Interviewers:

Is it something you learn when you do the study? When we are studying how to communicate with them?

Doctor:

Yes, it's part of our entire program. As part of our program, we do field research and all of that. We go into the communities and we take information, data, we interact, and whatever outcomes we get, we are able to use that to give back to the people what they should do.

So it's part of our training program. You need to learn it as a doctor.

Interviewers:

I think one of the challenges I've observed is that the whole community knows these TBAs that are living around them and the patients as well. But it has appeared only people who don't know them are the conventional doctors like yourself in the communities. So I think that is where there's already a gap in identifying these TBAs in the communities and profiling them to know where they are and what they do.

Challenges

Identifying TBAs

And in case there are emergencies or there are patients coming in with some form of information, okay, we're coming from this community and maybe we have visited a TBA already that could already give you the idea of who this TBA is and how to probably reach out to that particular TBA in a situation where you are not getting enough information from the patient or the relatives that brings this case to you. So I think maybe identifying these TBAs and then making it public and information available for you to easily reach out or access information from these TBAs within the communities, I think, I don't know whether that would be a way of bridging.

Doctor:

Yes, in fact, what you have said is very true. Identifying these TBAs is difficult because they are not open to health workers. They are open to the people in the community.

So unless someone in the community tells you that there's a bed attendant here who lives here, you are not going to know who that person is. So yes, if there's a way for us to get them out, get them together and then probably introduce them to whichever health facility is closer to them so that we can have contact if they have any and then be communicating with them. If that can be done, it will really help with the work.

If not, it is very much impossible.

Interviewers:

Because with the little interviews I've had with some of them in the communities around Myanmar, all of them do it like they used to work very closely with one midwife that was posted in the community some time back. And the midwife actually took the step to identify or visit them in the community.

[]

Interviewers:

Health workers. So I think from both sides, there's that interest of getting to work together which is a good sign of a possible integration, or more or less like coming out with protocols that would enhance the services of this because at the end of the day, they are those that give you most of the information about the clients that you need. These are the very clients that also come with serious complications that are very, sometimes they lose lives in those situations.

So I don't know, this leads to my question, whether there are a set of protocols already in place to train these TBAs because you made mention about if they see a particular scenario, they shouldn't even start to attend to such, they should immediately. But are there, what do you call it, institutionalized protocols that are in place to address this?

Doctor:

The public health sectors of every facility is responsible for some of these health educations and then the trainings and stuff. And I think it's been decentralized. Okay, so for community centers, they should also have a set of guidelines to be able to communicate with these birth attendants and then teach them what they need to know, yes.

What I know is that the teaching is according to the issues they encounter.

Yeah, so if maybe within a particular period, they are encountering a particular health condition that is consistent and posing a risk to the lives of the people, then they will have to intervene with their primary prevention, okay, by educating the people and teaching them what to do so that at least you have set in your primary prevention, then your secondary prevention, which is usually done in the health facilities, reduces in number, yes. So yes, there are guidelines like that that guides most of the health facilities around to reach out to the people in the community situations like that, yes, or even to the birth attendants when it becomes, or when a particular health condition becomes a high risk to the community, yeah.

Interviewers:

Okay, because I see that from the facilities at the primary health care level, I'm seeing that the chiefs and the clinics, they refer to the district, the district refers to the regional, regional, so there's that form.

Doctor:

There's always a chain, yeah.

Interviewers:

But then the chain breaks at the clinic level, and then you leave the.

Doctor:

Sometimes it breaks, it breaks because of finances, because anytime the people hear that they are going to be kept in an ambulance, then it's like, no, we don't have money, we cannot go there, like, we don't have money, we spend so much, so there's always a point where it usually ends, yes, and it usually would end at, especially in the other districts, it would just end there just because of finances, yeah. So we really need to be able to keep the chain going, otherwise we'll have a lot of backlog of issues down there, yeah, we'll have a lot of problems.

Interviewers:

Because between the TBAs and then the next nearest facility, there's no form of transfer protocol. As you just said, it's by word of mouth.

Doctor:

Yes, it's by word of mouth. Yes, so ideally, as we just mentioned, they should create that relationship, yes, especially the midwives, because these TBs are known, they are family to the community, but midwives and other healthcare workers are not known. They are being transferred from somewhere to the community, so they'll be seen as strangers.

And of course, if you're a stranger, it'll be difficult for people to approach you. So they'll need to actually make themselves available and be able to earn the trust of these TBAs. Then it makes it easy to penetrate into the affairs of the community.

Otherwise, I don't see how they can make it work. It'll be difficult.

Interviewers:

I have maybe a bit of a broad question, but let's say if we imagine, let's say, an ideal state of communication and collaboration between the TBAs and let's say the formal education system, given the, of course, the constraints that are in place, how would you see the division of roles and responsibilities between, let's say, the nurses and the formal systems and the TBA?

Doctor:

Okay, I'm not getting your question right.

Interviewers:

It's a bit broad. Let's say, you know, all the communication programs will be gone. And the formal, let's say the nurses are in regular contact with the TBAs. Okay, what would be the role? This is all working well, but what would then be the role of the TBA and what would be the role of the nurse and what would be their responsibilities?

Doctor:

Okay, so the TBA will basically be doing some of the role of the nurse. That's especially for, let's say, for instance, with antenatal visits and stuff like that. If the people are not comfortable visiting the health center, if it comes to palpations and checking to see their pregnancy is right, TBAs should be able to do all of those things and get those informations back to the health facility.

That's, I mean, these women, I've seen this number of women, they are not okay coming to the facility, but these are the informations I think we should keep in record so that we can follow up in case of a problem. Okay, so yes, they will be taking up some of the roles the nurses do. And when it becomes difficult, then they can migrate for the midwives to, you know, take over.

So yes, things like antenatal visits, they can handle. But things like administration of drugs, they cannot handle. At that point, they will have to move the patient to advise the patient to come and see a nurse because you need your tetanus, you need your SP, you need your folic acid, so and so.

Yes, so for those ones, they will have to know that midwife will have to handle it.

Interviewers:

Yeah, and do you think that this, if they would have these sort of TBAs to take over, let's say, the easy, regular part, do you think it would require a lot of training to the TBAs to be up to the level, to be able to do that? Or can they already do that in general?

Doctor:

Some of them already do it. Some of them, some of them are old in the system, so they know some of the drugs that are given to the pregnant women. So some of them have a chunk of drugs that they give.

TBA-SBA collabor...

Clear division of t...

TBA training

Doctor 6:

We don't know whether they are the right drugs they are actually giving, or they are giving it in the right doses. Yes, so some of them actually know how to do it, so it will not be much of a problem. What will be a problem is maybe if the route of administration of a drug is not oral, they are doing it on IM or an IV, even that one, they cannot do it.

So if a pregnant woman has malaria, of course the TBA cannot handle that, it has to come to the facility.

Interviewers:

Yeah, so it will, the training will probably, and the communication will need to support which criteria to know when to... Identifying when the complications are too much.

Doctor:

Exactly, if they attend to the woman, and after assessing, that is, if the TBA attends the women, and after assessing, they think that the woman is too sick, and cannot be taken care of at home, they should immediately be able to prompt them to move to the hospital.

Yes, and that communication can be done straightly if they have a contact of a midwife, or I've seen a case, like there's a woman that's in fever, she's been vomiting, having diarrhea, having a fever, I think that she may just be unwell, so I want to bring her to the first meeting. And yes, the midwife picks it up from there.

Interviewers:

Yeah.

Doctor:

It will make the work very easy.

Interviewers:

Okay. And do you think if there would be some kind of, let's say, first experimental system, or first version of it, that the nurses have enough time to, well, work with it? Or do you think that they are so over-committed that it will require, let's say, new hires from somewhere to work with that?

Doctor:

So, you're saying if they will have to hire people to help them do that for you?

Interviewers:

Yeah, do you think that, well, let's say, nurses would have enough time in their work pressure to, well, handle it? Because it will be probably extra load if they would get, like, regular calls from the TBAs to ask things, and...

Doctor:

Well, they should have the time, because they are the superheroes of the community.

So, with the kindness of how difficult it may be, I mean, some of them work around the clock, and I must applaud them. I believe they'll be able to do it.

Okay.

Yes, it's difficult, but yes, it's their duty.

Interviewers:

Okay. All right. Any more?

Doctor:

Okay, so my work here is done. Yeah. Thank you.

Thank you. Thank you so much.

Interviewers:

Thank you. Thank you so much for your time.

Interviewers:

Sure, sure, sure.

Interviewers:

You're a busy, busy..

Doctor:

I know. So busy.

Interviewers:

Is this the end of your working day, or do you have some more?

Doctor:

No, no, no, I'm done for today.

Yes. A couple of moments. I haven't seen all day, unfortunately.

Interviewers:

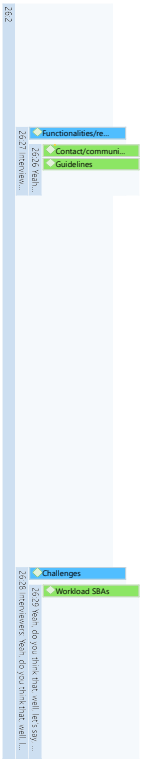
Okay. Thank you. Thank you so much.

Doctor:

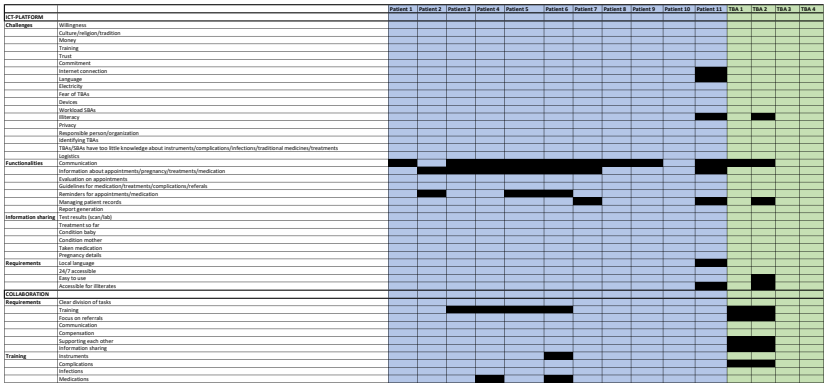
It was nice meeting all of you. It was nice to meet you.

Interviewers:

Thank you so much for your time. Okay.



7.5 Overview interviews



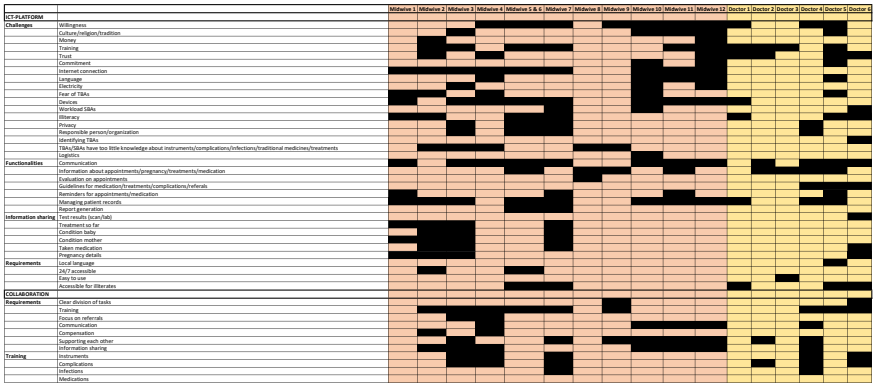


Figure 15: Overview interviews