

UNIVERSITY OF GHANA
SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES



**PERCEIVED MOBILE HEALTH TECHNOLOGY USE AMONG LITERATE PRE AND
POST NATAL ATTENDANTS AT THE COMMUNITY-BASED HEALTH PLANNING
AND SERVICES CENTRES IN DODOWA**

BY
AMOAH BERNICE
(11366297)

**THIS DESERTATION IS SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH IN
PARTIAL FULFILMENT OF THE REQUIREMENT OF THE AWARD OF MASTER OF
PUBLIC HEALTH (MPH) DEGREE**

MARCH 2025

DECLARATION

I, Amoah Bernice hereby declare that apart from specific references made which have been duly acknowledged, this research proposal is my own independent work undertaken under the supervision of Dr. Kwaku Asah-Opoku and I also declare that no part of this proposal has been submitted for the award of any degree in this University or any University elsewhere.



23/09/2025

AMOAHERNICE
(STUDENT)

Date



25/09/2025

DR. KWAKU ASAH-OPOKU
(SUPERVISOR)

Date



CERTIFICATION

I hereby certify that the dissertation was supervised in accordance with procedures laid down by the University of Ghana.



25/09/2025

DR. KWAKU ASAH-OPOKU

Date

(SUPERVISOR)



DEDICATION

I dedicate this work to the Almighty God for the inspiration and strength i needed to go through the entire research work. To my darling and supportive husband; Mr. Kwame Ntim Pipim and to my lovely children, Bright Maurice Amoah Pipim, Nana Ama Frempomaa Pipim, Barima Kwadwo Agyemang Pipim and Nhyiraba Ntimmaa Pipim.

God richly bless you all.



ACKNOWLEDGEMENT

My foremost appreciation goes to God Almighty by whose grace i am alive. I wish to express my gratitude to my husband, family and friends for their understanding, especially for the time i was away from them in pursuance of this programme. I thank all the lecturers who facilitated my studies at the University of Ghana, School of Public health.

I acknowledge all my respondents for their time and input during the interview sessions. I also wish to express my profound gratitude to my supervisor, Dr. Kwaku Asah-Opoku for his dedicated support and guidance in the conduct of this study.



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LIST OF ABBREVIATIONS

ANC	-	Antenatal Care
BPCR	-	Birth Preparedness and Complication Readiness
CHFP	-	Community Health and Family Planning
CHN	-	Community Health Nurse
CHO	-	Community Health Officer
CHPS	-	Community Health-based Planning and Services
DHMT	-	District Health Management Team
GEHIP	-	Ghana Essential Health Intervention Program
GHS	-	Ghana Health Service
ICT	-	Information and Communication Technology
ILO	-	International Labour Organization
NHIS	-	National Health Insurance Scheme
NHRC	-	Navrongo Health Research Centre
SDGs	-	Sustainable Development Goals
SMS	-	Short Message Service
UHAS	-	University of Health and Allied Science
UNFPA	-	United Nations Population Fund
USAID	-	United States Agency for International Development
WHO	-	World Health Organisation



ABSTRACT

Background

Mobile phone technology use in Ghana has advanced, reaching deprived and remote areas. The basic functionalities of smart phones with regards to social media, audio and video call are well comprehended by both illiterates and literates. There is the need to reduce primary health care access gap by reaching the unreached to complement the traditional Community Health-base Planning and Services (CHPS) concept to improve pre-and post-natal care with mobile technology.

General Objective

This study aimed to investigate the potential use of mobile health in the delivery of health services at Dodowa CHPS based on the perception of service providers and service beneficiaries.

Methodology

A qualitative research approach was adopted, using focus group discussion and in-depth interview to obtain data from twelve (12) pre-and postnatal attendants and five (5) health personnel. Data was gathered and analysed, engaging Creswell and Poth (2018) six steps thematic analysis.

Results

The findings of the study show that, all the participants considered mobile health technology use in health service delivery as good and effective. Even though, respondents perceived smartphone and data as expensive, however, proximity, reduced stress and convenience were outstanding.

Conclusion

The health care providers as well as pre- and postnatal literate attendants embraced the use of mobile technology in service delivery. The study indicated that amongst the social media applications, WhatsApp platform was much more popular and known for dissemination of information on health care services.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Technology has become the main stay with respect to advancement of different industries, economies, countries and fields. In terms of cheap technological sources, mobile devices have become one of the strategies for addressing health care in Africa and other developed countries (Pillay and Motsoaledi, 2018). The use of mobile health technology has generally seen a sharp increase in the world. Even though, usage in the world has seen an upsurge, the level of sophistication of the mobile health technology may differ. These may include actual mobile health apps to innovative use of existing mobile phone tools in the delivery of health services. The versatility of mobile health technology in terms of its varied application across different aspects of health care delivery is worth mentioning. The mobile health technology has been used to improve health and wellbeing outcomes in areas such as prevention of communicable diseases, maternal mortality, treatment adherence and immunization rates (Kruse et al., 2019).

Mobile health technology has become essential to both developed and developing economies. It enhances the delivery of health services and administration in diverse ways. It improves the speed, efficiency, coverage and simplicity with which health care is delivered. In a study involving systematic review of mobile health studies in developing countries, Kruse et al (2019), found that the most significant and specific areas of health improved through mobile health were infectious diseases and maternal health. The study also found that the specific and most used mobile health (mHealth) technology was short message service (SMS). The study also found the major barriers of mobile health technology as infrastructure, lack of equipment and technology gap. Ghana has seen and continues to experience massive growth in the cellular phone industry. The use of cell

phone (smartphone) in Ghana has almost become universal as both the rich, poor, adult and young turns to own and use them. The mobile phone usage penetration has increased among rural stakeholders i.e., rural smallholder farmers in Ghana (Awuku et al., 2023). There is widespread ownership and use of phone in Ghana that has become more or less integrated into users' social fabric. The use of these smart phones, especially the basic functionalities with regards to text / SMS, video call and social media (especially, TikTok and WhatsApp) are well comprehended by both illiterate and literates. Whiles community-based health planning and services remains the main driver of primary care delivery in Ghana, it continues to be under resourced. The mode of operation of the CHPS center has fundamentally been the use of volunteers, community-based nurses and community engagement (Adusei et al,2024). The Ghana Health Service presented a total number of 875 maternal death in 2018 and 838 in 2019 and there was a further decrease to 776 in 2020. The neonatal mortality rate (NMR) is 28 deaths per 1000 live births. The NMR in the poor homes is 32 neonatal deaths per 1000 live births and this is 1.3 times higher in the rich homes (UNICEF, 2014). Consequently, health disparities exist between rural environments and urban slum areas regarding how these groups pursue healthcare. Understanding the health-seeking behavior of rural-urban migrant slum residents is essential not only for promoting their well-being but also for ensuring that health services are provided based on their needs.

In Sub-Sahara Africa including Ghana, 1 in 16 women is likely to die as a result of pregnancy and childbirth (Feroz et al, 2017). The neonatal mortality rate (NMR) is 28 deaths per 1000 live births (UNICEF,2014). The Community Health-base Planning and Services (CHPS) initiative, aimed at reaching underserved communities, has become a vital aspect of the current Five-Year Work Plan of the Ghana Health Service, which is a key element in the national strategy for reducing poverty. This initiative targets impoverished and isolated regions within rural districts, aiming to enhance

the primary healthcare system by implementing a program that utilizes mobile community health providers. The mobile nurses in Dodowa even though in rural area practice urban CHPS where community health nurses carry fully equipped home visit bags to houses to render service (health education, immunization campaign and reminders of next appointment

1.2 Problem Statement

The idea of getting basic or primary healthcare to the periphery of Ghana and rural environs principally was the main driver for the establishment of the community-based health planning and services centers (Awoonor-Williams, Koku & Philips, 2022). The CHPS center approach to rural and community level health care delivery was slightly difficult. There were series of piloting, community engagements and research that ensured the assessment of various options and strategies for effective rural health delivery with respect to operations, implementation (logistics), resources and sustainability (Adjei et al., 2002). The lack of or inadequate use of smart technology to bridge gaps in resource inadequacy that hinders efficient work coverage of CHPS activities. This identified research gap is partly supported by CHPS+ work (Kweku et al., 2020) that suggested key issues of resource inadequacy and proximity factors as hindering the CHPS. According to (Awuku et al., 2023) however, there is wide spread and use of mobile phones in Ghana. The current research therefore intends to leverage on the available smart phone ownership to virtually reduce or bridge the resource and proximity constraints using basic phone apps and functionality. Hence, the study intends to develop an approach where basic smart phone technology can be used to undertake CHPS activities in rural and peri-urban locations to complement the traditional CHPS model. This study, therefore will empirically test the feasibility of leveraging fundamental mobile phone functionality in Dodowa (peri-urban location in Accra).

The relevance of the study is that it is intended to result in cost effective means to create enhanced access to health services for mothers, thus complementing the few CHPS centres and low staff numbers.

1.3 Objectives of the Study

1.3.1. General Objective

To investigate the perceived use of mobile health technology in the delivery of health services at Dodowa CHPS based on service providers and beneficiaries respectively.

1.3.2. Specific Objectives

- To assess client perception on the usage of mobile health in healthcare delivery at Dodowa CHPS zones.
- To identify the drivers for deploying mobile health technology in Dodowa CHPS zones.
- To identify the perceived barriers to the implementation of mobile health care among literate pre-natal and postnatal attendants at the CHPS Centers in Dodowa.

1.4 Research Questions

- What is the participants perception on the usage of technology to deliver health services?
- What are the various ways by which mobile phone functionalities can be deployed in health care delivery?
- What are the potential challenges to the implementation of mobile health technology in the delivery of health services?

1.5 Justification of the Study

Since the implementation of the CHPS in 1999 and being a national strategy to render an essential community-based health services in communities calls for regular remediation for its continuous improvement. Pursuant to the above, a major study to improve the CHPS approach of 1999 culminated into the CHPS+ (2017) that was expected to improve the community health delivery of CHPS in Ghana (Kweku, et al., 2020). Their research resulted from the national initiative aimed at strengthening the execution of the CHPS program in Ghana, thus the CHPS+. Some of the key setbacks or challenges enumerated included inadequate funding, non-availability of essential logistics and distant proximity of CHPS compounds from communities. The recommendation of the CHPS+ initiative was not explicit on the capacitation and use of technology to enhance and bring potential efficiency in the work of CHPS implementation in the face of scarce resources and current opportunity presented by mobile technology and its high use in Ghana. This research seeks to ascertain how this technology gap may potentially be converted into opportunity to improve community and rural basic health delivery based on the perspectives of key stakeholders of CHPS (community health workers and pre & post-natal young mothers). These research participants were chosen because they form the key stakeholders in the service provider and customer orientation as far as CHPS is concerned.

Despite few studies that investigated availability and use of mobile health technology in Ghanaian health facilities, their findings demonstrated very low use of mobile health at the rural community clinics (Osei et al., 2021). As part of their research recommendation, Osei et al., (2021), made the call for Ghanaian policy makers to encourage and promote the implementation of mobile health in rural clinics. Hence, this research seeks to investigate the viability of such a proposal in Dodowa.

1.5 Organization of the Study

The research will be divided into five principal chapters. The first chapter will include the study's background, the problem statement, the rationale for the study, and the research objectives. The second chapter will examine the literature related to the topics being studied and the theoretical framework. The methodology will be detailed in the third chapter. Chapter four will present and discuss the study's findings. Finally, chapter five will summarize the results, draw conclusions, and propose recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This part of the study discusses an overview of previously conducted studies related to the topic. As pointed out by Ago-Nortey (2018), a literature review offers a summary of what is known and unknown about the research area, incorporating all previous studies. The review will be organized into themes that outline community-based health planning and services in Ghana, the use of mobile health technology in healthcare delivery, the advantages of mobile health technology for service provision, the factors motivating mobile health technology's integration, and the theoretical framework involved.

2.1 Overview of Community-Based Health Planning and Services in Ghana

There has been an upgrading strategy in achievement of Sustainable Development Goals (SDGs) 2030 agenda by all countries globally. However, inadequate services delivery initiatives persisting in low-income and middle-income economies would reduce the focus in achieving these goals. (Sumankuuro, 2018). CHPS in Ghana looks forward to gain a universal primary health care. The CHPS program in Ghana aims to shift primary healthcare from health centers in sub-districts to more accessible community locations. The process of reorganizing the CHPS program depends on community resources for labor, service provision, and program management. According to the WHO (2017), preventable issues like severe hemorrhage, unsafe abortions, infections, pre-eclampsia, and complications during childbirth account for 75% of maternal fatalities. In Ghana, a remarkable 65% of maternal deaths occur for similar reasons.

The United Nations Population Fund indicates that the incidence of maternal fatalities and unsafe abortions in Ghana could drop by 90% if expectant mothers had quick access to emergency health services (UNICEF, 2014). In 2015, the Sustainable Development Goals established new objectives to lower the maternal mortality rate to under 70 per 100,000 live births and to eliminate preventable deaths among newborns by the year 2030.

Hoyler et al (2014) suggest that successful antenatal education and effective management of referrals, along with the presence of well-trained healthcare professionals during both typical births and those that have complications, help promote necessary measures. However, various social, economic, and cultural influences can affect the use of antenatal care (ANC) and the implementation of birth preparedness and complication readiness (BPCR). Moreover, the quality of care available is important; when healthcare facilities have suitable surgical equipment and blood transfusion services, the preference for facility-based childbirth is likely to increase. In 2004, Ghana introduced an innovative decentralized health program to tackle issues related to the use of skilled birth attendants (SBAs). This program focused on upgrading the abilities of community health nurses (CHNs) to community health officers (CHOs) by providing training in basic midwifery. The goal of this initiative was to prepare CHNs with essential skills to handle labor and delivery emergencies.

According to USAID (2020), 90% of quality health services that ensure the wellbeing of individuals in the world is Primary Health Care which is basic health services to all communities. Childhood mortality is 40% higher in communities that are over 5 kilometers from the nearest subdistrict or district health facilities. The Ghana Community-Based Health Planning and Services initiative builds on a pilot study from the Navrongo Health Research Center (NHRC), evolving it

into a program designed to enhance access, efficiency, and quality in health and family planning (Nyonator et al, 2005).

CHPS is a national initiative in Ghana aimed at shifting and redesigning primary health care, taking it from sub-district health centers to easily reachable community areas. The process of changing the CHPS organization depends on community resources for building, service delivery, and program management. In 1992, an internal review addressed issues concerning the dependence on volunteers who were compensated based on medicine sales. It became clear that community health workers integrated into the formal health system, earning regular salaries and having received formal training as community health nurses, were more likely to succeed (Elsey, 2023). This understanding led to the Navrongo Community Health and Family Planning Project (CHFP), which involved reassigning known community health nurses from their original positions to live and work within the community, taking charge of a larger population. This encouraged policymakers and researchers to explore the project's potential, emphasizing the importance of thorough evaluation. It ensured that research was a fundamental part of the design, implementation, and assessment phases of CHFP, which became widely recognized as the “Navrongo Experiment”.

The CHPS started in 1994 scheming to minimize the barriers of geographical access to health service delivery. Nurses were assigned to CHPS in the rural areas in Ghana to run a door-to-door service. This initiative was really effective involving community engagement and participation in service delivery, sustaining volunteerism and community health actions (Abboah-Offei et al, 2021). CHPS strives towards the utmost goal of Universal Health Coverage. The use of traditional institutions and community resources is essential for organizing and encouraging communities to offer “doorstep” services, including preventive care, family planning, and immunization (Woode,

2013). The strategies of the Navrongo Experiment proved to be effective, significantly enhancing the impact of primary health care, particularly in relation to child mortality rates and fertility measures (Pence et al, 2001). Many communities valued the establishment of compounds, which served not only as sites for outreach and primary care but also as housing for community health nurses. The successful replication of CHPS strategies in Nkwanta in 1998 led to CHPS being established as a national policy in 1999, with implementation across all regions of Ghana beginning in 2000. Navrongo and Nkwanta served as models for this scaling-up effort (Awoonor-Williams et al, 2022). The main characteristics of the Navrongo and Nkwanta pilot programs continue to be relevant, as Community Health Officers (CHOs), who are trained nurses, collaborate closely with local volunteers. An important approach for effectively launching the CHPS involved the inclusion of traditional leaders to secure support for the CHPS idea. In this rural area, communities were generous in providing land, aimed at encouraging more community involvement and mobilizing volunteers. This effort was first directed at building a CHPS center and then at aiding the delivery of health services (Nwememe et al, 2018). Health services rendered by the CHOs include health education, immunizations, household visits for antenatal and postnatal attendants, child welfare services, family planning services, outreach clinics, and supervising delivery, antenatal/postnatal care, supporting people with chronic non communicable diseases on their management regimen and treating of minor ailments (Koyaara et al, 2024). There are volunteers supporting the community health officers by assisting with community mobilization, the maintenance of community registers and other essential activities initiating health services. Workshops that provide training for CHOs are designed to enhance fundamental clinical and midwifery skills while also improving communication, negotiation, and counseling abilities (Nyanchoka et al, 2024). The insights gained from the evidence-driven aspects of CHPS are crucial

for the advancement of primary health care to meet the evolving needs in Ghana and elsewhere. Recent literature has highlighted the need to expand the CHPS coverage program. Studies conducted at a national level show that from 2009 to 2011, the number of active CHPS facilities surged from 868 to 1675.

The Policy, Planning, Monitoring and Evaluation Division of the Ghana Health Service has established a system to monitor data collected from all 110 District Health Management Teams (DHMTs) regarding the implementation of Community-based Health Planning and Services (CHPS). This system helps to evaluate progress at the district level. The information is gathered and analyzed every three months, then sent electronically to each district, featuring maps that illustrate CHPS coverage across Ghana. The outcomes of the monitoring and evaluation show both advancements and challenges with the CHPS program (Nwememe et al, 2018).

CHPS+ of Ghana Health Service (GHS) carried out a project in collaboration with the Mailman School of Public Health of Columbia University, USA, the University of Health and Allied Sciences, the University of Ghana's Regional Institute of Population Studies, Ghana, School of Public Health, and the University for Development Studies. CHPS+ initiative was scale up of the Ghana Essential Health Interventions Programme (GEHIP) which was piloted within three administrative districts in Upper East Region, Ghana. The piloting was successful which led to another scale up to cover more regions in Ghana. This led to the name CHPS PLUS (CHPS+), (Philips et al, 2018). The current research, part of the CHPS+ project, is led by the University of Health and Allied Sciences (UHAS) with the aim of enhancing the skills of front-line health staff in the Volta Region through both short and long training sessions. To achieve this, it was essential to carry out exploratory research to identify the training needs of these health workers. The CHPS+ initiative in the Volta Region primarily focused on two selected administrative districts: Nkwanta

South and Central Tongu, designated as ‘Systems Learning Districts’ by the Volta Regional Health Directorate (VRHD) (Kweku et al, 2020). Established in 2011 through Act 828 by the Parliament of Ghana, UHAS began its operations in 2012. It was chosen for the project due to its emphasis on problem-based learning, which is vital for the success of CHPS+. The Volta Region was also selected because it had the highest rates of under-five mortality (61 per 1000) and fertility (4. 8) in Ghana (Awoonor-Williams et al, 2013). UHAS's involvement in the CHPS+ project consisted of three implementation phases. The results from this study informed the second phase, which involved researching the capacity development and training needs of front-line health workers (CHOs, sub-district staff and district staff) and engaging with various stakeholders in the Systems Learning Districts (UHAS, 2018).

Challenges in the Implementation of CHPS

CHPS was launched in some district, implementing it across districts became a challenge and ineffective despite its strength and important findings made in the Navrongo and Nkwanta experience. The availability of requisite resources was found to provide solid funding for CHPS. There districts were geographic distributed by completing six CHPS implementation milestones in March 2003, constructing CHO postings in few pilot communities (Koyaara et al, 2024). For the continued successful implementation and expansion of CHPS, it will be necessary to enhance health financing strategies, reassess service delivery in response to pandemics, address the growing rates of non-communicable diseases, and adjust to the shifting needs of the community (Else et al., 2023).

The International Labor Organization (ILO) reports that nearly 1. 3 billion individuals cannot access quality and affordable healthcare in rural regions. In contrast, around 170 million individuals are forced to allocate more than 40% of their income to medical expenses. Basic

healthcare facilities are primarily designed to serve the most disadvantaged populations in numerous countries (Nyanchoka et al, 2024). Residents in these regions often face a higher burden of illnesses because resources are either insufficient or of poor quality due to limited funding and the inability to address health emergencies that need advanced technologies and care levels. Health institutions that serve the majority of the population with accessible healthcare services can be seen as providing the appropriate items in the right amounts, in suitable conditions, delivered to the correct locations, on time, and at reasonable costs, which fulfill the needs of clients (Nyaaba et al, 2020). There are gaps in health resource globally, which hinders the Universal Health Care. A study found that gap in service quality, financial protection, inadequate coverage of services, inequitable access, high out-of-pocket payment, and workforce challenges (Elseiy et al, 2023).

Sambo and Kirigia (2011), in their study also indicate that in Africa, about 56% of countries have fewer than eleven health posts per 100,000 populations and over 70% having fewer health centers, district hospitals, regional hospitals, and tertiary facilities. In 2018, a nationwide effort to categorize "non-functional" CHPS zones took place. According to the Oxford Business Group, health services that involve community participation tend to be more effective than those provided by the formal healthcare sector. CHPS zones in Ghana were grouped as non-functional when CHPS compounds were found to be less active and health staffs and equipment were not available (GHS, 2019). This was common particularly in remote rural areas, with the North East and Northern regions having only 22. Urban areas were also not adopting, for example Greater Accra region only had 672 zones out of 834 zones functioning and only 539 of them had basic equipment. The challenges to implementation of CHPS initiative remains in Ghana especially in the urban and remote rural areas where these aspects are hard to fulfill. The gaps concerning Infrastructural includes ability to provide 24-hours services, shortage of medicines, poor infection prevention and

control measures as well as lack of running water and electricity which are common health resource constraints in sub-Saharan Africa (Elseiy et al, 2023). Donor funding has decreased due to transitions among donors. This situation has worsened the financial difficulties faced in implementing CHPS, resulting in the Government of Ghana's budget for primary health care and CHPS being inadequate. Only a handful of nations on the continent are achieving the 15% target for government health spending set in the Abuja Declaration of 2001; these difficulties are widespread. The shortfall in government funding is pushing CHPS to depend more on funds generated internally through the NHIS, personal payments, and resources from specific programs and projects. Each of these funding sources poses significant challenges for a robust health system led by primary health care, with personal payments limiting access to care and focused programs tending to prioritize certain diseases rather than addressing the comprehensive needs of patients in various regions, including isolated rural and urban areas.

Grouping challenges of CHPS implementation looks at Health worker-based, Community-based and Health systems-based. Health, worker-based challenges are challenges at the side of frontline health workers in their delivering of services in the communities through CHPS. The challenges include negative attitude of health nurses, limited staff (CHOS/CHNs) at post when needed and their delaying in the referring process. The required CHOs per CHPS zone should be two but they are at times burden with work load which more hands were needed to render a fulfilling service outcome. Nurses who stay out of the community are hard to reach especially during out of work hours such as weekend and night to give care to the community members (Kweku et al., 2020).

Community-based challenges are the problems at the community level that reduces the efficient of CHPS implementation. The main challenges identified in the community were community acceptance and involvement in the CHPS programs. Health systems-based challenges occurred

contributed to the less effectiveness of CHPS implementation. These includes poor community entry and engagement, low supply of needed logistics to render services, proximity to the CHPS Compound, late referrals and lack of resources. Referral at the lower level were usually done late resulting to the occurrence of patient complications before it got to the next level of health systems for continuity of care.

2.2 Benefits of Mobile Health Technology in the Delivery of Health Services

In developing countries, heightening network coverage and reclining cost provide a wide range of possibilities for mobile phone users and other telecommunication. These possibilities can also be lengthened to the utilizers of mHealth technologies in the delivery of healthcare. The use of mHealth services has the prospective to increase health education, prevent disease and increase interventions for health promotion, (Aranda-Jan et al., 2014). The huge population acquired in the use of mobile phones compared to the computers and the internet was due to its portability and data transmission (Mitchell et al (2011). Telecommunication technologies contribute to the reduction of time, distance and the cost of information delivery which have enable health service providers to deliver cost-effective services, offering solutions for healthcare systems challenge such as inadequate finances, scarce resources, poor health information systems (Aranda-Jan et al., 2014). Mobile health technology effectively monitors the health of users, offers medical information, maintains health-related records, and supports medical decision-making. Research has indicated that mobile health influences user behavior regarding health, such as exercise, nutrition, alcohol consumption, sexual habits, and following medication regimens. Simultaneously, mobile health has been utilized to assist in managing various health conditions, including diabetes, asthma, depression, hearing impairments, anemia, and migraines. Furthermore,

the implementation of mobile health applications plays a vital role in enhancing the effectiveness of mobile health services.

Information and Communication Technology (ICT) has significantly transformed healthcare services, by enhancing the quality of care and ensuring clinical safety. According to Ahmed et al., (2014), the introduction of online consultations, prescriptions, and referrals marks a key development in mHealth. Moreover, having skilled healthcare workers, developing supportive structures, and sharing research and experiences are essential for promoting and implementing mobile health services. A survey conducted by Ahsan et al., (2013) indicates that mHealth can greatly improve health outcomes. In their study, Prue et al., (2013) observed that mobile phone services utilized in healthcare enable health professionals to swiftly identify and treat malaria patients in remote Bangladeshi locations. Huda et al., (2018) examined the feasibility, acceptability, and perceived relevance of using mobile phones in an impoverished rural community, discovering that many mothers were comfortable using and operating mobile devices, with positive feedback attributed to their experiences. SMS is recognized as a valuable service that provides patients with support, encouragement, and awareness, aiding in the improvement of their access may be limited or robust. This advancement has allowed rural communities to obtain health and increasing attendance at appointments. SMS messaging allows healthcare providers to timely prescribe medications, thereby enhancing the quality of health services and patient care (Yeboah et al, 2019). Some mobile applications are designed to evaluate the effects of certain diseases and help prevent specific health issues. A straightforward text can inform, gather, and update patients regarding their health status or promote behaviors for better health. It is a simple, low-cost tool that can help reduce health inequalities in developing nations. Healthcare workers are increasingly using smartphones or tablets to carry out their duties. Mobile technology devices can facilitate and

improve healthcare in developing regions. Utilizing text messages to encourage healthier behaviors and choices can be regarded as a crucial factor in enhancing the health of the entire community population.

2.3 Drivers of Mobile Health Technology in the Delivery of Health Services

Smartphones have become widespread, even reaching the most remote locations, where internet mobile health services, reducing geographical obstacles and improving access to care. Mobile health technology is significant in facilitating remote consultations, telemedicine, and monitoring in rural settings, which can greatly benefit individuals in these areas that lack adequate healthcare services. By using mobile health applications, people are empowered to take charge of their health and lifestyles through access to medical information, self-monitoring tools, and personalized health interventions. It's important to consider the community's characteristics, including their socioeconomic status, to gain an acceptable understanding from them (Khatun, 2015). In situations where phone ownership is low, neighbors can depend on family members or their community to share updated health information, which can enhance their well-being (Khan, 2016). Mobile health offers beneficial features that support teamwork during various project stages (Brooke, 2013). As technology advances, it is crucial to adapt and strategize future initiatives.

The outlook for mHealth in both developed and developing nations is promising, with rapid advancements introducing new developments in the health service sector. For substantial change to occur and to enhance mobile health usage in developing regions, it is necessary to reform policies at every level (Ryan and Deci, 2000). Successfully implementing mHealth programs demands extensive training for health care providers and the targeted population who will participate in these initiatives, ensuring they can embrace, comprehend, and utilize the technology effectively (Akter, D'Ambra and Ray, 2010). Educating users on device operation, such as cell

phones and mobile apps, as well as how to send and receive messages, will not only boost usability but also foster acceptance within the community (Akter, D'Ambra and Ray, 2010). Special care should be given to individuals with limited education when using SMS and WhatsApp since some may struggle to read and understand these communications (Ryan and Deci, 2000). Furthermore, it is essential to design the health systems considering the management of messaging timing and mobile network reliability to enhance compliance with treatment and follow-up appointments for infections, chronic diseases, birth defects, and maternal health (Zhou and Li, 2018). Future plans for mHealth technologies like messaging and audio resources are necessary to raise awareness of chronic illnesses such as hypertension, tuberculosis, HIV, colorectal cancer, heart disease, and pneumonia in rural and under-resourced areas to address the challenges those communities face. The obstacles that have been recognized will help upcoming leaders with project initiatives aimed at boosting the likelihood of ongoing success and sustainability. To tackle the primary challenges of mobile health projects, leaders executing mHealth initiatives ought to form alliances with local authorities and non-profit organizations to seek funding, guidance, and necessary infrastructure (Khan, 2016). Nations with developing economies should think about collaborating with equipment suppliers and putting resources into their infrastructure to enable their citizens to afford mobile phones and acquire the skills needed to utilize them. Furthermore, additional studies should focus on how governments can assist these nations in reaching their objectives and enhancing the acceptance of mHealth as a tool for improving healthcare services. It is crucial for developing nations to embrace new technologies to reduce the risks of being uneducated in using technological advancements in their health systems. More investment in mobile phones and thorough training on using these devices are essential to improve acceptance rates in developing regions (Zhou and Li, 2018).

2.4 Theoretical Perspective

This research is based on the three-factor theory, which expands upon the two-factor theory created to clarify job satisfaction within organizations (Wang et al., 2021). Kano et al. (2010) updated the two-factor theory and developed the three-factor theory. This theory categorizes product qualities to fulfill consumer needs. The three factors consist of fundamental factors, performance factors, and excitement factors, coming together to form five attributes of quality. The two-factor theory, sometimes referred to as Herzberg's motivation-hygiene theory, claims that two aspects influence job satisfaction: hygiene factors and motivators. According to this theory, enhancing hygiene factors helps avoid dissatisfaction, whereas boosting motivators can increase satisfaction and drive. The fundamental factors align with hygiene factors in the two-factor theory, representing the essential requirements of consumers without impacting their satisfaction levels. Excitement factors relate to motivation factors that can create excitement but do not lead to dissatisfaction when they are absent. The third group, known as "performance factors," exists between fundamental and excitement factors, providing satisfaction when present but causing dissatisfaction when unavailable.

The three-factor theory is widely utilized in various scenarios. Research into consumer satisfaction and dissatisfaction has suggested two distinct claims regarding the dimensional nature of consumer satisfaction (Wan et al., 2017; Westbrook and Oliver, 1991). The first assertion assumes that consumer satisfaction is unidimensional. This means that consumer satisfaction and dissatisfaction are the two ends on a continuum. The other perspective view posits that consumer satisfaction is bidimensional. Therefore, consumer satisfaction and dissatisfaction are two independent constructs. In this study, we argue that consumer satisfaction and dissatisfaction are two separate constructs that follow a bidimensional view. The reason consumer satisfaction is not just opposite

to consumer dissatisfaction (present context) is that consumer satisfaction and consumer dissatisfaction may also be due to varied factors, which are suggested by the 3-factor theory (Matzler and Renzl, 2006). Going forward, consumers' satisfaction levels may not correspond to their dissatisfaction levels. Hence, consumer satisfaction and dissatisfaction could coexist at the same time (Chen et al., 2014). There is evidence from past studies that consumer satisfaction is bidimensional.

Babin and Griffin (1998), showed that the 2-factor model of satisfaction and dissatisfaction could have an acceptable goodness of fit, that implies that satisfaction and dissatisfaction are distinct. Kim et al. (2016) discovered that the elements related to satisfaction and dissatisfaction in full-service hotels are different. Therefore, in this study, it is appropriate to adopt a bidimensional perspective on consumer satisfaction. It is suggested that the features of mobile health applications will lead to satisfaction or dissatisfaction regarding these applications. Satisfaction and dissatisfaction of this nature can influence the active use of mobile health applications. For this study, the features of mobile health applications are divided into basic attributes, performance attributes, and excitement attributes. Consumer satisfaction is defined as the evaluation of how well a product or service's actual performance matches one's expectations (Zhou and Li, 2018; Yi, 1990). When the actual performance of a product or service meets or surpasses expectations, consumers feel satisfied. Achieving satisfaction can shift consumers' attitudes toward the product or service positively (Oliver and DeSarbo, 1988). Satisfied consumers are more likely to share favorable opinions with others (Anderson, 2016). Regular use of mobile health applications can indicate a strong connection between consumers and these applications (Mollen and Wilson, 2010).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This part describes the methods used in the research. It discusses the area where the study took place, the design of the research, the target group, the actual study group and sample, the technique for sampling, the number of individuals in the sample, and how the data was obtained. Additionally, it includes how data was collected, managed, analyzed, and the ethical aspects of the study.

3.1 Research Design

This study employed qualitative design and phenomenological research approach. A qualitative research methodology was used in order to explain and explore the research subject's perception about mobile technology use for CHPS activities among pre and postnatal attendants in Dodowa. It will also be used to establish a foundational framework to guide further research (quantitative) in this area.

Phenomenological research aims to put aside preconceptions and prejudices regarding human experiences, emotions, and behaviors in a specific circumstance (Giorgi, 1997). Phenomenological research involves documenting and examining the ideas, emotions, and perceptions of the study participants in connection to the subject/problem. The qualitative approach allows the study participants to express their thoughts and experiences regarding the potential applications of mobile technology in the provision of healthcare services in peri-urban and rural areas of Ghana. In contrast to a quantitative approach, a qualitative approach enables individuals to elaborate on their responses and increases the comprehension of the subject being researched (Creswell, 2013).

3.2 Study Area

The capital of the Greater Accra Region's Shai-Osu Doku District, Dodowa, is 39 kilometers away from Accra, the capital city. Based on the population and housing data from 2010, Dodowa had 39,044 residents. According to the census (GSS, 2021), Dodowa had 105,610 residents. There are 53,136 males (50. 3%) and 52,474 females (49. 7%) in this. All five of Dodowa's Community-Based Health Planning and Services facilities are located there. Dodowa CHPS centers now have a workforce of ten (10) people. The Dodowa forest and Tsenku are two well-known tourist destinations in Dodowa. waterfalls. The majority of the residents are small business owners, farmers, and craftspeople. The district is mostly rural, with an estimated 70. 4% of the population residing there. A sizable portion of the workforce consists of government employees, including police officers, firemen, teachers, nurses, and district assembly workers.

The Community-based Health Planning and Services (CHPS) Initiative in Ghana expands on innovations designed to enhance the availability, efficacy, and quality of health and family planning. Nyonator et al. 2005's care. Clients in Dodowa are concentrated in far-off areas, and there are not enough community health officers to manage CHPS service there. As a result of this, CHPS access is inefficient, and a supplementary mobile health alternative is required. In 2019, the World Health Organization (WHO) acknowledged mobile health as a crucial element in the provision and support of healthcare policy guidelines and decision-making procedures. In a rural area like Dodowa, this strategy must be creative and make use of technology to introduce some efficiency, timeliness, broad coverage, and cost-cutting strategies. The traditional methods of operating the CHPS must be integrated with fundamental yet creative applications of mobile technology.

3.3 Study Population

The study's data came from literate pre- and postnatal mothers who had prior smartphone experience and used any of the Dodowa CHPS center's services. Data was collected from the team of healthcare professionals who have been providing care for more than five years at the Dodowa CHPS. The investigation included all related studies conducted in the Dodowa township and its nearby suburbs, with 23 individuals participating in the study. The study focuses on ANC and PNC since they make up one of the most diverse parts of the community health population in Ghana. Maternal mortality remains a health barrier that many developing nations find difficult to overcome, according to Abdulai (2023). Given that the inequities in the distribution and accessibility of maternal and child health continue to be prevalent in Ghana (Anarwat et al, 2021), it is imperative that they be addressed.

Purposive sampling was used in the study, which means that some exceptions were made in order for the study to produce high-quality data that addresses the established objectives. Moms who are illiterate and own smartphones were left out of the list. Because nurses in this category have been working for a long time and are in the best position to explain client preferences and expectations, they were employed for five years.

3.3.1 Inclusion and Exclusion Criteria

In order to achieve the objectives of this study and time factors, there were some pre-qualification measures employed for the recruitment of the study participants. The selection criteria for the recruitment of the pre- and post-natal attendants were based on literacy and experience in the use of smartphone. The inclusion criteria ensured the effective comprehension of English as mode of language for the interviews and language instruction for the use and operation of smartphone. There was no prior qualification requirement for the mother participants. On the part of expert

interviews conducted with the CHPs Health Officers, an inclusion criterion was five (5) years minimum experience and a staff of Dodowa CHPs center. The years of work experience is expected to enrich the quality of data collected.

3.4 Sampling Technique

The study participants were selected using a method of purposive sampling. The researcher was able to select participants using this method that were crucial to achieving the study's objectives (Palys, 2008). The individuals chosen for the study possessed pertinent information, familiarity, or insights on the subject under investigation. Fifteen (15) participants were chosen from the total study cohort.

This will include ten literate mothers with experience using smartphones during their prenatal and postnatal periods, as well as five healthcare professionals, such as community health officers, two midwives and two nurses) with at least five (5) years of practical experience providing community health services in and around Dodowa. It was believed that this met Bowen's (2008) definition of saturation in qualitative research.

3.5 Sources of Data

The data was gathered through in-depth interviews (IDI) conducted with five (5) health practitioners in the CHPS and two (2) focus group discussion (FGD) using an interview schedule. A diverse group of 5 to 6 literate pre- and postnatal mothers who had prior experience using smartphones participated in a focus group conversation.

3.6 Methods of Data Collection

The Shai-Osudoku Health Directorate was contacted for permission after receiving the ethical approval from the Ghana Health Service, Greater Accra Regional Health Directorate. As a result,

permission was requested for thorough interviews to be conducted in the communities with chosen employees and their clients, who were either pregnant or postpartum. The goal of the research was explained to the clients and Community Health Officers (CHOs) during the meeting. The participants learned the rationale and basis of the research through this. As a result, the participants' agreement was obtained in accordance with their own desire to take part in the research. In order for participants to be able to express themselves fully and freely, data was gathered using in-depth interviews (IDIs) and focus group discussions (FGD). Additionally, the researcher was able to thoroughly examine the answers provided. Since all of the participants in the study were literate according to the selection criteria, the interviews were conducted in English, which was the language that the research subject found most convenient.

3.6.1 Data Collection Tools

In the case of the FGD data collection, basic data collection tools such as field notebook, consent forms, discussion guide and digital voice recorder were employed. Tools such as digital voice recorder, interview guide, manual transcription, manual analysis and notebook were used for the IDI data collection. In both cases, the discussion and the interview guide were used to moderate and ask questions during interviews. The digital recorder helped in the collection of interviews for transcription and analysis.

3.7 Data Handling and Analysis

All the data collected via in-depth interviews (CHOs) and focus group discussions (pre- and post-natal mothers) was recorded, listened to and analyzed using Braun and Clark (2006) six steps of thematic data analysis. The data was manually analyzed using the inductive reasoning approach that culminated specific observations into broad generalizations. This research is exploratory in nature and hence, the goal was to explore an emerging phenomena of mobile phone use for CHPS

service delivery in Dodowa. The study is particularly interested in understanding the meanings and experiences of research subjects to establish thematic analysis (Creswell and Poth, 2018).

The six phases of the analysis were;

- Phase 1: Familiarization with the data. The researcher will transcribe data and read data over and over again while taking note of initial ideas.
- Phase 2: Generation of initial codes: The researcher will manually code coded fascinating features of the entire data systematically and collate data important to each code.
- Phase 3: Searching for themes: The researcher will do this by searching for themes from the data through collating codes into potential themes and then gathering all data significant to each theme.
- Phase 4: Reviewing themes: The researcher will generate a thematic map of the analysis by checking if themes are relevant to the codes extracted and the data as a whole.
- Phase 5: Defining and naming themes: Here, the researcher brings out emerging themes from the analysis and these themes will clearly be define and named.
- Phase 6: Producing the report: In this phase, the researcher will produce the report by employing themes that have emerged and defined in the analysis in discussing the findings of the study.

3.8 Credibility and Trustworthiness of the Study

The reliability and validity of data are crucial aspects of qualitative research. The researcher accomplished this through a method known as member checking. This is a validation technique used in qualitative studies to ensure both the credibility and accuracy of research findings (Creswell, 2007). To do this, the researcher turned audio recordings into written form and provided it back to some participants to verify the information. This process confirmed that the transcribed

data accurately reflected the meanings and intentions of what participants shared during the data-gathering phase. Thus, member checking reinforced the reliability and credibility of this research.

To prevent plagiarism, secondary information was properly cited. To obtain informed consent, the researcher first introduced herself and explained the study's purpose, then asked for permission before conducting interviews. This was confirmed by participants signing consent forms. To maintain privacy, participants' real names were replaced with pseudonyms, making it difficult for readers to identify their information.

3.8.1 Ethical Consideration

Plagiarism, voluntary participation, informed consent and confidentiality are some of the ethical issues the researcher considered. Again, ethical clearance for the study was sought from the Ghana Health Service Ethics Review Committee (GHS-ERC 025/12/24) to ensure compliance and permit. Secondary information was duly acknowledged in order to avoid plagiarism. In order to ensure informed consent of participants, the researcher introduced herself and purpose of the study to the participants and sought their consent before they were interviewed. This was evidenced through the signing of consent forms by participants. The confidentiality of participants was carried out by replacing participants' names with pseudonyms to avoid easy identification of information by readers.

3.9 Limitation of the Study

The main limitation of this study was the restrictive scope or geographical coverage to Dodowa and focused on literate pre and post-natal mothers who uses smartphones. This would limit the generalization of the findings of this research.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents the data gathered from interviews with ten (10) pre- and post-natal attendants and five (5) health professionals involved in Community Health-base Planning and Services in the Shai-Osudoku District, Dodowa. It also captures discussion on the findings in relation to the literature of this study.

The health personnel interviewed consisted of public health nurse, mid-wife (in-charge) and senior community health nurse. Their years of experience in maternal healthcare averagely ranged from six to fifteen years. In terms of age and sex of the health personnel interviewed, they were females and in the age range of thirty to forty-five years. The pre and postnatal attendants comprised of various work background, including three petty traders, three artisans, two teachers, a caterer and a student. On the average, the mothers had basic educational background. Their average age was (29) years with the highest age being (45) years with their income levels generally modest. The respondents were from Dodowa and its environs; market area (lower), Mantetse and Wedokum respectively in Greater Accra region.

There were two (2) different focus group discussion, five (5) participants in each group with literate pre- and post-natal mothers who have experience of smartphone usage. The subsequent section discusses the aims of the study and their corresponding themes.

4.1 Client's Perception on the Usage of Mobile Health in Healthcare Delivery.

This section of the findings is based on fundamental knowledge of basic phone functionalities that emerged from the interview with both attendance and health care providers. The study intended to find out what client know about phones and its functions, how it's operation or use on social media platforms and factors that drives or hinders the possibility of using mobile phone to engage in basic CHPS service delivery. Other activities involved in mobile health study includes attendant's impressions, benefits and barriers of mobile health in the delivery of services.

4.1.1 Client's fundamental knowledge of basic phone functionalities, uses and social media platform:

Pre and postnatal attendants mentioned some of the basic functions of phones as making calls, sending messages, researching, transferring and receiving money. They stated applications used for health treatment and how technology had contributed to health and other daily activity. This includes learning a trade, marketing goods, acquiring healthier characters, dressing, and others. Below are some participants' description of basic mobile phone functions:

"I think mobile phone can be used for so many things; you can use it to call someone. And also, our money is withdrawn through the mobile money" (Participant 2, 38years, trader).

"We use mobile phone in during research, maybe there is something you don't understand then you can quickly take your phone and google. It is at times used to remind us on our next visit to child's immunization" (Participant 3, 39years, Designer)

"The mobile has been too helpful paa oo to be honest with you, mobile phone is now use for everything, looking at where I work sometimes, I go to the hospital or when any number of my family visit the hospital when sick, every information on my health will be texted on WhatsApp to

my phone afterwards, thus the labs and medicines. So, the mobile phone has really help in terms of health care” (Participant 8, 40years, Human resource officer).

4.1.2 Familiarity with smartphone functions and usage:

Majority of the client described mobile phone as an essential device in terms of health care. Some attendance said it has really brought comfort, timeliness and safety in terms of health care. It also maintains client’s punctuality based on their schedule appointments.

“Eeeeh, we use phone to check your health especially your weight I leant it on social media I think Instagram or so but I have not tried it before. You can use it to check your weight, your BP and those things” (Participant 10, 34 years, Businesswoman).

“You can also use it maybe you are sick and maybe you have a doctor’s number, you can call the doctor and the doctor too can text you the drug or medication you need, but this mostly happens in the private hospitals” (Participant 5, 23 years, caterer).

4.1.3 Phone applications used in the conveyance of mobile health education:

Attendants acknowledged mobile phone education as it support primary health care and reduce patient cue at the facility level. Attendants used some mobile application as their source of health education for the purpose of their needs at particular time. A few were on Facebook, WhatsApp, Twitter and TikTok.

“As for me Rebecca, am always on WhatsApp. Any messages that are sent to me on it, I don’t miss it. WhatsApp have been very helpful. I also respond to my messages early because am always on WhatsApp (Participant 10, 34 years, Business woman).

“For me I sell things online so I at times snap and market them on TikTok and my WhatsApp status” (Participant 9, 25 years, Student).

TikTok, camera, YouTube, Instagram, Calander, Calculator, Pinterest Play Store hmm depending on what you need at that time, you search for and use” (Participant 6, 27 years, Teacher).

4.1.4 Reason for the use of a particular social media platform on your phone:

Most mobile application are very educative compared to others, and their purchases are moderate or free. Examples are *WhatsApp* and *SMS*.

“Text messages and WhatsApp to talk to people by sending messages and this is the cheapest” (Participant 9, 25 years, student).

“We learning new thing as day in day out and is the place to learning new things” (Participant 2, 38years, trader)

4.1.5 Possibility of using social media platform for health service delivery:

WhatsApp was client preferred application, since it is common to most people using smart phones. The clients also recommended WhatsApp audio in their common language to be use on their WhatsApp platform. They also mentioned that, for an inclusive benefit, Short Message Service (SMS) should be added to the WhatsApp because not everyone was on WhatsApp.

“Actually, for me like this not everyone is using smartphones and also some of the parent can't read so maybe if the message is sent to the platform, they need to interpret it for them or audio in a language they will understand” (Participant 5, 23 years, Caterer).

“I will choice WhatsApp, because for WhatsApp so many people are there and even anyone using a bit high phone has WhatsApp on it so it will be good to use WhatsApp. My

work place most of the information are given there” (Participant 8, 40 years, human resource officer).

4.1.6 Potential use of mobile phone for health care (CHPS) delivery:

Majority of the attendants’ felt WhatsApp was the appropriate platform for delivering mhealth services on mobile phone. For existence and effectiveness of the WhatsApp group will depend on:

- To include all contacts of client who visit the facility and all nurses available.
- Restricting people from sending test that are not health related.
- Frequently posting health issues by the health staff (nurses)
- Reminding client on their next visit especially CWC.

“To organize a group by taken all the contacts of the people who come to the clinic and create a WhatsApp group to remind people of somethings” (Participant 7, 23 years, hairdresser).

“The message should also be in recording and in Twi and Ga dangbe because some people cannot read and not everyone have WhatsApp phone so the other people can tell them about what is put on the platform. Some uses WhatsApp status, TikTok and Facebook and with that one everybody will benefit” (Participant 7, 23 years, hairdresser)

4.1.7 Importance of the use of mobile application to support CHPS health care services:

Few also spoke on important of mobile application and it been important. These reduce hospital wasting time and solve minor concerns of clients to avoid hospital stress. Current health issues on pandemics would be shared earlier before it gets out of hand. The platform would also help improve primary health care and prevent other diseases.

“It will be important, it will be important, it will be, it is not every time for you to visit the hospital”. (Participant 10, 34years, businesswoman).

“Before God and man to me it will help because it not everything that you can run to the hospital or clinic so if its WhatsApp group being created for health care, any minor issue or misunderstanding, I can put it there to wait for the feedback and I think such issues can also benefit others on the platform. someone in the group may also have an idea on my concern and can also share so to me it is very important. We should also use different languages in the audio” (Participant 1, 35 years, Seamstress).

“During the Covid 19 period mostly even, when people were not aware those with smartphone were having the preventive methods earlier through friend and others from WhatsApp and Facebook and even Google so that we will prepare not to contract the disease” (Participant 9, 23years, Student).

“Also, the teachings that the nurses will put on the group will teach us to stop some bad things so it will be very useful” (Participant 6, 27years, teacher).

Only two participants disagreed on the basis of their bad experience with some nurses (nurses’ bad attitude). They did not agree to the fact that nurses would compile or accept to render their services online and free.

“To me it could help and at the same time it cannot help. the reason is that some of the nurses do have sympathy and understand her job, so will receive your call but if the call falls in the hands of the unkind ones she will ignore your call at times they will be on the phone doing their own things so you become a problem to them and will not even remember to send or put information on the page” (Participant 2, 38 years, Trader).

“As said earlier by participate 2 even seeing the nurse face to face in the hospital is a problem, they will look at you in some way as if you are coming to worry them. Because of this bad attitude, will they accept to deliver their services online. We will be happy to hear from them before we get to the clinic Humm.... they are lazy were not born to be nurses” (Participant 4, 32 years, Trader).

4.2 Perceived enablers of mobile health use

4.2.1 Perception on basic health services to deliver via mobile phone:

The mother’s perception on the basic CHPS health service included education on health topics like nutrition, danger signs in antenatal and postnatal period, and child immunizations. It also includes tracing defaulters, follow up after discharge and given reminders on next appointments.

“Teaching people and calling people to come to the clinic. They can also do counselling” (Participant 3, 39 years, designer)

“Like if tomorrow is weighing, they can use it alert mothers and they can also tell mothers the type of food to eat when they are pregnant” (Participant 10, 34 years, businesswoman).

“I will choose teachings of health and counselling” (Participant 4,32 years, trader).

4.2.2 Participants perception on basic mobile function or app suitable for CHPS activities:

Available applications included Babies packed, Artificial Intelligent (AI), WhatsApp and normal phone calls. Comments from mothers;

“When I was pregnant, I downloaded an application that was telling me how the weight and how healthy the baby is but deleted it after the baby was two years.it was called Babies packed”
(Participant 6, 27 years, Teacher).

“I me there is these new App that is AI so if you have any question and then you want to ask you just have to text or sometimes send it in a voice, it comes with the voice so me I like to using that and is very helpful” **(Participant 3, 39 years, Designer).**

“One of my friends who stay at Madina have been telling me about their hospital own where the nurses even call them the next day to ask about the baby and the mother if they are fine”
(Participant 8, 40 years, human resource).

“Some hospitals call the next day after your visit to find out how your medication is going and also do you had any challenges during your visit yesterday or there was some problem you had, let them know about it a help solve” **(Participant 7, 23 years Hairdresser)**

4.2.3. Perceived willingness of participants to engage in mobile health care delivery:

With smart phone availability all mothers will be committed. Being in the comfort of your home and receive health care would save money. Keeping the page active with more health-related issues will increase mothers’ patronage in the mobile health care delivery.

“It will be very helpful and I think all mothers will like it especially those with smartphones”
(Participant 5, 23 years, Caterer).

“They will be happy because not everything that you will go to the clinic and your money for consultation and T&T will be free” **(Participant 25, years, Student).**

“If the page will be active with more health information, then mothers will be happy and will always visit the page to learn” (Participant 6, 27 years, Teacher).

“They will respond but I think it will take time because they know the normal procedure” (Participant 4, 32 years, Trader).

4.2.4 Priority consideration for development of mHealth for CHPS deployment:

The population of mothers using smart phone and the education given on the platform would play a crucial role in CHPS deployment. The need for sufficient money for data by the CHPS Health Nurses to keep the platform active cannot be exempted.

“It will depend on the population” (Participant 10, 34 years, businesswomen).

“To tell mothers or looking at the mothers who use smart phones and money for the data. I think it will be very helpful and could move gradually if the education on mHealth is well given. The starting of everything is not easy, to remember in those days there was no idea on mobile phone use but look at where we are now. The piloting that will be a bit difficult but it will help and can be long term too” (Participant 8, 40 years, Human Resource Officer).

“Hmmm the data for credit too.... I don't know if the nurses will be willing to use their own money to buy data for the program. Even me, at times it takes weeks before I buy another data when it gets finished” (Participant 7, 23 years, Hairdresser).

“We can use messages and use calls to start, is possible for the start” (Participant 5, 23 years, Caterer).



4.2.5 Perceived adoption or otherwise of use of mobile phone technology for CHPS health care delivery:

Majority of the mothers agreed to accept and adopt because we were in the modern world and technology is leading and had made things easier. Mothers could also make calls and ask of the concerns on other health related issues. CHPS mobile health services would help save time and money.

“Mothers will strictly adopt because everything that is going on now is social media either in WhatsApp group Facebook all the other Apps” (Participant 1, 35 years, Seamstress).

“To me I believe that it will help and work, even in this modern period technology have really change and make things easier. With health care you can call your doctor and ask if the appointment will come on and is the vaccine available for your child” (Participant 8, 40 years, human resource officer).

“When the was no phone in Ghana here, you will pick car to go and meet your doctor and he will not be around then and your T&T would be wasted. Maybe you were not having enough money on you. example from my work place I did some test for the worker and we all left after the test, the test result was sent to every worker on phone without going there. So, it saved our time and money and other risk that could have happen” (Participant 8, 40 years, human resource).



4.3 Perceived barriers to mobile health use.

4.3.1 Perceived Mobile Health CHPS implementation and operationalization hindrance:

The biggest hindrance of client was the rules to the WhatsApp application to deliver health services. Thus, exempting information that are not health related. Also, few clients are using the smart phones, data to run the Apps and others would not visit the page in days.

“People may not join and if the talking is too much others will mute it because sometimes the talking is too much” (Participant 6, 27 years, Teacher).

“The finance, the money that they will use for the data I mean on the mothers’ side. Am saying this because the nurse will send it but those who will look at it do not have the data; the message can be sent but they will look at it in 3 days’ time or to one week when they buy data”. (Participant 1, 35 years, Seamstress).

“Some also do not have smartphones, others may not also read and that will be the problems” (Participant 5, 23 years, Caterer)

4.3.2 CHPS services that will be difficult to execute with mobile phone:

The perception of clients on difficult health service with mHealth include mental health issues and laboratory investigations. In-person services such as checking of blood pressure, vital signs, vaccination and medications cannot be taken on the mobile phones. Responds from clients:

“To me I disagree with what she said because people who have problem like depression or home problems can come to the clinic, even things that you do not know what to do they can help you” (Participant 3, 39 years, Designer).

“Like you are pregnant and is your clinic day you can’t sit in the house and tell the nurses or doctor to check your BP, and weight for you for you and also lab test” (Participant 9, 25 years, Student).

“When you are sick and you have to take injection, the mobile phone cannot give injection You have to walk to the health facility and take it. Also weighing and prescription” (Participant 10, 34 years, Businesswoman).

RESEARCH FINDINGS ON CHPS SERVICE PROVIDERS

4.4 Client’s Perception on the Usage of Mobile Health in Healthcare Delivery.

4.4.1 Staff fundamental knowledge and experience of mHealth service delivery:

Usage experience of basic form of mobile application for CHPS service provision:

The health care personnel used basic form of mobile application as part of CHPS service provision to their clients and the required outcome were successful. Three (3) out of five (5) used normal call and SMS and the other two used MOTECH.

Below are nurses’ expressions on women perception of postnatal care:

“Yes, please we use the calls and I also use SMS yes” (Zonal head, 15 years work experience).

“Aaaah Yes, I have but not in Dodowa here thus MOTECH to improve uptake and care of pregnant women who we do take care of them” (Midwifery Officer, 12 years work experience)

“Mmm Okay with our unit when the client come and they are due for their review we call to check up on them or to remind them of their review date you know some of the client will forget about their review date so when is time we call their relatives so that they can come to the facility for their medication. You know we are dealing with mental health clients and most of them cannot

read so is only normal call we use. You can send a text message but client will not see” (Principal Community Mental Health Officer, 12 years work experience)

“Mmmh yes in Sogakope yes” (Principal Community Health Officer, 10 years work experience).

4.4.2 Any training received by Service provider on mobile health

The training was done on the mobile technology (MOTECHE).

“MHealth in general no but the MOTECHE (Mobile Technology) that I was talking about. It was an App that we use to track for instance defaulter and we save the information of client on it. It also stores client information and from time to time we send reminders to them as when they are coming for their next visit” (Midwifery officer, 12 years work experience).

“Yes please, it was done last year which was in a form of workshop but I have forgotten the actual name or topic for the workshop” (Zonal head, 15 years work experience).

“Yes, we were trained on the” (Principal Community Health Officer, 10 years work experience).

4.4.3 Service providers level of technology / internet literacy:

The health workers were literates when it came to the use of the internet. Some went through training and others learnt through continues practicing online.

“Yes please, I have been trained, I myself I did a little training on the use of internet so have been abreast with the use of internet services” (Zonal head, 15 years work experience).

“Ooooh I will say yes but I do not have all the work skills but the basic ones that will enable me to use somethings like the email, WhatsApp, uploading and downloading files typing I think am good in that areas. but with applications that I find challenges I just call for assistance” (Midwifery officer, 12 years working experience.)

“I will say yes because I did a personal six months online course just to upgrade myself”
(Principal Community Health Officer, 10 years work experience).

“Mmmmh ... yes, I have no training but can express myself using most of the application like the WhatsApp, Facebook, Instagram, Google, Telegram and the others too” *(Community Health Nurse, 6 years)*

4.4.4 Service providers familiarity with basic mobile and social media tools/apps:

The common social media tools mostly used by the health care provider were WhatsApp, SMS, TikTok, Telegram, Facebook, Google and others for a particular their need.

“Ooo the WhatsApp, SMS, TikTok, Telegram and the others but basically WhatsApp and SMS are what we used here” *(Zonal head, 15 years work experience).*

“The common ones like Instagram, Facebook, WhatsApp and other google apps. I used most of them per what is needed at that very moment. I mostly read text messages from friends during my leisure hours and visit other interesting apps like the TikTok to have fun” *(Midwifery officer, 12 years working experience)*

“Mmm... I don't think so because those are social medias so the only things we can use to improve health is maybe share information, (health education) and creating awareness through those platforms. And also, so many things go on there some are let say for fun so if we really want to improve service delivery through mhealth then I think they have to create App purposely for that. May be let say an app for people or individuals who want to read something on malaria OR an Apps to see a doctor. But to use something like Instagram and WhatsApp to me, it will not be effective” *(Midwifery officer, 12 years working experience).*

4.5 Service providers perceived enablers for mobile health use

4.5.1 Perceived existence of conducive environment for the implementation of mHealth in

Dodowa

A conducive work environment was created which facilitated a successful service delivery. This reduced paper work, and client information was intact and privately saved. The service delivery through the mobile application collapsed due to the poor supply of phone data.

“I will say yes, even though there were some challenges that we face but it was helpful and also it to facilitate a successful implementation of the service in several ways for example data privacy when it happens like that you know we are able to do away with the paper work which may be within rate easily for other staff or other users of the facility but with the Motech App after login in you are also obliged to log out and you even have to login with password so it’s difficult for someone to get in touch with someone information that are private” (Midwifery officer, 12 years working experience)

4.5.2 Issues needed in place to ensure effective mHealth deployment for CHPS activities:

The nurses state that, the effectiveness of the mHealth at the CHPS would depend on funds.

“Most of the client do not know anything about it so there should be creation of awareness may be on radio, television to make client aware but with the network problem I do not know what we can do about it” (Zonal head, 15 years work experience)

“I think funding, if enough funding is ensured in this mHealth service delivery I think it will go a long way to help us. If it is the government who is implementing that the funding should come from them. the funding to for restance when these devices are faulty it will be use to repair and when there is no data this fund will be used to buy data. Because if devices become faulty then that is all

“yegyai ato ho” (left forever). Then training of more staffs to be using it”. (Midwifery officer, 12 years working)

“There should be constant provision of data, if there is no constant provision of data it will work for some time then that is it. The data should be purposely made for the mHealth activities WhatsApp” (Principal Community Health Officer, 10 years’ experience)

4.5.3 Key stakeholders to ensure successful mHealth CHPS activities:

The key stakeholders include government, Ghana Health Service, nurses, clients, (pre- and post-natal mothers, guardians and parents and children), NGOs and other organizations who supports the program.

“Mmmh the first thing our client can be a stakeholder ooo those that we are going to use the mHealth on. And also, actually it will be what the m-health technology sees to achieve, exactly it could be the government, Ghana Health Service, anyone who has interest in health ministry of health. And any individuals and NGO who want to help in funding. As well as the nurses and the users too” (Midwifery officer, 12 years working)

4.6 Perceived enablers to mobile health use by service providers.

4.6.1 Important considerations as part of key issues that will support mHealth deployment positively for CHPS activities:

In the deployment of mobile health, there should a training for care providers on the mobile application used. The creation of community awareness on the part of the client is very important. The financial aspect to help organize a training for health staff and to buy data would contribute to CHPS deployment. The care providers submissions included the following:

“I think with the supportive aspect I think we need more training; thus, more people need to be train on how to use the mobile Apps and I think the community numbers and the client need to be abreast with, there should be awareness so that at least they should be informed that there are other services that we can reach them on” (Zonal head, 15 years work experience).

“I will first talk about training a lot of staff if possible I know it not that easy because let say you are in a facility, due to lack or inadequate of fund they are unable to train all of them one has to go and come and brief but there are in situations where by is so common in our settings that the one who will go to the workshop or the one who will be train will come back and just sit down without even teaching or briefing the other colleagues what he or she learnt, so in these cases if that person is not there to do the work as into enter information using the mHealth App I don't know whether you get me, the work will not be done. And also making sure that the MoTech for instance that I was talking about we could not sustain it because of such issues because of the fact that you people were trained so if those people are not there then no entries it means that the work will not be done. And sometimes too even though majority of people will be trained but the devices the tablets, phone use to give the services are few, and so it become difficult” (Midwifery officer, 12 years working experience).

“As in using our personal phone Mmmh...., I think we can but the only situation here will be like the are some times that when you enter into the health facility or especially working at the labour ward as busy as the place maybe you may not even want to put your phone with you or have a place to put it or being afraid of infections sometimes you do not even want to take your phone at all. So, if we have one designated phone that everyone is using, I think that one also helps” (Midwifery officer, 12 years working).

“For all the clients and the health workers that is basically what we use, at the moment the number of people using smartphone are few, most are on the type we call Yam. So, if you don't even have smartphone, you will receive SMS. we are able to communicate with them both for the WhatsApp, SMS so if you don't even have the smartphone, you can still your message through SMS”) (Zonal head, 15 years work experience)

4.6.2 Motivation to use mobile application for CHPS healthcare delivery:

The mobile application will really help because apart from texting messages via SMS, voice messages in the language of choice will be given and client who were absent during the general health talk meetings at the health facility would also benefit. It would be easy and reliable, and it could serve as reference to easily retrieve past information and reused. These would serve as an opportunity to send messages across in comfort and stress-free manner.

“I think it has really help because we the midwives when a client default for not coming for ANC we use it to alert them through SMS but we can improve it by we sending messages to them on their health status may be breastfeeding, family planning, on the benefit of ANC, the danger signs so Even if you can't read, we can even do a voice note to really understand. I think it can help make the client more knowledgeable in some of the health issues so even if the a last she did not come to listen to the health education that we give in the morning they will still have knowledge in most of the health talk that we do” (Zonal head, 15 years work experience).

“Oooo even though is time consuming it serves as a reference; I always say that documentation is very importance. No documentation means zero work done is that not it? So, if it's in use it will help me to retrieve some information. Assuming you have a note that you record everything inside and you are looking for an information that you dated a year back or two it will be difficult

comparing the mHealth, the mHealth will be easier to retrieve than the let say the paper work. it is also reliable” (Midwifery officer, 12 years working).

“Ok it will be convenience, easy, sitting in your office to send messages across and you can use the medium to educate people around” (Principal community mental health officer, 12 years work experience).

4.6.3. Perceived challenges faced by users of mHealth services

The major challenge of the client was the lack of data, the network problems and mobile illiteracy.

“With the mobile application I think sometimes the network is the problems; other issue is about the client not being able to read because those in the other facilities they add voice message in a common language to those who are not able to read so if very body is able to use that one fine. If the person cannot read, they will not get the information they need to acquire” (Zonal head, 15 years work experience).

“Well, there will not be feedback to whether actually the people really heard whatever the message you send out and there maybe they have a question how are they going to ask it that is their data issues” (Principal community mental health officer, 12 years work experience).

“I will say finance that is money to buy data because I may be sending the message alright but with time, I will be expecting data to run these services and if my expectation is not met. I will soon or fill lazy to upload messages again” (Principal community mental health officer, 12 years work experience).

“Situations that people are not abreast or they have little knowledge in the use of this mobile devices, and data issues as well. People may be having the phones alright but how to navigate the

phone is the problem do you get me. I also think storage issues (Midwifery officer, 12 years work experience).



CHAPTER FIVE

DISCUSSIONS

5.0 Introduction.

The main aim of this study was to investigate the perceived use of mobile health technology in the delivery of health services at Dodowa CHPS. According to the study's findings, almost all the participants in the focus group discussion as well as the nurses and midwives interviewed were of the view that mobile health technology was good and effective in ensuring attendants health and the baby's normal growth.

5.1 Discussion of Findings

The main aim of this study was to ascertain the feasibility of mobile health use in Community-Based Health Planning and Service delivery in Dodowa. According to the study's findings, almost all the participants in the focus group discussion as well as the nurses and midwives interviewed were of the view that mobile health technology use in health care delivery would be good. They also ascribed to its effectiveness in ensuring the well-being of pre and postnatal literate attendants as well as the community health personnel. The reason been that issues of proximity and convenience was prioritized by both the nurses and clients. The convenience that it provides comes as a major driver that shapes both the service provider and user's choice and adoptive behaviour. Despite the cost of smartphone affordability and data been expensive, the proximity and convenience benefit still stood out. This is a demonstration that a fundamental way of engaging the attention of clients would be effective if the benefit of mHealth could be demonstrated well on the convenience and practical aspect. In general terms however, the scaling of mHealth in Ghana still holds a positive outlook despite the challenge of smartphone acquisition per the findings. According to Awuku et al., (2023), mobile phone use and penetration in rural areas, specifically, by smallholder farmers have significantly increased. This convenience driver also supports

previous findings that sought to highlight those inadequacies in health infrastructure and resources such as CHPS centers, clinics, stationed health personnel in rural locations (GHS, 2019; Bagrmivin et al, 2023). Hence, it justifies and demonstrates a major gap in implementation of CHPS that mHealth sought to mitigate.

Results from the findings on the knowledge of mobile technology use, some Dodowa community attendants construed on basic phone functions as using mobile phones to make calls, send messages and researching. Others, saw mobile phone functions as a source of entertainment, transferring and receiving money, and acquiring new knowledge. Other functions included transforming one's attitude, behavior, lifestyle and skills through social media platforms. The learning of trade, marketing goods, acquiring healthier characters through health education and modified dressing skills were also considered part of mobile phone functions. The majority of pre and postnatal literate attendants stated that the mobile phone has really brought comfort, saving time and money, and stress reduction in the lives of human. This research supports the findings of (Aranda-Jan et al., 2014) who found that telecommunication technologies contribute to the reduction of time, distance and the cost of information delivery which have made health service providers to deliver cost-effective services, offering solutions for healthcare systems.

The attendants recommended the use of WhatsApp as the best functional application for health treatment and educational support. It was among the common social media platform used on participants phones. Attendants mentioned TikTok, Google, WhatsApp, SMS and YouTube as the social media platforms they use. Mobile phone was seen as a very helpful device used in every activity one undertakes. It had really brought comfort and saves time making requirement easy to access. Mothers were committed in engaging in mobile health care delivery using the WhatsApp application. This finding is similar in terms of attendant's willingness to use mobile application to

engage in mHealth service to Huda et al (2018). Their research found that Bangladesh women accepted to operate mobile phones for health service delivery. While this study aligns with Huda et al., (2018) on acceptability, it slightly differs on the specific mobile application of choice. This current study found women interest in WhatsApp as appropriate or most like mobile application for mHealth. However, the findings of (Huda et al., 2018; Sanchez-Franco et al., 2021) pointed to SMS. These differences can be attributed to jurisdictional differences (also culture) and the rapid evolving nature of technology with time. The current study was conducted in 2024, while the rest took place in 2018 and 2021 respectively.

The main challenges faced by the women (beneficiary) and providers (health personnel) were training and funding. Generally, the government budget to various sectors is not adequate and receives support from donor bodies. The government, through its appropriate ministries/agencies needs to prioritize mHealth by increasing its budgetary allocations to such areas. This finding is also supported by a study by Elsey et al., (2023), which recommended strengthening of health financing strategies.

The mHealth provides a crucial conduit for reaching last mile and vulnerable rural dwellers and hence must be prioritized as part of primary health dissemination, with rural population access in mind. The service providers also need to sharpen their technological know-how and acquaint themselves to new and refresher trainings to master the craft in order to effectively deliver.

Furthermore, the three (3) factor theory was used to classify service quality to meet consumers' needs. The three factors are the fundamental factors, excitement factors, and performance factor. The theory posits that improving upon fundamental needs reflects consumers basic requirement to prevent dissatisfaction, while excitement factors enhance motivators and leads to greater satisfaction and motivation. The performance factors," lies between fundamental and excitement

factors, which causes satisfaction when present and dissatisfaction when not available. Consumer satisfaction and dissatisfaction are the two end on a continuum and must be due to varied factors to satisfy. The attributes of mobile health applications will result in satisfaction or dissatisfaction with the applications. In situations where the actual performance of a product or service meets or exceeds consumers' expectations, they feel satisfied. When a state of satisfaction is attained, the consumer improves their attitudes toward the product or service. This will depict from a behavioral perspective, consumers' willingness in using mobile health applications. Hence, where consumers feel satisfied using a mHealth application, they will commit and engage in using mobile health application. Some attendants said the sustainability of the mobile service will depend on the activeness of the nurses by posting relevant health information that meet their requirements. The health professionals also requested for a motivation to reduce their cost on data and feed the system with required health information keeping the page active.

5.2 The identified challenges and enablers of mHealth implementation in Dodowa.

5.2.1 Perceived challenges of mhealth care delivery by attendants

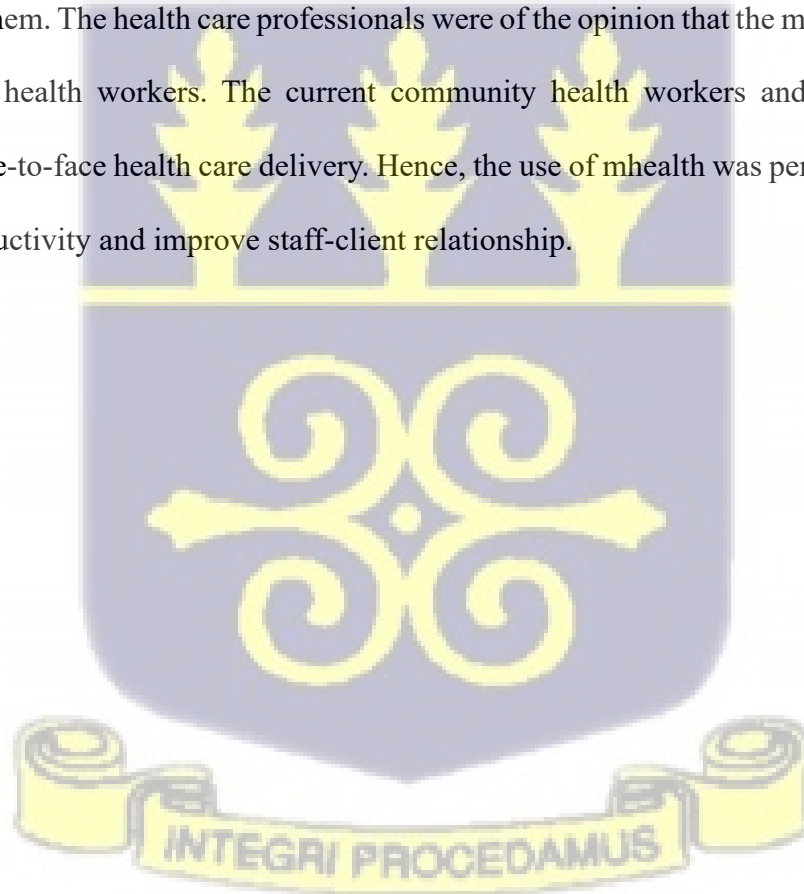
The pre-and post-natal literate attendants identified hindrances of mhealth care that can potentially affect delivery. Some of the attendants mentioned the inability to afford smartphone and cost of data as a major concern. They also raised concerns about the operationalization of the WhatsApp platform to host mhealth delivery. They specifically, stated the possibility of disruptions on the platform that may due to indiscriminate postings by mothers and asked for health personnel to ensure adequate controls. The mothers also want health professionals to regularly post content to keep WhatsApp platform active. The attendants called for the use of audio in their local language

as against text messages as mode of communication on the WhatsApp platform. They also spoke about the uncertainties in the telecommunication network access as potential threat.

The health personnel called for the provision of appropriate training on all mhealth intended activities as well as requisite logistics. They mentioned the need to intensify awareness creation towards pre and post-natal attendants about the mhealth technology.

5.2.2 Perceived enablers of mhealth care delivery by mothers and service providers

The pre- and post-natal attendants were of the opinion that the mhealth will reduce the frequency of clinic attendance. They perceived that such a situation will create convenience as part of health care access for them. The health care professionals were of the opinion that the mhealth may reduce stress faced by health workers. The current community health workers and logistics are not adequate for face-to-face health care delivery. Hence, the use of mhealth was perceived as a means to enhance productivity and improve staff-client relationship.



CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.0 Introduction

This chapter is the final section of the study. It is presented in two parts. The first part presents the conclusion of the study and the second part gives the recommendation of the study.

6.1 Conclusions

The findings of this study have highlighted the perceived drivers of mobile health use in Dodowa CHPS. The study suggests that pre and postnatal literate attendant's decision to seek mobile health use was impacted by nurse's acceptance and activeness in delivery of health education in the created platform. This is because in Dodowa CHPS, attendants' decisions on mobile health were dependent on nurse's implementation and compliance. Most facilities have started and is working well by impacting knowledge, increasing the well-being of their clients and ensuring the safety of the community.

Specifically, on the first objective of the study, it's clear both the women (beneficiaries) and service providers (nurses) embraced the mHealth approach to CHPS intervention. The emphasis from both sides centered on the convenience it offers. Due to the limited resources (infrastructure and human capacity), the mHealth closes a very important gap, thus proximity. The mHealth creates an enhanced way of health service delivery and access for health personnel and attendants respectively. The major setback identified with respect to the mHealth usage was cost, funding and training related matters. These are more related to the CHPS and beneficiary. However, there are also bigger hurdles that are broad and enablers for the micro-hindrances mentioned above to

materialize. Thus, government increased budgetary support to the health sector and enabling environment for telecommunication companies to improve their services as well as expansion.

On the second objective, the service provider (nurses) and beneficiaries (mothers) believed a combination of SMS messages in English and local dialect (Dangme) and WhatsApp platform can be used as starting point. The attendants believe timely health information sent to their phones as well as health reminders may really impact positively on their health. On the use of WhatsApp, the attendants, strongly suggested firm monitoring of the platform so irrelevant postings are not encouraged. They also emphasized regular postings by the service provider in order to keep the platform active and interesting. That would deepen the extent of hooking to the platform by the attendants.

The last objective covers the barriers identified in the study that can hinder the implementation of mobile health care in Dodowa. The cost of smartphones may be a challenge for most mothers, while it also constitutes the basic item needed for deployment of mHealth activities in Dodowa. In the actual operationalization of the mobile health, the mothers mentioned the need to prevent disruptions on group WhatsApp platform. Thus, systems must be put in place to avoid irrelevant and non-related postings on WhatsApp platform. Another issue that may hinder implementation was inactiveness in terms of postings on the WhatsApp platform by service providers. Literate pre- and post-natal mothers prefer regular and frequent posting of health information.

6.2 Recommendations

After recognizing the drivers and hindrances that impact pre and postnatal attendants' decision to the use of mobile health technology and its benefits, recommendations were given. These suggestions on feasibility of mobile health will affect the community's health. Some

recommendations have been given based on the findings of this study for implementation of mobile technology in Dodowa CHPS

To begin, the data revealed that pre-and postnatal attendants in Dodowa thought mobile health was good and that the benefits will include education that would be posted on the desired platform created. As a result, it is suggested that nurses create a WhatsApp group for their clients using the contacts of clients in their register in order to educate on trending issues.

Furthermore, the findings of this study revealed that some attendants patronizing Dodowa CHPS experienced problems such as financial constraints, poor health facilities, and poor attitude of nurses and midwives. Accordingly, the study suggests that postpartum health care be supported, particularly for postpartum moms in rural areas, to make it more inexpensive and accessible to them. The Ghanaian government, through the Ministry of Health, might take up this project in partnership with all Ghanaian health facilities.

In addition, health directorates, particularly, where the CHPS center is located might provide staff involved with internet data to run the mobile health services. This would motivate them to be more helpful to update the mobile platform with trending health issues to keep the page active. Again, hospital administration, in partnership with the Ministry of Health, should guarantee a facility-based training (workshops) and seminars for nurses and midwives on mobile technology on regular basis to encourage them to have positive interactions with postpartum mothers. This would encourage postpartum women to take advantage of service to keep them updated.

In furtherance of future research, quantitative study on large scale can be conducted with an expanded research participants, involving both literate and non-literate pre- and post-natal

mothers. This can improve the validity of the finding for generalization, theorizing and enhanced picture of the phenomenon.

More so, constant refresher courses on customer service and new trends in health care should constantly be extended to nurses, midwives and all workers to change their poor attitudes.



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APPENDIX I: PARTICIPANTS INFORMATION SHEET

Title of Study: Feasibility of Mobile Health Technology Use Among Pre and Post Natal Attendants at the Community based Health Planning

And Services in Dodowa

Introduction:

My name is Bernice Amoah, a Masters Public Health student in the university of Ghana. I stay at Oyibi near the church of Pentecost (P.O.BOX, LG 810 LEGON). My email address is bamoahpipim@gmail.com and a contact number 0246718809.

Background and Purpose

The use of mobile health technology has generally seen a sharp increase in the world. Even though, usage in the world has seen an upsurge, the level of sophistication of the mobile health technology may differ. These may include actual mobile health apps to innovative use of existing mobile phone tools in the delivery of health services.

The purpose of research is to determine factors that drive or hinder the potential use of mobile phones as medium of health delivery as part of complimentary means to support decentralized health delivery through the CHPS approach in Dodowa.

Nature of Research

There has been an upgrading strategy in achievement of Sustainable Development Goals (SDGs) 2030 agenda by all countries globally. However, inadequate services delivery initiatives persisting in low-income and middle-income economies would reduce the focus in achieving these goals.

CHPS in Ghana looks forward to gain a universal primary health care. The United Nations Population Fund (UNFPA, 2014) states that maternal deaths and unsafe abortion in Ghana could be reduced by 90% if expectant mothers were given ready access to emergency healthcare. Measures will be promoted through effective antenatal education and efficient management of referrals, coupled with adequate skilled healthcare professional. This research seeks to ascertain how this technology gap may potentially be converted into opportunity to improve community and rural basic health delivery based on the perspectives of key stakeholders of CHPS (community health workers and pre & post-natal attendants). The study will be conducted at Dodowa and its environs and data for the study will be collected from literate pre- and post-natal attendants who have the experience of using smartphones and received services from the Dodowa CHPS centers. Data will also be collected from the team of health workers delivering services at the Dodowa CHPS center and with over (5) years working experience.

The data will be collected using an interview schedule to conduct in-depth interviews (IDI) with five (5) health professionals working within the CHPS and discussion guide to conduct two (2) different focus group discussion 5 to 6 in each group with literate pre- and post-natal mothers who have experience of smartphone usage and it will be done in three days.

Participant's involvement

Participants have the right to live at any time or refuse an input if she not comfortable with it. In this discussion, there are no right or wrong answers. Please feel free to share your insight on the various topics we will be discussing. We will appreciate both negative and positive comments regarding the things to be discussed.

Please the sessions will be recorded solely for the purpose for which reason we are meeting here today. We intend to capture every bit of comments and insights coming from you and hence the need for the recording. I will place name tags on each of us in order to enable us to identify each other by our names. Please ensure we can have an orderly discussion. If you want to talk, kindly alert me by raising your hand.

- **Potential Risks:** There are no potential risk or harm.
- **Benefits:** The use of mHealth services have the potential to improve affordability of interventions for health promotion, increase health education and disease prevention. The use of mobile health technologies contributes to the reduction of time spent at the hospital, distance and the cost of information delivery which have made health service providers to deliver cost-effective services, offering solutions for healthcare systems challenge such as inadequate finances, scarce resources,
- **Costs:** The principal investigator bears all cost which include transportation to the health facility (CHPS), printing of discussion guide, data used and refreshment for participates.
- **Compensation:** Participates will be refreshed with snacks.
- **Confidentiality:** The sessions will be recorded solely for the purpose for which reason we are meeting here today. We intend to capture every bit of comments and insights coming from you and hence the need for the recording. I will place name tags on each of us in order to enable us to identify each other by our new names. In this discussion, there are no right or wrong answers. Please feel free to share your insight on the various topics we will be discussing. We will appreciate both negative and positive comments regarding the things to be discussed.

- **Voluntary participation/withdrawal:** Participants have the right to leave or withdraw from the discussion at any time for personal reasons.
- **Outcome and Feedback:** The sessions will be recorded solely for the purpose for which reason we are meeting here today. We intend to capture every bit of comments and insights coming from you and hence the need for the recording. There will be no feedback to participants after data collection.
- **Appropriate alternative Procedures and Treatment:** Not applicable
- **Feedback to participant:** There will be no feedback to participants after data collection.
- **Funding information:** The principal investigator bears all costs which include transportation to the health facility (CHPS), printing of discussion guide, data used and refreshment for participants.
- **Sharing of participants Information/Data:** The principal investigator owns the data that would be generated and is solely for the purpose of this research (will not be shared for any other reasons).
- **Storage of samples (Where applicable):** The data collected will only last for two months after the analysis is accepted by the supervisor. Data would be used solely for the purpose of this research.

Provision of Information and Consent for participants

Permission would be requested from participants before recording of interview. Participants will receive a copy of the Consent form after it has been signed or thumb-printed.

Contacts for Additional Information

You may contact me, Principal Investigator (Amoah Bernice on 0246718809), or my supervisor

(Dr Kwaku Ansah- Opoku, 0206300692) if you need further explanation of pertinent questions about this research.

Your rights as a Participant

This research has been reviewed and approved by the Ghana Health Service Ethics Review Committee (GHS-ERC). If you have any further questions about your rights as a research participant, you can contact the GHS-ERC Administrator, Nana Abena Apatu, between the hours of 8 am-5 pm through, 0503539896, email addresses: ethics.research@ghs.gov.gh



APPENDIX II: CONSENT FORM FOR RESPONDENTS

STUDY TITLE: Feasibility of Mobile Health Technology use among pre and postnatal attendants at the Community-based Health Planning and Services in Dodowa

PARTICIPANTS' STATEMENT

I acknowledge that I have read or have had the purpose and contents of the Participants' Information Sheet read and all questions satisfactorily explained to me in a language I understand (English). I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name of Participant.....

Participants' SignatureOR Thumb Print.....

Date.....

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name.....

Signature

Date.....



APPENDIX III: QUESTIONNAIRE ON FOCUS GROUP DISCUSSION GUIDE

Research Title: Feasibility of Mobile Health Technology use among pre and postnatal attendant at the Community-based Health Planning and Services in Dodowa.

Moderator: Bernice Amoah (0246718809 / bamoahpipim@gmail.com)

Duration: 45 Minutes

Target Audience: Literate pre-and post-natal mothers (basic education) with experience of using smart mobile phones and have accessed the services of any of the Dodowa CHPS centers (currently or in the past). It also includes service providers of CHPS (CHOs and midwives) in Dodowa, with not less than (5) years of CHPS service provision.

Purpose of Meeting

The discussion is centered on a research work by Bernice Amoah, a final year Master of Public Health student at University of Ghana School of Public Health. Her research is focused on factors that drive or hinder the potential use of mobile phones as medium of health delivery as part of complimentary means to support decentralized health delivery through the CHPS approach in Dodowa. The purpose of our meeting here today is to discuss about factors that drives or hinders the possibility of using mobile phone to engage in basic CHPS service delivery in Dodowa. You were invited because you have the experience in the area we are researching into and believe you can provide very useful insight to guide the research agenda.

In this discussion, there are no right or wrong answers. Please feel free to share your insight on the various topics we will be discussing. We will appreciate both negative and positive comments regarding the things to be discussed.

Please the sessions will be recorded solely for the purpose for which reason we are meeting here today. We intend to capture every bit of comments and insights coming from you and hence the need for the recording. I will place name tags on each of us in order to enable us to identify each other by our names. Please ensure we can have an orderly discussion. If you want to talk, kindly alert me by raising your hand.



Interview Guide for Pre and Post Natal Mothers

1.0 Introduction

1.1 Reason for the Discussion

Moderator introduces herself and reason why they have gathered together and expected objectives of this discussion.

1.2 Rules and Procedures

Moderator spells out rules and procedures governing the discussion to participants and enforce them.

1.3 Participants Self Introduction

Each participant introduces herself – mentions her name, what she does for a living, her age and name of community.

2.0 Discussion of Various Themes of Topics

2.1 *Mother's fundamental knowledge of basic phone functionalities, uses and social media platforms.*

- What basic functions do you know about phones?
- Which of these functions are you familiar with and mostly use? (**PROBE** for functionality description and use experience).
- Which of the functionalities do you think can be used for health treatment and educational support? (**PROBE** for specific ways of usage).

- Do you use any social media platform on your phone and why? (**PROBE** for specific media platform).
- Do you foresee any possibility of using social media platform for health service delivery and education via phone? (**PROBE** for favourite social media choice and why?).
- What do you see as the appropriate ways or steps to introduce use of mobile phone as means to deliver health service to pre- and post-natal mothers in Dodowa? (**PROBE** any suggested pre-requisites in terms of mobilization, organization & financial implications).

1.2 Mother's broad view of potential use of mobile phone for health care (CHPS) delivery.

- Do you see any importance of using mobile application to support CHPS health care services? (**PROBE** degree of importance or otherwise and underlining reasons).
- Generally, do you think mothers will accept and adopt the use of mobile phone for CHPS health services? (**PROBE** underlining reasons for acceptance or otherwise).

1.3 Mother's perception on the use and deployment of mobile health care for CHPS activities.

- What basic CHPS health services do you think can be done using the mobile phone?
- Which other CHPS services may be difficult to conduct using the mobile phone? (**PROBE** further reasons).
- Do you already have idea any basic mobile function or app that can be used for CHPS activities?
- What do you see as the level of commitment of mothers in engaging in mobile health care delivery? (**PROBE** drivers of mother's commitment to mHealth or otherwise).

1.4 Proposal input towards conceptual parameters for future mHealth care Implementation

- What do you consider the most priority in designing mHealth deployment for CHPS activities? (**PROBE** short-, medium- & long-term issues).
- What do you consider the biggest hindrances to mHealth CHPS implementation? (**PROBE** different tiers of hindrances; operational, strategic & policy wise).
- Who are the key stakeholders that matter most for a successful mHealth use in CHPS activities? (**PROBE** underlining reasons for choices).



Interview Guide for CHPS Services Providers

3.1 Demographics Information

Sex:

Age:

Position:

Years of service:

3.2 CHOs fundamental knowledge and experience of mHealth service delivery

1. Have you used any basic form of mobile application as part of CHPS service provision to your clients? (**PROBE** specific form of mobile application & perceived success rate).
2. Have you received any training on mHealth? (**PROBE** specific training outcomes).
3. Do you feel the work environment creates a conducive environment for the implementation of mHealth in Dodowa?
4. Naturally, are you a technology or internet savvy person? (**PROBE** the why and why not)
5. What basic mobile and social media tools / apps are you familiar with? (**PROBE** participant's mobile and social media tools he/she mostly uses).

3.3 The perceived barriers and drivers of mHealth deployment for Dodowa CHPS activities.

- What do you consider most as key issues that will support positively mHealth deployment as part of CHPS service provision in Dodowa? (**PROBE** for specific drivers and underlining reasons for choice).
- Personally, what is your motivation to use mobile application for CHPS healthcare delivery?

- What is your opinion about major deployment challenges you perceive about users (Pre & post-natal mothers) of mobile application for CHPS services provision?
- What do you see as some of the bigger issues that need to be in place to enable effective deployment of mHealth for CHPS activities? (**PROBE** governmental, economic, infrastructural, policy and financial issues).

3.4 Proposal input towards conceptual parameters for future mHealth care Implementation

- What do you consider the most priority in designing mHealth deployment for CHPS activities? (**PROBE** short-, medium- & long-term issues).
- What do you consider the biggest hindrances to mHealth CHPS implementation? (**PROBE** different tiers of hindrances; operational, strategic & policy wise).

Who are the key stakeholders that matter most for a successful mHealth use in CHPS activities? (**PROBE** underlining reasons for choices).

