

**AN EVALUATION OF TOTO-HEALTH MOBILE PHONE PLATFORM ON
MATERNAL AND CHILD HEALTH CARE IN KENYA**

BY

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DECLARATION

This is to declare that this research project is my original work and has not been presented for a degree in any other University.

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DEDICATION

I dedicate this work to Jehovah God, who has given me strength beyond what I thought was possible thus enabling me to complete this project. All praise and glory goes to him.

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I would like to thank my mother whose unwavering support and constant motivation has seen me through the most difficult times, your love and support has kept me going, I thank you. I would like to thank my father for his constant support and encouragement. I would also like to thank my elder brother Bemih Kanyonge, for his continued guidance and for showing me that nothing is impossible. I would like to thank my sisters Loise and Melany for their constant moral support and for reminding me not to take myself too seriously.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC	– Ante Natal Care
ICT	– Information, Communication and Technology
MCH	– Maternal and Child Health
SMS	– Short Message Service
UN	– United Nations
UNICEF	– United Nations Children's Fund
USAID	– United States Agency for AID
WHO	– World Health Organisation

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ABSTRACT

This study sought to evaluate Toto Health mobile phone platform's performance on maternal and child health care in Kenya. The following objectives guided this study: To find out the type of information that expectant mothers access on the Toto Health mobile phone platform; to assess how expectant mothers use the information received from the Toto Health mobile phone platform; to investigate the ways in which Toto Health mobile phone platform has improved the lives of expectant mothers and children below five years. The Health Belief Model constituted the theoretical framework. This study adopted a descriptive survey design. The sample size for this study was 36 mothers living in Mukuru Kwa Njenga slums who were selected using purposive sampling technique. The study used qualitative research approach. Data was collected through focus group discussions and key informant interviews. Interview schedules and focus group guides were the main data collection tools. Data was analysed thematically and presented in narrative form. From the research findings, it emerged that the Toto Health mobile phone platform provides the following information to pregnant mothers and parents of children under five years; antenatal care, healthy pregnancy, safe delivery, child development and stimulation, breastfeeding/nutrition, reproductive health, postnatal care, clinic dates and immunisation reminders, parenting and hygiene. The study concludes that Toto Health mobile phone platform provides useful information to pregnant mothers and parents of children who are less than five years, and has greatly improved the lives of the end users. The study further concludes that Toto Health mobile phone platform plays a huge role in reducing maternal and child deaths not just in low income areas but among the middle class as well. The study recommends that future developers of communication interventions on maternal and child care focus not only on the women but men as well. The study recommends that mobile phone platform innovators incorporate aspects that show a personal touch to their users.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapters covers the background of the study, statement of the problem, objectives of the study and significance of the study. The scope of the study and operational definition as well.

1.1 Background of the Study

Majority of child deaths occur within the first 28 day period of the child's life but six and a half million occur when the child is below the age of 5, up to half the number within the first 24 hours of their life and 75 percent within their first week. Within sub-Saharan Africa, the approximated maternal mortality ratio is 500 per 100,000 which is a large number compared to the high income countries which is 16 per 100,000 (Essendi, 2015).

The risk of a woman dying as a result of either pregnancy or childbirth is about one in six women in underdeveloped areas compared to one in about 30,000 in developed areas such as Northern Europe. These deaths can be clustered around labor, delivery as well as post-partum treatment with the most vulnerable being rural populations and poor people (Ronsmans, 2006).

The Millennium Development Goals (MDGs) were eight international development goals set in the year 2000 by a total of 191 UN member states. The fourth millennium development goal was to reduce child mortality in the world. All the MDGs were inter-dependent and each goal had specific future achievements set within a particular timeline. The MDGs had three main spectrums which were human capital, infrastructure and human rights. Human capital was core inclusive of nutrition,

healthcare and education which were intended to increase people's capabilities which would also advance their means to a productive life. It was estimated that in the year 2013, 289,000 women had died of pregnancy or childbirth related issues such as severe bleeding and obstructed labour which was a sign that the Millennium Development Goals number four had not been as successful (Fund, 2013). Sustainable Development Goals were subsequently developed to improve the MDGs; they are a collection of 17 global goals set by the United Nations. The SDGs unlike the MDGs had a set framework that did not distinguish between any 'developed' and 'developing' nations. Since the inception of the sustainable development goals 78 percent of births had a qualified care giver during delivery, which was an 18 percent increase from 2013. There has been a 44 percent reduction in the mortality rate of children below five years (Fund, 2013).

Women living below the poverty level in remote areas are the least likely to receive adequate healthcare because these regions have particularly low numbers of skilled health workers that could assist in the prevention of maternal deaths. When the 2015 United Nations General Assembly was held in New York, United Nations Secretary General Ban Ki-Moon proceeded to launch a Global Strategy for Women's, Children's and Adolescent's Health. This strategy was a roadmap that sought to end all preventable deaths of women and children and create a sustainable environment. There have therefore been efforts to reduce maternal and child mortality but most developing countries are yet to register significant reduction in maternal and child mortality rates (Peterson, 2016).

1.1.1 Health Situation in Kenya

The health situation in Kenya has often been affected by a multitude of challenges consisting of high population growth rate, high poverty levels, literacy inequalities in several poor regions of the country and significant gender disparities. The health status of mothers, new-born babies and children below five years of age are important indicators of the overall economic and health well-being of a country (Ministry of health, 2013-2017). The constitution of Kenya under article 43(1) guarantees every individual the highest attainable standard of health which happens to be very important to the realisation of the right to life; however, mothers and children below the age of five are still dying out of preventable diseases. Despite the country's commitment to maternal health care, Kenya continues to make slow progression with this regard. With a maternal mortality rate of 488 deaths per 100,000 live births, the country is off track in achieving the UN Millennium Development Goal (Ministry of health, 2013-2017).

According to the Maternal Health Task Force, the quality of maternal healthcare that one is likely to receive in Kenya is directly proportional to their wealth. Due to lack of information, illiteracy levels and inability to access healthcare services the number of maternal and infant deaths in rural areas and informal settlements is still very high. The government has taken measures to reduce maternal deaths in Kenya, with the advent of the beyond zero initiative in January 2014 by the first lady. To-date the campaign has generated momentum towards community health actions as well as complementing county health actions to accelerate the reduction of maternal and new-born deaths. However, there are still huge gaps, although maternal health care is free, staff in government hospitals are still not able to sustain the demand. (Office of the first lady, 2018-2022) Women and children are still dying due to lack of access to public health facilities, inadequate medical staff and facilities, a situation that becomes even worse

during doctor's and nurse's strike. According to a report from the standard newspaper, operations in many public hospitals in the country were paralysed for months, last year due to the doctors and nurse's strike, during that time women and children are not able to get access to much needed healthcare. Despite the government's efforts to improve maternal health care issues such as lack of proper facilities and inadequate staff in public institutions, low literacy and poverty levels, access to medical facilities as well as lack of information are yet to be bridged. (Standard Newspaper, 2017)

1.1.2 Mobile Technology in Healthcare

Mobile health is defined by WHO as the “medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistances and other wireless devices. Mobile health (M-health) is the use of mobile telecommunication in increasing wireless healthcare delivery systems to improve the lives of customers or human beings as a whole. Mobile technology has generated new tools that have helped in the access of public health challenges and in this case maternal health (Alice White, 2017). Due to uneven distribution of caregivers and prevalence of cardiovascular diseases in China, stroke was the leading cause of death among the elderly. There was therefore a need for advancement in health technology in health technology which included wearable health devices which showed a promising future in the management of chronic diseases especially from a first world country. Mobile technology systems have enhanced international cooperation in countries from different time zones and the sharing of high quality medical resources. As the most populated country in the world, China is trying to combat the challenge of aging population in the country with the speculation that the world is likely to have one billion people aged 65 and above by the year 2030 (Jing Sun, 2016).

China's has made the use of mobile technology to improve healthcare in the country. This was due to lack of adequate medical resources to support their growing population. China has therefore worked at ensuring that mobile and internet services are well distributed in the country. Currently, China's mobile penetration is higher than that of the United States with 80% at 4G broadband rate (Jing Sun, 2016). The use of mobile technology in health is rapidly spreading in developing countries, In Asia and Africa, though Africa has the lowest rate of mobile health technology adoption. Mobile devices such as phones and tablets have had a huge impact on the spread of mobile health technology delivery and outcomes. They have significantly improved surveillance, clinical care, prevention and self-management (White, 2017).

The future is pointing towards a greater use of mobile technology. Mobile technologies have assisted with engagement between patients and healthcare practitioners. For example the D-EYE Retinal Imaging System invented by Dr. Andrea Russo is an innovative device that connects a smartphone into a portable and effective fundus camera. The fundoscope lens as well as a downloadable app allows for easy storage and management of patient information. The D-EYE Retinal Imaging System has helped diagnosis of various diseases like glaucoma, diabetes through diabetic retinopathy as well as cataracts. The system was invented in order to improve accessibility to medical screenings for those in dire need especially bed ridden patients, children and infants (Teong, 2015). Cancer Aid is an app that was founded by Australian oncologist Nikhil Pooviah. It is an app that provides patients with journey organisers and treatment plans and helps patients keep track of their appointments as it is personalised to a patient's cancer subtype. The app was launched in 2016 (Teo, 2015). Many more apps have emerged or are emerging that are assisting with important tasks such as information and

health record maintenance. The availability of these medical apps on mobile devices has made it possible to access mobile clinical resources.

Mobile technology in health care has improved efficiency and increased the quality of patient care. Since the introduction of mobile technologies in health care there have been reduced medical errors. There have been a number of innovations created specifically to reduce maternal mortality rates in Africa, twenty percent of the number of deaths in children under the age of five has been directly related to maternal health and malnutrition

Safermom Nigeria, a Nigerian mobile phone platform used as an interactive low cost platform that sends expectant mothers personalised messages, does pregnancy follow-ups, keeps track of immunisation dates and also shares child health and safety tips with mothers. The mobile phone platform has a team of physiologists, physicians and public health practitioners and partners with various NGO's, hospitals and clinics in Nigeria. Safermom's founder, an intern at a small health center serving 12,000 pregnant mothers every month, realised there was a huge gap in health literacy, social and psychological support for mothers. Since the inception of the platform there has been a 70 percent increase in health literacy levels, 60 percent of the mothers registered to the platform now go for regular antenatal care (*Safermom*). *GiftedMom Cameroon* is another free text mobile phone platform that supports new mothers and pregnant women with prenatal care and vaccine reminders thus reducing preventable mother and child mortality rates.

MAMA: Mobile Alliance for Maternal Action is a mobile phone platform that was launched in 2011, the platform sends warning signs, reminders and encouragement to expectant mothers in Bangladesh, South Africa, India and Nigeria 2-3 times a week,

this platform has been particularly useful in reducing mother to child HIV infections in the above countries. *Safe pregnancy and birth* an award winning app with information for midwives, clinical officers and NGO workers enabling them with information to care for mothers who do not have access to medical facilities. The platform deals with data collection, patient monitoring or appointment reminders and medical information, the app is available in both English and Spanish. It is clear that mobile technology is being adopted around the world as a means to reduce maternal mortality rates in developing countries with huge success (Dupree, 2016).

1.1.3 Toto Health

Kenya has a large untouched spectrum for adoption of M-health projects and applications and this can be seen in how M-PESA has become part of our daily routines and has helped the sending and receiving of money an easy process. In a way, the extensive use of M-PESA is directly involved in helping mobilise mobile phone health platforms (Mitra, 2014).

Toto Health a mobile phone health platform that utilises SMS and voice technology that was initiated to help reduce child and maternal mortality and detect issues and abnormalities during the early stages of the pregnancy. The mobile phone platform shares many similarities to *safermom* mobile phone platform from Nigeria. Toto Health is revolutionizing maternal and child health industry by leveraging mobile technology platforms. With over thirty thousand subscribers and over three million messages exchanged since its inception. (Toto Health, 2018).

The mobile phone platform's aim is to improve maternal and child health status in informal settlements and rural areas. The mobile phone platform specifically engages with expectant mothers as well as mothers with children under the age of five. The idea

is for the parents to get timely access to information with regards to child health, nutrition, hygiene and reproductive health easily and in their local language. The SMS-based mobile phone platform also monitors indicators to aid in the detection of abnormal growth in children below 5 years linking them to the nearest and right health care provider for the abnormality. Once a parent has registered to the Toto Health system they are able to get information on SMS during the various stages of the pregnancy or child's age in a timely manner (Toto Health mobile phone platform, 2018).

1.2 Statement of the Problem

Approximately 6,000 and 8,000 women in Kenya die every year during childbirth; the current maternal mortality rate is 488 deaths per 100,000 live births. Kenya has made little progress in reducing this to achieve the commitment set in the Millennium Development Goals of 147 deaths per 100,000 (Ministry of health, 2013-2017). The doctor-patient ratio in Kenya is one doctor to 17,000 of the population as opposed to the recommended one doctor for every 1,000 patients by the World Health Organisation. This clearly shows a massive gap with an enormous need that must be met (BabyMed, 2015). There remains a lack of collective community knowledge for safe and healthy pregnancy and 75% of the Kenya population lives in rural areas, often far from well-equipped health facilities with trained personnel. This broad portion of the population therefore has limited access to face-to-face coaching on healthy pregnancy (KNBS, 2014).

The Government has been making substantial strides in ensuring that all women receive maternal health care in public institutions. However, there are many issues that have yet to be dealt with if the goal to reduce maternal and infant death is to be realised. Issues such as lack of proper facilities, inadequate staff in public institutions, low

literacy and poverty levels, access to medical facilities as well as lack of information need to be addressed (Africa progress panel, 2010). The country lacks basic infrastructure like access to quality and clean water and reliable electric power in many areas. It is estimated that 42.8% of women were able to access a skilled health practitioner while the rest couldn't due to distance to health facilities. Poor infrastructure was a major hindrance to developing countries achieving the 4th and 5thMDGs that ended in 2015. Besides infrastructure shortage of health workers, nurses and midwives in especially rural areas puts a strain and overburdens the few that are available thus compromising on the quality of their health care (Essendi, 2015).

Toto Health is a mobile phone health platform that utilises SMS and voice technology that was initiated to help reduce child and maternal mortality and detect issues and abnormalities during the early stages of the pregnancy. Although this technology has been effected in various informal settlements in Nairobi, its contribution towards reducing maternal health care and the extent to which it is impacting on lives of expectant mothers and children below the age of five is not known. This study will evaluate, Toto Health as a mobile phone platform that is aimed at reducing child and maternal mortality rates in select informal settlements Nairobi.

1.3 Study Objectives

1.3.1 General Objective

The general objective of this study is to investigate the performance of Toto Health mobile phone platform in reducing maternal and child mortality in Mukuru Kwa Njenga an informal settlement in Nairobi County.

1.3.2 Specific Objectives

The specific objectives are:

- i. To find out the type of information that expectant mothers access on the Toto Health mobile phone platform.
- ii. To assess how expectant mothers use the information received from the Toto Health mobile phone platform.
- iii. To investigate the ways in which Toto Health mobile phone platform can improve the lives of expectant mothers and children below five.
- iv. To find out if there are any challenges that Toto Health mobile phone platform faces while disseminating information to expectant mothers.

1.4 Research Questions

This study will answer the following questions:

- i. What kind of information do expectant mothers access on the Toto Health mobile phone platform?
- ii. How do expectant mothers use the information received from the Toto Health mobile phone platform?
- iii. Can Toto Health mobile phone platform improve the lives of mothers and children below the age of five?
- iv. Are there any challenges that Toto Health mobile phone platform face while disseminating information to expectant mothers?

1.5 Significance

Toto Health mobile phone platform uses SMS and voice innovation that was started to help lessen child and maternal mortality and identify problems during the early stages of the pregnancy. Knowledge of the platform will help reduce maternal and child mortality in Kenya.

1.6 Justification of the Study

The findings of this study will be useful to various stakeholders: to scholars as it will add to the existing knowledge on the impact of a systems model on maternal health care services in Kenya, the applicability of maternal health care systems.

To policy makers involved in the reduction of maternal mortality rates in the country particularly by informing decision making, policy making and Innovation in health campaigns by organisations such as the Ministry of Health, Beyond Zero campaign, NGO's, as well as Health practitioners and policy makers. Organisations such as the first lady's beyond zero campaign initiative and NGOs engaging with expectant mothers living in informal settlements and rural areas who do not have adequate access to information and health care, such as PATH International, White Ribbon Alliance, Care International, Kenya Health Care Federation, and UN Women. This study will help the above organisations assess whether this platform will help them achieve maternal health care country including areas where access to medical facilities is a problem.

The study may also assist the government in budgeting process as it forms the basis of determining how resources should be allocated to our health deliveries with the aim of reducing maternal deaths while promoting economic growth and development.

Finally, with the implementation of free maternal health care in all government facilities, this study may assist policy makers in the jubilee government to develop a comprehensive policy

1.7 Scope and Limitation of the Study

The study sample population will be expectant mothers and parents with children below the age of five registered to the Toto Health Platform in Nairobi Count, Mukuru Kwa

Njenga informal Settlement area. This area is among the areas where the community organising model (COM) is attributed to the synergy created through strategic collaborations of Community Advocacy Groups (CAGs) in health care (Kenya Medical Association, 2017). Therefore the study was limited to evaluating of Toto Health platform's performance. The study was carried out over a period of 6 months.

1.7 Operational Definitions

Maternal health: In this study maternal healthcare refers to the health of women during pregnancy, childbirth and postpartum

Child health: In this study child health refers to the health of children who are five years and below.

Maternal Mortality: In this study maternal mortality rate refers to the death of a woman due to pregnancy complications.

Child Mortality: The number of children who die before the age of five.

Mobile phone platform: The use of the mobile phone to disseminate information to the public.

Toto Health: a mobile phone platform that uses mobile technology to help reduce maternal and child mortality as well as detect development abnormalities in early stages.

M-health: the usage of mobile telecommunication to increase wireless healthcare delivery systems and to improve the lives human beings as a whole.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter reviews relevant literature on the performance of Toto Health mobile phone platform in curbing maternal and child mortality. The chapter develops an empirical review that was used in the study and a theoretical review.

This chapter addresses maternal health as a concept, details the theoretical literature as well as the empirical literature relevant to this study. In this regard, it reviews the documented literature on the various concepts in the topic of interest and identifies the research gap to be addressed.

2.1 Maternal Health Care and ICT

Maternal health under development communication has been reviewed in many different studies under health communication. There is a visible gap between maternal health care in developed countries and maternal healthcare services and facilities in developing countries. There have been noticeable improvements in the field of maternal health especially in sub-Saharan Africa from the year 1990 to date. There however, is a significant amount of maternal deaths caused by haemorrhage, unsafe abortions together with hypertensive diseases of pregnancy that could have been avoided (Summit, 2010).

Prenatal care is dependent on expectant mothers getting proper education on maternal health care. According to study data used from the 1992-1993 National Family Health Survey in selected states in Northern and Southern India it was found that the southern states fared better than the northern states on all selected characteristics being that the southern states were more affluent. On matters of literacy among females aged 6 and

older lay at 66% and 77% in Madhya Pradesh and Rajasthan respectively (Northern States) compared to 18% and 62% in Kerala and Andhra Pradesh respectively in the South. More statistics were compared with the states Uttar Pradesh in the North and Tamil Nadu in the South and it showed that less than a third of homes in Uttar had electricity compared to the two thirds in Tamil (Govindasamy, 1997).

Despite the overall decline in the sector of infant mortality, before the National Family Health Survey, 1 in every 10 children died in Uttar Pradesh during the first year of their life. This study sought out to explain the association between maternal health care education and the utilisation of maternal and child health care services. Educated mothers are more likely to recognise a problem and seek medical attention. They were also likely to make greater utilisation of modern health services and being able to break away from tradition thus safeguarding themselves and their children.

According to a UNICEF survey, only half the births of illiterate women in India received antenatal care compared to the 79% of literate women with less than middle school education and 90% of women with at least a middle school education. Maternal education and child healthcare are therefore simultaneous. The report also stated that most children who do not receive adequate healthcare after birth, died from respiratory ailments, gastrointestinal diseases and six vaccine-preventable diseases: TB, Diphtheria, Whooping cough, Tetanus, Polio and Measles (UNICEF, 1990). Children born to mothers with at least a middle school education were 62% more likely to be taken to a health facility for treatment compared to the children born of illiterate mothers. This goes on to show that education played a huge role in maternal health. This research verified the positive relationship between a mother's education and her ability to seek maternal and child health services by examining the utilisation of antenatal and delivery care and child care (Govindasamy, 1997).

Another challenge facing the fight against maternal and child mortality is prenatal and maternal health care services because the access to prenatal care like supplements, HIV testing and Malaria prevention is a major hindrance. Taking an example from Ecuador, the country has a free maternity and child care law that oversees that every woman has the right to free quality maternal healthcare during pregnancy. This includes postpartum services and access to reproductive health programmes.

To quote President Paul Kagame at the 2007 'Connect Africa Summit' he stated that in ten short years, what was once an object of luxury and privilege, the mobile phone has become a basic necessity for Africa. Without realising it, many lives have been transformed by the introduction and usage of mobile phones and they have become an important stakeholder in economic development especially among Africa's poorest countries.

Kenya's mobile penetration in the 2015/16 financial year reported at 88% according to the study statistics with 37.8 million subscribers from the 36.1 million in the previous year and the numbers are surely to increase as we move forward. It was also reported that the number of internet users grew from 29.6 million to 31.9 million (Authority, 2016). The number of mobile phone user is expected to surpass five billion by next year which would be a round-up of 67% globally with 36 percent of the global population using smartphones.

Toto Health mobile phone platform is at the forefront when it comes to reducing maternal and child mortality rates in Kenya. Following a report done by GSMA Mobile for Developments, there was a proposal for the utilisation of technological advancements low healthcare settings including maternal health. Toto Health provides Kenyan moms with information about how to take care of themselves and their babies

during and after pregnancy. Its vision is to transform lives through creative and innovative relations while providing services and solutions that deliver more value to their customers. Kenya has been listed among the top 10 countries where it is dangerous for expectant mothers to live in. this is because between 6000 and 8000 women die during childbirth alone with the current maternal mortality rate being 488 for every 100,000 live births (BabyMed, 2015).

2.2.1 How Expectant Mothers Use the Information Received From the Toto Health Mobile Phone Platform

Giving birth is a very fulfilling experience especially for first time mothers and unfortunately this is a privilege that only women in developed countries where majority of expectant women have access to better healthcare and medical attention. When women take care of themselves during the nine months of pregnancy, they get to enjoy natural and safe birth. This is a benefit for the mother but also for the baby as well. Without the aftermath of anesthesia during delivery (epidurals), or the soreness and tenderness that comes after C-section deliveries, mothers who are able to have a natural birth recover more quickly than those who don't and are able to start walking around much faster after natural births(Natural, 2018).

A study was conducted in Peru to explore the hypothesis of formal education and its relationship to maternal health. It sought to find out whether formal education did in fact have an impact on access to maternal healthcare services by expectant mothers. The findings were consistent with the hypothesis giving reliable estimates on the noticeable positive effect of maternal education and access to prenatal and delivery care. Numerous studies have been conducted since in developing countries successfully showing a positive association between maternal education and child survival (Elo, 1992).

A study conducted by the World Fertility Survey in India showed that education, exerted strong influential tendencies in the reduction of maternal and child mortality levels. It has been a strong hindrance in the fight against preventable mother and child deaths and this can be related to developing areas in sub-Saharan Africa (Govindasamy, 1997).

There have been multiple debates on whether provision of multiple healthcare services will in turn increase utilisation. Nepal has the highest mortality rates in South Asia, a study was conducted by UNICEF to try and figure out factors influencing their low utilisation of maternal healthcare services with respect to women's status and household structure. According to the findings, women with low status were less likely to access or use modern facilities in retrospect to women with a higher status. This is because in many developing countries the type of healthcare facilities accessed by the women and children in need was of low quality (Masaki, 2001).

The findings of the Nepal study clearly indicated how important maternal education is in the utilisation of maternal healthcare services. Educated women are more likely to realise benefits and advantages of staying healthy and are therefore more likely to utilise services available to them. Education also increases knowledge of modern healthcare services and facilities which in turn increases the demand of these modern healthcare services which in this case is the mobile phone platforms for expectant mothers (Matsumura Masaki, 2001). A study was conducted in the country of Thailand on Education and the use of maternal healthcare. Its main focus was to analyse the impact of female education in relation to their use of maternal healthcare services within the country. There was a distinct positive effect on schooling and prenatal care especially in relationship between secondary educations which emerged as the most consistent predictor of health service use (Raghupathy, 1996).

When there is an increase in education levels among women especially in underdeveloped countries, it positively impacts the maternal mortality ratio influencing other aspects like access and utilisation of maternal healthcare services as well as changes in women's reproductive behaviour and their levels of sanitation (Koch, 2007). Between the years 1990 and 2010, there has been a significant reduction specifically by 41% in maternal deaths and 33% in infants. These deaths are much higher in countries with a lack of skilled healthcare professionals at delivery. Africa continues to lead, being the continent with the highest rates of child mortality with one in eight dying before the age of 5 compared to the 1 in 17 ratio in developed countries (Sparrow, 2014).

People who are less privileged in many countries have less access to health services and health practitioners than those who are better off. The causal relationship between these two, both health and poverty, has been studied by several researchers over the past few years, poverty has been recognised as going past the borders of material and financial assets to be understood as also the lack of freedom to lead the life someone chooses to. Access to health services also can be understood in multiple ways other than access to uses of services in times of need. It can also be understood as supply or opportunity for use of services as well as the actual usage of the health services (Peters, 2008).

Kenya, has the most affluent resource in Eastern Africa, however, the country still has some of the worst outcomes in maternal health. In the year 2010, 360 women out of 100,000 died ranking the country at position 51 out of the 75 countries responsible 95% of maternal deaths. In 2003, the child mortality rate in Kenya was at 115 per 1000 children compared to 88 per 1000, which was the average for sub-Saharan Africa (Abuya, 2011).

Poor infrastructure is another critical factor that is an obstruction towards access to these mobile phone messaging platforms. There are still mothers especially in rural areas that are not able to access either a mobile phone or a source of electricity. Infrastructure is an important in enhancing economic and social development in the country, which in turn leads to eradication or improvement of poverty levels (Hope, 2011).

A study was conducted in Kenya to find out the effect of maternal education on Immunisation patterns and nutrition status. It was found that mothers who lacked any formal education were extremely worse off than mothers with a primary education were 2.17 times more likely to be fully immunized (Abuya, 2011).

Over the past few years, Kenya has made major improvements, with the launch of the Beyond Zero Campaign by First Lady Margaret Kenyatta. The First Lady launched the campaign on the 24th of January 2013 in a bid to lend a helping hand towards the country's depressing maternal mortality rates.

2.3. Information Acquired by Users through this Mobile Phone Platform

Short Message Service (SMS) as well as Multi-Media Services (MMS) are offering support to medical practice and preventative healthcare. A study was conducted by *Vodopivec-Jamsek V* from the *London School of Hygiene and Tropical Medicine* on the co-relationship between mobile phone messaging and preventative healthcare. Its main objective was to assess the effects of mobile phone messaging as a mode of delivery for preventative healthcare, health status and health behaviour outcomes. From the primary results it was noted that there was a notable amount of evidence that showed women who received prenatal support via mobile messaging had a higher satisfaction than those who didn't. It was reported that their confidence levels increased while their

anxiety levels decreased. There was also high quality evidence that participants receiving mobile messaging support had a higher likelihood of quitting smoking and taking their Vitamin C than those who were placed in a control group (Vodopivec-Jamsek, 2012).

Through different advancements in information and communication technologies. One of the main goals and aspects of expanding ICT has been to improve the quality health care, women can receive quality health care from an attendant who is not within their reach. ICT has also been seen to remove the boundaries between inpatient and outpatient care while also giving room for efficient and quality patient care in general (R. Haux, 2001).

2.4 Mobile Technology Challenges

Although mobile phone platforms have brought with them many benefits they are faced with numerous challenges the one disadvantage is privacy especially when dealing with confidential patient information. Mobile phone platforms have confidential user information and are likely vulnerable to outside or inside attack and with limited government oversight or incentives to educate users on security, privacy and identity protection (Hanumandas, 2016).

When considering the aspects of privacy especially on critical information like health status of a patient, it is important to consider training users in methodological factors such as management of passwords as well as management of data that contains patient information. Poorly trained users will find it difficult to adapt to the new technology which will only bring about negative outcomes that will have users thinking the mobile phone application itself is untrustworthy. Poorly trained personnel also open a gateway to cybercriminals who can easily get hold of a patient's information (Gurupur, 2017).

Kenya is known for its use of mobile technology in various sectors such as mobile banking with applications like M-PESA and ZOONA. However there seems to be very few mobile health technologies that have been created to improve the health sector. Many mobile health technologies created have not advanced past the pilot stage and are yet to be integrated into the healthcare system. This may be due to the fact that majority of the population especially those living in the rural areas have not adopted the use of smart phones and many of the mobile phone technologies formulated rely on smart phone use (Mitra, 2014). Another challenge is inadequate infrastructure. Electricity supply in Kenya is inconsistent or lacking in many rural areas. This makes it difficult for mobile technologies created to be sustainable (Mitra, 2014).

There are also some technological challenges such as the ease of use, information and security. There is also an unwillingness to adopt these technologies. ICTs can be defined as tools that facilitate communication by electronic means from radio and televisions to mobile phone handsets. Electronic healthcare has been a result of the merging of ICT software and healthcare or healthcare related services. In a larger perspective, ICTs in healthcare have brought about a new way of working with a commitment to a global network, which has improved healthcare locally, regionally and globally. In summary, ICT adoption in healthcare needs effective organisational communication among those involved in order to move the ICT adoption process to a success (Zakaria, 2010).

2.5 Ways in Which Mobile Technologies Have Improved Healthcare

M-health is the use of mobile telecommunication to increase wireless healthcare delivery systems and to improve the lives of customers or human beings as a whole. Mobile technology has helped in addressing some of the public health challenges. According to the International Telecommunications Union, mobile coverage has

increased its reach to 90% of the world population and 80% of the world's population living in rural areas (Tigest Tamrat, 2012). A UNICEF funded programme in Madhya Pradesh in India offered expectant mothers a health telephone helpline, complimentary ambulance system and drivers equipped with mobile phones in a bid to deal with the challenge of delays in seeking obstetric care. M-health also supports the exchange of information in a bid to increase health promotion often through the generation of short-message service to expecting mothers (Tigest Tamrat, 2012). Mobile phone technologies are allowing individuals to self-monitor diets, weight or physical activity, thus helping individuals improve their health care. There are also mobile phone apps using text messaging to help constant smokers quit smoking with a combination of traditional quit-smoking programme. (American Heart Association Scientific Statement, 2015).

Telemedicine refers to the methods of advancing healthcare based on telecommunications technologies used by healthcare practitioners. Telehealth is becoming a popular trend being adapted globally. This is especially useful in rural areas where access to hospitals and other health related services are lacking. Patients can now use their computers to virtually communicate with a doctor who is possibly on another county or continent. According to an Alliance for Connected Care study, tele-health services can save up to \$100 per doctor visit. Another study that was published in *Chest Journal* shows patients in an ICU equipped with tele-health services were discharged 20% faster and had a 26% lower mortality rate than traditional ICU's (White, 2017).

M-health is already being used to monitor a variety of conditions including heart disease, diabetes, autism, insomnia and asthma. There are a lot of advantages that come with mobile phone healthcare platforms and this includes its versatility across all areas of healthcare and its potential to improve the health monitoring of at-risk patients. M-

health will pave way for earlier interventions and significantly decrease admissions to hospital as well as visits to healthcare practitioners in general. There is also a potential for biometric hardware and real-time health analytics, especially when considering a lean healthcare environment.

Locally, the introduction of M-health has also significantly improved data collection and management in the maternal and child healthcare spectrum. This is because health workers and practitioners collect data after every delivery for immunisation purposes and programmes. For example in Tanzania, SMS services were linked to health data systems that recorded the weekly progression of pregnant women. Midwives in Indonesia also collected patient information in order to advance the ability of healthcare professionals in the monitoring of the expectant mothers even though they were physically separated at the time (Tamrat, 2012).

BabyMed, another Kenyan mobile health platform, provides both stage and age based information together with global practices while also providing follow-ups on Antenatal care and reasons why mothers should prioritise antenatal care in the first place. Their messages also include self-care during and after pregnancy as well as infant care during the infant stages. *BabyMed* has increased access to high quality, relevant local health information which has in turn improved health-seeking and preventative behaviours among mothers, including uptake of antenatal care, early care-seeking in response to things like childhood illness and hand washing, which has contributed to improved maternal and child survival (BabyMed, 2015).

Toto Health a mobile phone health platform that utilises SMS and voice technology was initiated to help reduce child and maternal mortality and detect issues and abnormalities during the early stages of the pregnancy. Toto Health is revolutionising

maternal and child health industry by leveraging mobile technology platforms. With over thirty thousand subscribers and over three million messages exchanged since its inception (Toto Health, 2018).

Through mobile phone technologies, we are able to run healthcare related software applications in different health related sectors including maternal and child care. A 2015 study on trustworthy apps for maternal and child health focused on ten free maternal health care mobile phone platforms available on both Google and Apple stores in order to determine the level of trust and overall technical performance. It was found that out of the ten applications only four of them were fully functional. It raises the question of the great variation when it came to these maternal and child care applications and overall functionality (Scott, 2015).

2.6 Theoretical Framework

2.6.1 Health Belief Model

This study will be based on the Health belief model. This is a psychological model that attempts to explain and predict health behaviours and is done by focusing on the attitudes and beliefs of individuals. Health Belief Model was first developed in the 1950s by social psychologists in response to the failure of the Tuberculosis screening programme and adapted to explore a variety of long term and short term diseases as well as HIV transmission (Hayden, 2009). In the 1950s, US public health researchers began developing psychological models designed to enhance the effectiveness of health education programmes (Hochbaum 1958; Rosenstock 1966). The relationship between health beliefs and behaviours was conceptualised primarily in terms of Lewin's (1951) idea of 'valence'. Particular beliefs were thought to make behaviours more or less attractive. This resulted in an expectancy-value model of belief-behaviour relationships

in which events believed to be more or less likely were positively or negatively evaluated by individuals.

The Health Belief Model was developed to help people understand why prevention techniques were something many people failed to adopt. Afterwards, it was then assimilated to help understand and analyse a patient's reaction to certain medicinal drugs. Its basis is in its two fundamental aspects of health-related behaviour which are; a desire to avoid illness and faith that a specific health action will prevent or cure an illness (Lamorte, 2016).

The Health Belief Model is among several scientific applications and frameworks like Social Learning Theory that have been applied successfully to help in the explaining, influencing and predicting (Rosenstock, 1988). It is a fundamental aspect in research communication with six pillars that are used to predict health behaviour namely; risk susceptibility, risk severity of behaviour, benefits to action, and barriers to action, self-efficacy and cues to action. Though the Health Belief Model is rarely used by researchers and communication experts, it has aided in trying to understand conflicting past results and tries to facilitate easier future research (Jones, 2014).

Perceived susceptibility is the level of risk a person or patient has to acquire a certain disease while perceived severity can be defined as a patient's attitude towards the contagiousness of a disease in relation to treating the disease or not. Benefits to action is the level of effectiveness to treating the said disease, the direction a person decides on taking during prevention or treatment of a disease relies on the analysis of both the perceived susceptibility and the perceived severity thus the recommended action will be perceived as beneficial. Perceived barriers or barriers to action are all things that try to hinder a person from getting the required medical attention like lack of finances. Cues to action are the various incitements that induce the decision-making process for

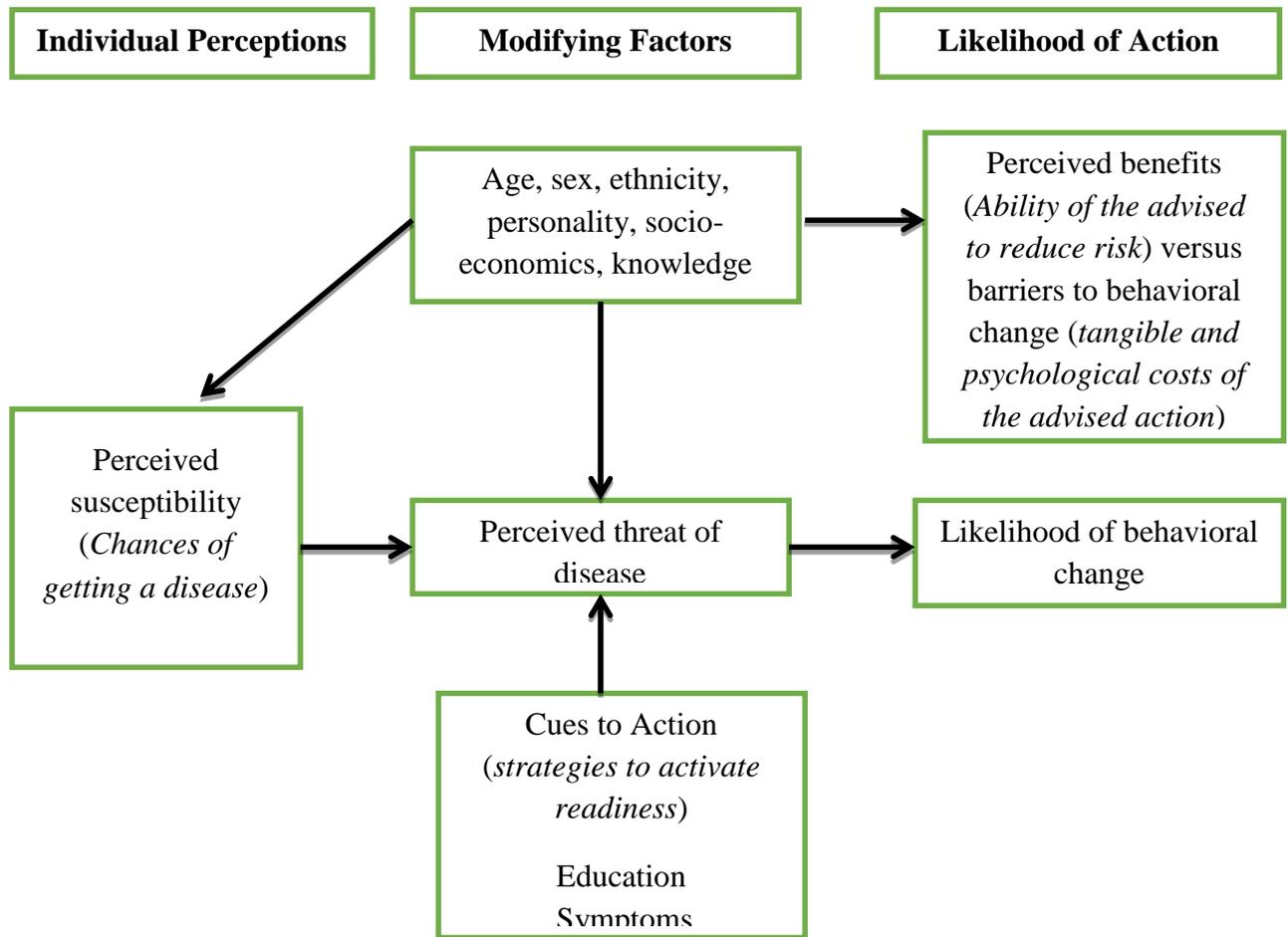
example advice from friends and family or elevation of sickness or symptoms, reasons why any individual would feel they are threatened by a serious disease. Self-efficacy can be defined as the level or ability of a person or patient to successfully perform any of the above behaviours. This fundamental pillar was however added mid 1980 after the formation of the Health Belief Model (Lamorte, 2016).

According to Irwin, a Professor and Director at the Centre for Health and Behaviour Studies at the California State University at the time. The Health Belief Model hypothesises that health-related action depends on the simultaneous occurrence of three classes of factors: The existence of sufficient motivation (or health concern) to make health issues salient or relevant. The belief that one is susceptible (vulnerable) to a serious health problem. The belief that following a particular health recommendation would be beneficial in reducing the perceived threat, and at a subjectively-acceptable cost.

This theory is important to our study as it helps us understand why mothers chose to seek treatment or not during and after pregnancy as well as what kind of treatment a woman seeks to pursue.

However, the theory has the following drawbacks it assumes behaviour is rational, and therefore ignores emotional responses to perceived risk assumes people have the skills to alter the behaviour and ignores social context of behaviours. Also, it doesn't account for social related factors that influence health behaviour, since the theory focuses on an individual and leaves out the belief that you can perform behaviour but leaves out the perception that the person will be able to follow through with the behavioural change (self-efficacy)

Figure 2.1: Health Belief Model



Source: Glanz et al, 2002 pg. 52, (Communication theories, 2017)

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter focuses on the research design, target population sample and sampling procedure, validity and reliability of instruments and data collection procedures that were undertaken during the research.

3.1 Study Site

This study was carried out in Mukuru kwa Njenga Slum where the Toto Health mobile phone application is in use. This area, like many informal settlements, is characterised by high mortality rates, high poverty levels and low quality health services. Expectant mothers living in this area do not have access to proper medical health care, staff in government hospital are not able to sustain the high population in these areas. This area is also characterised by low literacy levels, the residents therefore lack adequate information on prenatal and postnatal care (KDHS, 2014).

3.2 Research Design

The study used a descriptive research design. A qualitative design is ideal for this study because this study sought to assess how the Toto Health mobile phone platform has added value or not added value to the lives of expectant mothers in Nairobi and how it can be adopted by others.

3.3 Research Approach

A qualitative approach is a general way of thinking about conducting qualitative research. It describes, either explicitly or implicitly, the purpose of the qualitative research, the role of the researcher(s), the stages of research, and the method of data analysis. The study got qualitative data from key informant interviews such as expectant

mothers, individuals behind created the platform, the individuals who generate information from the platform (midwives and nurses) as well as the platforms end users that is expectant mothers and mothers with children below the age of five who live in Mukuru slums. This study sought to understand in depth the effect that Toto Health mobile phone platform has had on expectant mothers registered to the platform by gauging the respondent's personal experiences, attitudes and feelings.

3.4 Target Population

Cooper defines target population as the population of interest from which the individual participants are objects from which the data is taken (Cooper, 2011). The target population was expectant mothers and mothers with children under the age of five in Mukuru Kwa Njenga in Nairobi County, as well as users and beneficiaries of the Toto Health mobile phone platform. The target population of this study was 3,000 expectant mothers and mothers with children below the age of five from Mukuru slum registered to the Toto Health mobile phone platform.

3.5 Sample Size and Sampling procedures

3.5.1 Sample Size

According to a report by the UNDP (UNDP 2010), there are 110,000 households in Mukuru kwa Njenga informal settlement and a population of about 600,000 individuals. About 60% of this population is women and children (KDHS, 2014). This area has a high number of expectant mothers and mothers of children below the age of five registered to the Toto Health platform mobile phone platform. Toto Health has registered 3,000 expectant women, and men with expectant wives from Mukuru Kwa Njenga slums.

From this population, a sample of thirty six expectant women and women with children below the age of five was selected.

3.5.2 Sampling Procedures

The sampling procedure used in this study is purposive sampling which is a non-probability sampling technique. Purposive sampling like the name suggests is very deliberate. Its goal is to focus on certain aspects of a population in this case, expectant mothers and mothers with children below the age of five who are registered to the Toto Health mobile phone platform. The type of purposive sampling technique that this study will employ is homogeneous sampling. This is because the study's sample population is going to be women who are about to give birth or have given birth to children and have been registered to the Toto Health mobile phone platform. Purposive sampling is ideal for this study because it will allow us to get in depth data from key individuals and will also save on time (Patton, 2002).

3.6 Data Collection Methods

This study made use of focus group discussions and key informant interviews as the main data collection methods. The data was collected using focus group interview guides. The study had 4 focus group discussions with a total of 8 participants each. Going into the study, the researcher had assumed that all participants in the focus group discussions would be women. However during the research process, the researcher came across men who are enrolled in the Toto Health mobile phone platform who joined in the focus group discussions. Five men and twenty seven women were participated in the study. The participants were drawn from residents of Mukuru kwa Njenga Slums registered to the Toto Health mobile phone platform. The study also collected data from the key informant interviews, the tool used was interview schedules. A total of four

key informant interviews were carried out, participants for the key informant interviews included an Individual from organisations championing for maternal health care who have made use of Toto Health mobile phone platform in their fight to reduce child mortality, midwives and nurses working with the platform to provide information to women registered to this platform in a timely and concise manner, as well as the creators of the mobile phone platform. The Interview guides had open-ended questions. The guides were simple and easy to understand. The tools had the type of information accessed in the platform, how this information is being put to use as well as how the information is improving the lives of expectant women and parents with children below the age of five.

3.7 Data Analysis and Presentation

Qualitative data collected from the key informant interviews and the Focus group discussions was analysed using narrative analysis and has been presented in a narration form. The data was analysed thematically and is presented in prose. Narrative analysis helped the study deduce the experiences of the mothers who have used the Toto Health mobile phone platform.

3.8 Ethical Considerations

For ethical consideration, the researcher will obtain s certificate of fieldwork to collect data from the University (see appendix V). A permit was sought before embarking on the study. This letter assisted the researcher to acquire authority to collect data (see appendix I). The researcher obtained written consent from all participants. Anonymity was also guaranteed to participants who do not wish to reveal their identity in relation to the study especially in the case of young mothers. The respondents were assured that the data is exclusively for academic purposes. Focus groups discus5sions were held in

Kiswahili, to allow the subjects to express themselves better. The researcher then obtained a certificate of plagiarism and a certificate of corrections that ascertains that the study is up to standard (see appendix VII and appendix VI).

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Overview

This chapter presents data collected from the field, its analysis, the interpretation of the findings on the performance of Toto Health mobile phone platform in reducing maternal and child mortality in Mukuru Kwa Njenga, an informal settlement in Nairobi County.

4.2 Response Rate

Out of the thirty six participants and key informants targeted by this study, thirty six people successfully responded to the interview. Of these, four were key informant interviews which included an Individual from organisations championing for maternal health care who have made use of Toto Health mobile phone platform in their fight to reduce child mortality, midwives and nurses working with the platform to provide information to women registered to this platform in a timely and concise manner, as well as the creators of the mobile phone platform. This response rate was excellent and representative.

4.3 Background Information of Research Respondents

Thirty two participants participated in the focus group discussion, two midwives were interviewed, the creator, and an individual from the white ribbon alliance bringing the total number of respondents to thirty six. Four focus group discussions each with eight participants were used. Out of these twenty seven were female while five were male. The number of females is higher than that of males because of the total population characteristics of the users of Toto Health mobile phone platform.

The respondents were aged between twenty to forty years of age. The distribution of the respondents according to age was as follows: six were between twenty to twenty five years old; thirteen were between twenty six to thirty years, nine were aged thirty one to thirty five years while four were aged between thirty six to forty years. Six respondents used the platform after pregnancy only while twelve users used the platform during and after pregnancy. This could be explained by the fact that during the pilot phase, Toto Health mobile phone platform was availed to expectant mothers for free hence many who were expectant at the time enrolled and were able to benefit from it during and after, once the pilot phase ended , the platform introduced a fee and in the process many users unsubscribed. Of the respondents in the focus group discussion, twenty used the platform during their first pregnancy. This could be because of the anxieties of first time pregnancies and the tendency by mothers to seek as much information as possible on their health and that of the baby.

This research focused on Mukuru slums in Nairobi County. Three types of respondents were interviewed for this study; expectant mothers and parents of children under five years who are end users of the Toto Health mobile phone platform; Nurses and Midwives who provide the information shared on the platform and the creator of the platform. Collection of data from the end-users was by way of focus group discussions while information from the creator, nurses and midwives was by way of face to face interviews.

4.3 Evaluation of Toto-Health Mobile Phone Platform on Maternal and Child Health Care

4.3.1 Type of Information Accessed on Toto Health mobile phone platform

The researcher sought to establish the type of information accessed from the Toto Health mobile phone platform. The aim of this research paper is to establish the effectiveness of Toto Health mobile phone platform, it was important to first understand how the end users learnt about Toto Health mobile phone platform. The following is an excerpt of the responses given when participants were asked to state how learnt about Toto Health mobile phone platform.

Question: How did you learn about Toto Health mobile phone platform?

P1: I learnt about Toto Health mobile phone platform through a friend while attending the burial of a neighbour who had died while giving birth.

P2: I learnt about Toto Health mobile phone platform through a midwife in Mukuru clinic health facility while attending my ANC.

P5: I learnt about Toto Health mobile phone platform during weekly chama meetings one of the ladies spoke about how the platform had helped save the life of her child when she got burnt and therefore thought it would be a good platform to join.

From these responses, it was clear that participants were well aware about the presence of Toto Health mobile phone platform. One of the nurses whose job description is to provide content for sharing on the platform noted that: she has been a midwife for over twenty years and has helped deliver over two thousand babies. Some of the developmental issues babies and mothers face are almost similar. However, she makes

sure to do more research on a case by case basis to ensure the information was timely and relevant to the user. The researcher further sought to find out how often the participants used the information in the SMS send to them giving examples on type of information they receive from the Toto Health mobile.

Question: How often did you use the information in the SMS send to you, give

An example on type of information you receive from the Toto Health mobile phone platform

P6: Every week; I use it to get information on reproductive health and baby Immunisation schedules.

P4: On monthly bases as a reminder to attend my ANC clinics, Antenatal care, healthy pregnancy and safe delivery.

P5: Twice a week; I always looked forward to the text messages every Monday and Thursday morning with information on what to expect from the baby at the age he was, how many hours of exercise I needed, vaccination dates and medical facilities near me as well as what foods to feed the baby and myself.

From this above excerpt, the aspect on convenience and variety of timely information was echoed by most of the focus group discussion participants who observed that the platform provides information relevant for both the baby and the mother, during and after pregnancy up until the baby is 5 years old. The information provided was on Antenatal care, healthy pregnancy, safe delivery, child development and stimulation, breastfeeding/nutrition, reproductive health, postnatal care, clinic dates and immunisation reminders, parenting and hygiene. These findings concur with those of Tamrat (2012) who found that there are a lot of advantages that come with mobile phone

healthcare platforms and this includes its versatility across all areas of healthcare and its potential to improve the health monitoring of at risk patients. SMS services are linked to health data systems that recorded the weekly progression of pregnant women. Midwives can collect patient information in order to advance the ability of healthcare professionals in the monitoring of the expectant mothers even though they were physically separated at the time.

The researcher also sought to establish the inspiration behind Toto Health mobile phone platform from its developer. The developer who was a key informant in this study averred that the choice of topics was informed by research and personal experience on the most pressing needs of pregnant mothers and parents of children below 5 years. The developer asserted that he lost an aunt and her two unborn babies as well as pregnant classmate because they did not have access to information on how best to take care of their pregnancies. This motivated him to find a convenient way to ensure that pregnant mothers and parents were well informed. Felix Kimaru began his research on what kind of information they needed, he added that he spoke to health professionals, read books and online sources as well as spoke to pregnant mothers and parents about their needs. The Health Belief Model supports the findings of this study in its persuasive argument that it was developed to help people understand why prevention techniques were something many people failed to adopt. Afterwards, it was then assimilated to help understand and analyse a patient's reaction to certain medicinal drugs. Its basis is in its two fundamental aspects of health-related behaviour which are; a desire to avoid illness and faith that a specific health action will prevent or cure an illness (Lamorte, 2016).

4.3.2 How Expectant Mothers and Parents of Children Under 5 Years Use the Information Received From the Toto Health Mobile Phone Platform

Providing information is one thing, however for communication to be considered as having taken place in an effective way, the end user must find the information useful. To this end, the researcher sought to establish if the parents and pregnant mothers really did find the information provided useful. Participants in the focus group were asked to raise their hands if they did find the information useful. All the participants in the focus groups responded in the affirmative. Whereas this could be said to be a true representation of the effectiveness of information received, the researcher is cognizant of the fact that this being a group setting some may have felt shy and feared being singled out for responding otherwise. Through this findings, the study is in consonance with the findings of Otieno et al, (2010), which asserted that knowledge on health matters gives one the basic skills on both antenatal and postnatal care. This knowledge is acquired through seminars, campaigns, experience and exchange between women. There are campaigns in the country that are aimed at encouraging mothers to be involved in maternal health care delivery systems in various hospitals in the country. This is because despite the low number of health care providers in the country, the government is making a number of efforts to ensure that professional health care services are accorded to various individuals in the country especially to pregnant mothers. The researcher therefore asked follow up questions to allow for use of examples and citations on how useful the information provided was. One of the questions posed was:

Question: What did you like best about Toto Health mobile phone platform?

P1: As a man, I had anxieties and questions about what was going on with my wife and what to expect. Unlike women who openly discuss issues related to

pregnancy, for men it is quite rare. With Toto Health mobile phone platform I felt I had a friend I could ask anything and everything and they responded on time and in a friendly way as a first time father.

- P2: I have a very busy schedule, getting reminders of what vaccinations were due as well as where to get them was really helpful.
- P3: As a first time mom I didn't know where to attend my ANC clinic but Toto Health mobile phone platform linked me with the nearest and right health care provider.
- P4: Whenever I went to the public hospital I found that there were very long lines and by the time it was my turn after waiting the whole day the nurses were rude and didn't always give me the answers I wanted. The platform therefore helped me to build more confidence as a first time mother.
- P5: The best thing about this platform is that it tells you things before they happen for example, I got a notification that when my child starts teething they would be irritable they would cry all the time, and they would even diarrhoea and refuse to eat. So when this finally happened, I did not panic or worry because I knew my baby was teething. If it wasn't for the platform I probably would have taken my child to hospital for no reason.
- P6: There was a time during the fourth month of the pregnancy, that I started experiencing a lot of pain in my lower abdomen and then I started bleeding. I live very far away from the hospital and the bleeding occurred at night. So we messaged the mid wife on Toto Health who gave us a few tips on what to do to help the pain subside before visiting the hospital the next morning. They also

told us of more danger signs to look out for. I was aware of symptoms even before I experienced them. It felt nice to have somebody help us on the other end. When I got to the hospital the nurse told me that Toto Health had saved my baby otherwise I would have had a miscarriage.

This question sought participants to single out aspects of the Toto Health mobile phone platform that they liked. Unmistakably the mothers get auspicious access to data with respect to child's health, sustenance, cleanliness and conceptive health effectively and in their dialect. The SMS-based mobile phone platform likewise screens markers to help in the identification of anomalous development in children below five years connecting them to the closest medical services providers. When a parent has enlisted to the Toto Health mobile phone platform they can get data on SMS during the different phases of the pregnancy.

From the responses, there was a clear association between male attendance to at least one antenatal care visit and delivery by a skilled birth attendant. In most cases, men who have subscribed to Toto mobile phone platform so as to encourage their wives to attend clinics, help prepare and save money for delivery and arrange transportation to the hospital. These findings are in line with the findings of a study conducted in early 2010 in Nairobi County in Kenya found that the outcomes associated with male attendance at maternal health care included knowledge of maternal health care services, women giving birth at a health clinic, distance to health facility and men desiring no further children. The study also found out that one of the strongest factors was knowledge about maternal health care services. Therefore, husbands' awareness on maternal health care systems is very critical and can be used in improving and implementation of free maternal health care in Kenya.

Question: What other source of information (if any) did you rely on for information during your pregnancy/raising your child? How does it compare to Toto Health mobile phone platform?

P1: I would rely on information from women who have given birth before and who are friends or family but this information wasn't always accurate because every mother's experiences is different and every child is different. Sometimes the information that I got was very superstitious and did not rely on scientific data.

P2: Being a modern mum I would rely on Google as a source of information the challenge with this however, is that you get varied opinions from various writers and the information is not always accurate. I remember one time my child had a rash on the neck and Google told me I should rush the child to hospital as he may have a serious condition. However the Toto Health was able clarify that the rash was because I had been overdressing the baby.

P3: Personally I did not search for information at all because the baby grew naturally. If the baby fell sick I would pray for the sickness to go away. This one time my baby got so sick I thought she was going to die. I fasted for four days and it worked.

On inquiry as to why they wouldn't just Google seeing as they had the means and access to the plethora of information available on Google, they mentioned that Toto Health mobile phone platform's main attraction was the personalised information; that unlike Facebook groups and Google the participant avowed that Toto Health mobile phone platform provided information that was specific to their needs. Another major advantage of Toto Health mobile phone platform SMSs over Facebook groups and Google was the fact that it provided information in advance, it could tell you what to

expect at a certain stage of the baby's development before it happened. Information gotten from Facebook groups and Google also tends to be exaggerated and sometimes false which may cause a mother to panic as opposed to the Toto Health platform which makes one calm and creates confidence in one's ability as a parent.

Another question posed to respondents to determine how useful Toto Health mobile phone platform was, did you ever respond to any of the SMSs sent to you? What prompted you to respond? By asking this question, the researcher sought to understand if the respondents did find the information useful enough to ask follow up questions. Asking follow up questions shows that the recipient has received the information and is interested enough to seek clarification/ask for more. To this question, one of the respondents said:

I had difficulties with my first pregnancy mainly because I was not keen on some danger signs. For the second pregnancy, I was a bit cautious. I texted the Toto Health mobile phone platform team every now and then to inquire about any unusual feeling or movement and thanks to the information they gave me, I had a better pregnancy experience with my second baby. Said Sharon, a mother of two aged 4 and 1 years old. (p4, 6/10/2018)

On whether the participants ever respond to any of the SMSs sent to them, the researcher was availed with a screenshot obtained from documents at Toto Health mobile phone platform offices that shows a high engagement rate with users. Majority of the questions are on baby and mother's development followed closely by questions on baby's health and nutrition.

Besides these testimonies, the usefulness of the Toto Health mobile phone platform can be best demonstrated by the number of users it has across the country. When the platform was first introduced, twelve thousand respondents were registered; this number quickly grew to thirty six thousand in a period of less than two years.

The researcher also sought to understand from the developers and midwives if there were any complains about the platform. To this question, the creator and midwives noted that they indeed had received complaints but not on the quality of information but rather the complaints from disgruntled husbands who were not pleased with the notion of a stranger sending their spouses information on something as intimate as pregnancy and sexual reproductive health.

The findings correlate with those of a study conducted by UNICEF (2001) to try and figure out factors influencing how expectant mothers and parents of children under 5 years use the information received from various modern day platforms. According to the findings, women who were less privileged were less likely to access or use modern facilities in retrospect to women who were privileged.

Individuals who are poor in undeveloped countries do not have access to health administrations and health professionals than the individuals who are from developed countries. The causal connection between these two, both health and destitution, has been examined by a few scientists in the course of recent years, neediness has been perceived as going past the fringes of material and budgetary resources for be comprehended as likewise the absence of opportunity to lead the existence somebody choses to. Access to health services additionally can be comprehended in numerous courses other than access to employments of administrations in the midst of need. It can likewise be comprehended as supply or open door for utilisation of administrations and additionally the genuine use of the health services.

4.3.3 Impact of Toto Health Platform

One of the objectives of this research was to establish whether Toto Health mobile phone platform can improve the lives of mothers and children below the age of five.

This question seeks to assess the impact of the Toto Health platform. It seeks to understand whether there are changes in behaviour as a result of the mobile phone platform.

One of the questions the researcher asked was whether they had developed confidence as a result of using the platform. This question is important as it helped the researcher understand perspective from first time parents and parents who had already experienced pregnancy before on how the platform was helping them cope.

Question: Would you say you developed more confidence during your pregnancy /motherhood as a result of the information?

P1: Toto Health mobile phone platform has really helped me know what to expect during

Pregnancy and even as my baby grows. For example I had noticed rashes on my friend's baby and seen the stress she went through trying to heal them. Toto Health mobile phone platform sent me an SMS saying if my baby had rashes it could be because they were overdressed. I therefore made sure not to overdress my baby and I can gladly say that my baby has not had the rashes I saw on my friend's baby.

P3: I noticed that my baby was not crawling despite the fact that the platform had sent me an SMS stating that she should be crawling by nine months. I as therefore very scared and my baby did not crawl when I sent an SMS Toto Health asking if there was something wrong with my baby they told me that some children skip this stage all together. I therefore became very calm and true to their words and my baby was walking in no time.

P4: With Toto Health mobile phone platform, I received information on what to expect at

various stages of my pregnancy and the baby's development. This helped to reduce my panic as I knew what to expect in advance and was well prepared mentally to handle it. It helped me avoid panic.

The best way to measure impact is by looking at any behaviour changes brought about by an intervention. As shown by testimonies from the midwives and parents and pregnant mothers, Toto Health mobile phone platform has led to them wanting to break from the norm and do things differently. Pregnant mothers and first time parents felt they were more confident while nurses and midwives are ready and accepting of new technologies in the health sector as it has made their work easier. These findings correspond with those of Haux, (2011) who indicated that the M-health framework point is to enhance maternal and youngster health status in casual settlements and provincial regions. The SMS-based cell phone stage likewise screens markers to help in the location of unusual development in youngsters beneath 5 years connecting them to the closest and right human services supplier for the variation from the norm. When a parent has enrolled to the M-health framework they can get data on SMS amid the different phases of the pregnancy or tyke's age in an opportune way.

The research sought to establish whether the nurses and midwives would you recommend for other nurses and midwives providers to join/incorporate platforms like Toto Health mobile phone platform in their work. The three midwives interviewed responded in the affirmative saying that SMS platforms such as Toto Health mobile phone platform and other information technologies are the future of the health sector. The midwives said the platform has helped to reduce queues at hospitals. It has also

helped them to attend to as many mothers as possible as it is faster to send a message and advise a mother on first aid care than to have them queue in line only for them to ask the same question in person. The findings are in line with UNICEF (2001) findings that indicated that mobile technology in health care has improved efficiency and increased the quality of patient care. Since the introduction of mobile technologies in health care there have been reduced medical errors.

The same question was posed to parents in the focus group discussion. Many of them agreed that the platform was worth refereeing friends to and that they already encouraged their friends to enroll. A participant who is a second time mother to a five years old and nine month old observed that:

Before Toto Health mobile phone platform, it would take me over 30 minutes to get to the hospital. Once there it would take me another hour or so lining up to see a doctor concerning my child's diarrhoea only to be told the main cause was because the child was teething. Now with Toto Health all I need to do is send a text and within a few minutes I have a response on any first aid precautions I need to take. I have already told 3 of my friends to enroll and will be referring more."(p6, 6/10/18)

Further evidence of the impact of Toto Health mobile phone platform is showcased by researches done by scholars and awards and recognitions accorded to the developer by local and international organisations. In one research conducted by GSMA, it emerged that when comparing exclusive breastfeeding behaviours of three different segments of Toto Health users, advanced users demonstrated improved adherence to advocated practices in comparison to intermediate users and novice users.

In evaluating how effective an innovation is, it is important to look at challenges with the innovation and what can be improved. This information helps to appreciate the impact of the invention as it is able to rise above the challenges and bring about social change despite the huddles. This is the case for Toto Health. The platform has

experienced its fair share of challenges but in spite of all has managed to continue to provide timely and information to pregnant mothers and parents to children under 5 years.

Question: Any challenges you encountered while using the platform??

P1: When Toto Health was starting it was a free platform and therefore enjoyed its services throughout my pregnancy however Toto Health centres sent as sms saying that we now have to start paying two hundred shillings a year and forty shillings a month if we were to continue enjoying the services of the platform. Then I asked myself would I buy sukuma wiki for my family or pay for this service the answer was obvious. If I could afford the platform I would continue using it.

P4: When I joined the platform the administrator said that I would be receiving Messages twice every week. During the first three months, the messages were very consistent unfortunately, now sometimes they send a message once a week, sometimes twice a week and sometimes they can go a whole week without sending any message.

P7: Whenever Total Health Sent me messages my husband would ask who was that who was messaging me. He thought that another man was sending me messages. He forced to me to leave the platform. If it was up tome I would continue using the services in the platform.

During the Focus Group Discussion, respondents indicated they had unsubscribed from the platform as they could not afford to pay the KES 400 required once the free trial period ended. They all indicated that whereas the information they received was timely and relevant, they just could not afford to set aside money to subscribe as they had many

other needs to cater for. They indicated that given different economic circumstances, they would definitely subscribe to the app.

Another challenge pointed out by the focus group discussants was the inconsistency in messaging. That they could go for weeks without receiving information. This is a genuine challenge on the part of the mothers, considering many of them relied on the platform for guidance. The inconsistency could be as a result of high employee turnover rate due to the financial woes explained above. These findings correspond with those of Zakaria (2006) who found that there are some technological challenges such as the cost of service that hinders its adoption. The ICT adoption in healthcare needs effective organisational communication among those involved in order to move the ICT adoption process to a success.

Our key informant interview with the nurses also pointed to financial woes affecting the platform's performance. The midwives indicated that because of financial issues they had to seek employment elsewhere and now only provide services to Toto Health mobile phone platform on a part-time basis.

The developer was open enough to divulge to the researcher that indeed he had experienced some financial problems with the platform that had affected service delivery and employee retention. He said:

In the beginning, we had anticipated to have many partners to come on board and support the platform. However that never came to be. The overhead costs for running the platform range between four hundred to seven hundred thousand Kenyan shillings per month. We decided to pass this on to the end user in the form of a subscription fee. This led to many unsubscribing. Also the platform can only deduce the symptoms of the mother based on general information. The platform cannot monitor the baby's progress or heart rate. This has been a challenge but we are working on a device that will help monitor both the baby and the mother's vital. (Felix Kimaru, app developer 6/10/18)

All is not lost though as at the time of the interview, the developer indicated he had secured a partnership with a telecommunications company which would see the cost of sending messages subsidised. He was also in talks with various county governments to pay for their constituents so that they could access the services for free.

Discussion

From the focus group discussion the researcher noted that the platform was not just useful to the women alone it was also important to engage the men. Engaging men will go a long way in helping them understand and appreciate the need for the information being send and encourage their wives, daughters and nieces to subscribe. During the researchers conversation with the developer, it emerged that majority of unsubscribers were due to the fact that many men were not comfortable with their wives receiving intimate information from strangers. This is a genuine concern given the secrecy and privacy attached to pregnancy and sexual reproductive health issues in many African communities. It would therefore be advisable to register families so that both the man and wife receive messages.

The researcher noted that there was lack of personal touch from the messages. The mothers therefore felt that they were talking to a robot instead of speaking to an actual person. The researcher further noted that visits from members of the platform to simple acts like sending birthday messages for their children would help users not feel like products but rather part of a family with someone caring for them at the other end of the line. A recurring response among the parents on what they liked most about Toto Health mobile phone platform was the visit made by Toto Health mobile phone platform personnel. Whereas the information sent over text was sufficient, it reinforced their confidence in the system whenever the Toto Health mobile phone platform team

paid them a visit. ICTs have made life easier and made it possible to get virtual assistance whenever and wherever, however every once in a while it helps to have a face to face meeting with your users.

A major problem affecting Toto Health mobile phone platform is the lack of finances. This has led to high employee turnover rates and affected the consistency information dissemination. To solve this problem, these study recommends that developers of apps and mobile phone platforms device innovative methods of fundraising to ensure sustainability of their platforms other than subscription fees. These can include partnerships with corporates who can run ads on their platforms, seeking out donors to finance the platforms and partnerships with county governments who can provide support by paying off part of the fee for their constituents.

In our discussion with Toto Health mobile phone platform founder we inquired what he would do better if an opportunity to upscale his platform presented itself. He mentioned developing an app. The researcher is well aware that there are already many existing apps developed by Kenyans that offer information on maternal and child care such as HIV Factsheet, StraightTalk , Sophiebot , Baby Center to mention but a few . Whereas Kenya is considered the IT hub of Africa, the rate of adoption, use and effectiveness of apps on social issues such as health remains unclear. He however noted that the app would go a long way into reaching out to the middle class group a social class that he is yet to tap into. The SMS platforms such as Toto Health mobile phone platform and other information technologies are the future of the health sector. The platform has would be helpful reducing queues at hospitals.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter presents a summary of the findings, conclusions drawn from the study and recommendations for possible action by the developer and relevant maternal and child healthcare stakeholders. These conclusions are solely focused on addressing the purpose of this study, which was to investigate the performance of Toto Health mobile phone platform in reducing maternal and child mortality in Mukuru Kwa Njenga an informal settlement in Nairobi County.

5.1 Summary of Findings

The overall objective of this study as outlined in chapter one, was to investigate the performance of Toto Health mobile phone platform in reducing maternal and child mortality in Mukuru Kwa Njenga an informal settlement in Nairobi County.

The research questions guiding the study were:

- i. What kind of information do expectant mothers access on the Toto Health mobile phone platform?
- ii. How do expectant mothers use the information received from the Toto Health mobile phone platform?
- iii. Can Toto Health mobile phone platform improve the lives of mothers and children below the age of five?

This section will provide a summary of the responses to these questions using the research findings in chapter 4.

5.1.1 Type of Information Accessed on Toto Health Mobile phone platform

From the research findings, it emerged that the Toto Health mobile phone platform provides the following information to pregnant mothers and parents of children under 5 years. According to responses from respondents, the type of information they received can be classified into: healthy pregnancy, safe delivery, child development and stimulation, breastfeeding, nutrition, reproductive health, immunisation reminders, parenting and Hygiene categories.

This information is sent out every Monday and Thursday at 9.00 am as well as on needs basis whenever users raise questions. As noted in chapters 1, the idea behind Toto Health mobile phone platform is for the parents to get timely access to information with regards to child health, nutrition, hygiene and reproductive health easily and in their local language. In chapter 2 the study observed that one of the main goals and aspects of expanding ICT has been to improve the quality health care, women can receive quality health care from an attendant who is not within their reach. Based on the research findings the study concludes that Toto Health mobile phone platform is a proficient means for pregnant mothers and parents of children below five years to receive a variety of information on the mother and baby's health in a timely and convenient manner.

5.1.2 How Expectant Mothers and Parents of Children under 5 years Use the Information Received from the Toto Health Mobile Phone Platform

From the research findings in chapter 4, it emerged that many of the mothers found Toto Health mobile phone platform relevant in their day to day lives in that they could ask questions and get responses almost immediately without the inconvenience of having to queue at hospitals. This made it a very convenient means of communication

with experts thereby helped to reduce anxiety and build their confidence. This ties in well with what was stated in chapter 2 of this study that ICT helps to remove the boundaries between inpatient and outpatient care while also giving room for efficient and quality patient care in general.

Toto Health mobile phone platform developer had identified his target market as families from low income areas. However in our interviews with Toto Health mobile phone platform users, we discovered some were from the middle class. On inquiry as to why they wouldn't just Google seeing as they had the means and access to the plethora of information available on Google, they mentioned that Toto Health mobile phone platform's main attraction was the personalised information; that unlike Google.

5.1.3 Impact of Toto Health Platform

As noted in the literature review section of this research, studies done have shown that women who received prenatal support via mobile messaging had a higher satisfaction than those who didn't; that their confidence levels increased while their anxiety levels decreased. This research has helped to prove these earlier studies right as stated in chapter four. The focus group discussants indicated that their confidence levels went up thanks to information they received from Toto Health mobile phone platform.

Mobile phone platforms have brought with them many benefits they are faced with numerous challenges. One of the challenges stated in chapter 2 is privacy. This challenge emerged with our respondents in that husbands felt the messages sent frequently were intrusive. A bigger challenge for the Kenyan platforms is the lack of financial sustainability frameworks. This is because the technology start-up in the country is not as well developed in the other countries and has not attracted as many funders.

5.2 Conclusions

5.2.1 Objective 1: Type of Information Accessed on Toto Health Mobile phone platform

The study concludes that Toto Health mobile phone platform provides useful information to pregnant mothers and parents of children less than 5 years that has greatly improved the lives of the end users. The mobile phone platform has improved maternal and child health status in informal settlements and rural areas.

The study also concludes that Toto Health mobile phone platform is a proficient means for pregnant mothers and parents of children below five years to receive a variety of information on the mother and baby's health in a timely and convenient manner.

5.2.2 Objective 2: How Expectant Mothers and Parents of Children Under 5 Years Use the Information Received From the Toto Health Mobile Phone Platform

The study concludes that many expectant mothers and parents of children under 5 years found Toto Health mobile phone platform relevant in their day to day lives in that they could ask questions and get responses almost immediately without the inconvenience of having to queue at hospitals.

5.2.3 Objective 3: Impact of Toto Health Platform

The study further concludes that Toto Health mobile phone platform play a huge role in reducing maternal and child deaths not just in low income areas but among the middle class. This is because of the way the information is personalised and send provided on a need basis.

The study also concludes that the women's confidence levels went up thanks to information they received from Toto Health mobile phone platform.

The study finally concludes that, Toto Health mobile phone platform play a huge role in reducing maternal and child deaths not just in low income areas but among the middle class. This is because of the way the information is personalised and provided on a need basis. However despite all these advantages, there are challenges that hinder these platforms from being effective. These challenges if tackled can help make the platforms more effective. A bigger challenge for the Kenyan platforms is the lack of financial sustainability frameworks.

5.3 Recommendations of the Study

1. The researcher recommends that future developers of communication interventions on maternal and child care focus not only on the women but also the men as well as well as individuals in the middle class. From the focus group discussion the researcher noted that the platform was not just useful to the women alone it was also important to engage the men. Engaging men will go a long way in helping them understand and appreciate the need for the information being sent. During the researchers conversation with the developer, it emerged that majority of unsubscribers were due to the fact that many men were not comfortable with their wives receiving intimate information from strangers. This is a genuine concern given the secrecy and privacy attached to pregnancy and sexual reproductive health issues in many African communities. It would therefore be advisable to register families so that both the man and wife receive messages.
2. The researcher noted that there was lack of personal touch from the messages. The mothers therefore felt that they were talking to a robot instead of speaking to an actual person. The researcher further noted that visits from members of the platform to simple acts like sending birthday messages for their children would help users

not feel like products but rather part of a family with someone caring for them at the other end of the line. A recurring response among the parents on what they liked most about Toto Health mobile phone platform was the visit made by Toto Health mobile phone platform personnel. Whereas the information sent over text was sufficient, it reinforced their confidence in the system whenever the Toto Health mobile phone platform team members paid them a visit. ICTs have made life easier and made it possible to get virtual assistance whenever and wherever, however every once in a while it helps to have a face to face meeting with your users.

3. A major problem affecting Toto Health mobile phone platform is the lack of finances. This has led to high employee turnover rates and affected the consistency information dissemination. To solve this problem, these study recommends that developers of apps and mobile phone platforms device innovative methods of fundraising to ensure sustainability of their platforms other than subscription fees. These can include partnerships with corporates who can run ads on their platforms, seeking out donors to finance the platforms and partnerships with county governments who can provide support by paying off part of the fee for their constituents.
4. The study recommends that the nurses and midwives should be encouraged to join/incorporate platforms like Toto Health mobile phone platform in their work so as to ensure that as many people as possible benefit from such platforms.

5.4 Recommendations for Further Research

The researcher is well aware that there are already many existing apps developed by Kenyans that offer information on maternal and child care such as HIV Factsheet, StraightTalk , Sophiebot , Baby Center to mention but a few . Whereas Kenya is

considered the IT hub of Africa, the rate of adoption, use and effectiveness of apps on social issues such as health remains unclear. The researcher recommends a study on the effectiveness of maternal and childcare apps in Kenya.

REFERENCES

- Authority, T. (2016). *Kenya's mobile penetration hits 88 per cent*. Retrieved May 14, 2018, from Communication Authority of Kenya: www.ca.go.ke/index.php/what-we0do/94-news/366-kenya-s-mobile-penetration-hits-88-per-cent
- Abuya, B.A E. O. (2011). Influence of Maternal Education on Child Immunisation and Stunting in Kenya. *Maternal and Child Health Journal* , 1389-1399.
- BabyMed. (2015). *Jabotech*. Retrieved May 14, 2018, from BabyMed: <http://babymed1.jabotech.co.ke>
- Best Health. (2010, June). *Best Health Magazine*. Retrieved March 3, 2018, from Web Exclusive: www.besthealthmag.ca/best-you/health/maternal-health
- C., H. (2009). Women, Gender equality and Diabetes. *International Journal of Gynecology and Obstetrics* .
- Caroline, W. G. (2006). Maternal Mortality: who, when, where and why. *The lancet* 368 (9542) , 1189-1200.
- Christina, L. Jones, J. J. (2014). The Health Belief Model as an Explanatory Framework in Communication Research: Exploring Parallel, Serial, and Moderated Mediation. *Health Communication* , 567-575.
- Communication studies theories*. (2017, 02 27). Retrieved 04 09, 2018, from University of Twente: www.utwente.nl/en/bms/communication-theories/sorted-by-cluster/health%20communication/Health_Belief_Model/
- David Peters, A. G. (2008). Poverty and Access to Healthcare in Developing Countries. *Annals of the New York Academy of Sciences* .
- Donald, P. S. (2011). *Business Research Methods*. McGraw-Hill/Irwin.
- Dupree, K. (2016, March 13). *Mashable*. Retrieved March 11, 2018, from <https://mashable.com/2016/03/13apps-maternal-health>
- Einloth, S. R. (2010). *Building Strong Foundations*. Friedrichsdorf.

- Elard Koch, J. T. (2007). Women's education Level, Maternal Health Facilities, Abortion Legislation and Maternal Deaths: A Natural Experiment in Chile from 1957 to 2007. *PLoS one* .
- Elo, I. (1992). Utilisation of Maternal Health-care services in Peru: The role of Women's Education. *Health Transition Review* , 49-69.
- Essendi, H. (2015, November 9). *National Center for Biotechnology Information*. Retrieved March 11, 2018, from US National Library of Medicine: www.ncbi.nlm.nih.gov/pmc/articles/PMC4640392
- Fund, U. N. (2013). *Realizing the Potential*. New York.
- Harrington, A. (2005). *Modern Social Theory*. Oxford University Press.
- Harrington, A. (2011, July 27). *Social Theory*. Retrieved March 3, 2018, from Oxford Bibliographies: www.oxfordbibliographies.com/view/document/obo
- Health, K. B. (2014). *Kenya Demographic and health survey*. Ministry of health.
- Health, M. o. (2013-2017). Transforming health, accelerating attainment of universal sustainable goals . *Kenya health sector stratgedic plan* , 19-21.
- Health, M. O. (2013-2017). Transforming Health: Accelerating Attainment of Universal. *kenya health sector startedgic plan* , 16.
- Hope, K. R. (2011). Infrastructure constraints and Development in Kenya. *Sage Journals Vol 2, Issue 2* , 91-104.
- Irwin, V. S. (1988, June). Social Learning Theory and Health Belief Model. *Health Education Quarterly* , pp. 175-183.
- Karen Scott, G. G. (2015). How Trustworthy are Apps for Maternal Health. *Health and Technology* , 329-336.
- Kothari. (2004). *Research Methodology*. New Delhi: New Age International Publishers.
- Kothari, C. (1990). *Research Methods*. India: New Age International Limited.

- Kowalczyk, D. (n.d.). *Descriptive Research Design: Definition, Examples and Types*. Retrieved April 27, 2018, from Study.com: <https://study.com/academy/lesson/descriptive-research-design-definition-examples-types.html>
- Lady, O. O. (2017). *A Strategic Framework for Engagement of the*. Nairobi: office of the first lady.
- Lady, O. O. (2018). *A Strategic Framework for the Engagement of the First Lady in the Promotion of Healthy Lives and Well-Being of Women, Children and Adolescents*. office of the first lady, Beyond Zero. government of kenya.
- Lamorte, W. W. (2016). *The Health Belief Model*. Retrieved 5 14, 2018, from Behavioral Change Models: sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories2.html
- (2017). Chapter 17: Maternal Reproductive and Child Health. In D. P. Lawrence Gostin, *Advancing the right to health: the vital role of law*.
- Matsumura, M., G. B. (2001). Women's status, Household structure and Utilisation of Maternal Health Services in Nepal. *Asia-Pacific Population Journal* , 23-44.
- McCourt, C. (2014, March). Retrieved March 16, 2018, from SciELO: www.scielo.br/scielo.php?script=sci_arttext&pid
- Mugenda, O. M. (2003). *Research Methods: Qualitative and Quantitative Approaches*. Nairobi: Acts Press.
- Nasriah, Z., S. Y. (2010). *Managing ICT in healthcare organisation: culture, challenges and issues of technology adoption and implementation*. Dubai: University of Wollongong .
- Natural, M. (2018). *13 Benefits of Natural Childbirth*. Retrieved May 12, 2018, from Mama Natural: <https://www.mamanatural.com/natural-childbirth/>
- Newspaper, S. (2017, February friday). Doctor's strike. Nairobi, Kenya.
- OECD Health Policy Studies. (2010). *Improve Health Sector Efficiency*. Paris.

- Orodho, J. (2004). *Elements of Education and Social Science Research Application in Education and Social Sciences*. Nairobi: Masola Publishers.
- Panel, A. P. (2010). *Maternal Health*.
- Paper, S. N. (2017, February Friday). Doctors issue 14 day strike. Nairobi, Kenya.
- Paul, H., J. H. (2009). Health Belief Model. In *Introduction to Health Behavior Theory* (pp. 31-42). Jones and Bartlett Publishers.
- Pavalavalli, G., B. R. (1997). *Maternal Education and The Utilisation of Maternal and Child Health Services in India*. Calverton, Maryland,: Macro International Inc.
- PeterHedstrom, R. S. (1998). Social Mechanisms: An introductory essay. In *Social Mechanisms: An analytical approach to social theory* (pp. 3-33). Cambridge: The Press Syndicate of The University of Cambridge.
- Peterson, H. B. (2016, November 08). *International Journal of Gynecology & Obstetrics*. Retrieved April 6, 2018, from Obstetrics and Gynecology: obgyn.onlinelibrary.wiley.com/doi/full/10.1016/j.ijgo.2016.10.005
- Haux,R. P. K. (2001). Information Processing in Healthcare at the Start of the third Millenium: Potential and Limitations. *Methods Archive* , 156-12.
- Raghupathy, S. (1996). Education and use of maternal healthcare in Thailand. *Social Science and Medicine* , 459-471.
- Safermom*. (n.d.). Retrieved from Safermom: <https://safermom.com>
- Sparrow, A. (2014, May 6). *Maternal and Child Health in Kenya*. Retrieved March 17, 2018, from Huffpost blog: <https://m.huffpost.com/us/entry/5454692>
- Summit, U. N. (2010). *We can end poverty 2015 (Millenium Development Goals)*. New York.
- Thabane, M. J. (2010). *A tutorial on pilot studies: what, why and how?* BioMed Central Limited.

- Tigest Tamrat, S. K. (2012). Special Delivery:an analysis of mHealth in maternal and newborn health programmes and their outcomes around the world. *Maternal and child health Journal* , 1092-1101.
- Toto Health mobile phone platform. (2018). *Homepage*. Retrieved March 3, 2018, from Toto Health mobile phone platform: <https://Toto Health mobile phone platform.org/homepage>
- Vickie Lambert, C. L. (2012). Qualitative Descriptive Research: An Acceptable design. *Pacific Rim International Journal of Nursing Research* , 255-256.
- Vodopivec-Jamsek, d. J.-U. (2012). Mobile phone messaging for preventative health care (Review). *Cochrane Database of Systematic Reviews* , Issue 12.
- Alice White, D. T. (2017). *Health Worker mHealth Utilisation: A Systematic Review*. Computers, Informatica, Nursing : CIN, 206-213.
- American Heart Association Scientific Statement. (2015). Mobile technology may help people improve health behaviors. Retrieved June 26, 2018, from American Heart Association:
<https://newsroom.heart.org/news/mobile-technology-may-help-people-improve-health-behaviors>
- Jing Sun, Y. G. (2016). *mHealth for aging China: Opportunities and Challenges*. Aging and Disease, 53-67.
- Mitra, P. (2014). Challenges and Opportunities for mHealth in Kenya. Retrieved June 26, 2018, from *TechChange*: <https://www.techchange.org/2014/11/03/mhealth-challenges-opportunities-kenya-india/>
- Shilpa Hanumandas, S. T. (2016). MHealth Application Overview. *Imperial Journal of Interdisciplinary Research*, 1503-1506.
- Sjogren, B. (1997). Reasons for anxiety about childbirth in 100 pregnant women. *Journal of Psychocmatic Obstetrics & Gynecology* 18, 266-272.
- Teo, D. L. (2015). Australia Cancer patient app CancerAid set to launch in Asia. *Journal of Mobile Technology in Medicine*.

Teong, D. J. (2015). Innovative retinal imaging device turns smartphones into portable ophthalmoscopes. *Journal of Mobile Technology in Medicine, Electronic ISSN 1839-7808*.

Varadraj G., T. W. (2017, August 8). *Challenges In Implementing mHealth Interventions: A Technical Perspective*. Retrieved June 26, 2018, from US National Library of Medicine: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5583043/>

APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

Bilha Luseka

K50/89057/2016

Dear Sir/Madam

REF: MA RESEARCH STUDY

I am an MA Communication Studies student at the University of Nairobi. I am carrying out a study on the; “*Evaluation of Toto-Health Mobile Phone Platform On Maternal And Child Health Care*” I kindly request your assistance by answering the questions to the best of your ability. The Information will be used solely for academic purposes only and at no instance will your name appear in the report. Your participation and assistance will be highly appreciated.

Yours faithfully

Bilha Luseka

APPENDIX II: FOCUS GROUP DISCUSSION (FGD) GUIDE

I) Type of Information Accessed on Toto Health

- How did you learn about Toto Health mobile phone platform?
- How often did you use the information in the SMS send to you, give an example.
- What type of information did you receive from the Toto Health mobile phone platform (a. healthy pregnancy b. safe delivery c. child development and stimulation d. breastfeeding / nutrition e. reproductive health f. immunisation reminders g. parenting h. hygiene)

II) Utilisation of Information Received

- How long have you used the platform?
- What did you like best about Toto Health mobile phone platform?
- What other source of information (if any) did you rely on for information during your pregnancy/raising your child? How does it compare to Toto Health mobile phone platform?
- Did you ever respond to any of the SMSs sent to you? What prompted you to respond?

III) Impact of Toto Health Platform

- Would you say you developed more confidence during your pregnancy /motherhood as a result of the information
- Did you discuss the information received with other mothers? Why/why not?
- Would you recommend Toto Health mobile phone platform to other mothers? Why/Why Not?
- Were you satisfied with the information given on the Toto Health mobile phone platform SMS? Why/Why Not?

Challenges faced by Toto Health

- Any challenges you encountered while using the platform?
- What could Toto Health mobile phone platform do better?

APPENDIX III: DEVELOPERS INTERVIEW GUIDE

i. Type of Information Accessed on Toto Health

- What is the inspiration behind Toto Health mobile phone platform?
- What gap has Toto Health mobile phone platform helped fill?
- How often do you receive responses from your users? What type of responses do you receive (a) Thank you, b) follow up question, c) acknowledgement of receipt?)

ii. Utilisation of Information Received

- How do you ensure information sent out to Toto Health mobile phone platform users is factual?
- How many users do you have registered?

iii. Impact of Toto Health Platform

- How do you measure effectiveness of your platform?
- What is your opinion on the future of SMS platforms that provide essential information on healthcare like Toto Health mobile phone platform? Is there competition?
- Have you had instances of complaints from Toto Health mobile phone platform users? How did you manage that?
- If you were to upscale Toto Health mobile phone platform, what new features would you introduce?

What can SMS platforms offering Health information in Kenya do better?

iv. Challenges faced by Toto Health Mobile phone platform

- What challenges did you encounter? How did you solve them?

APPENDIX IV: NURSES/MIDWIVES INTERVIEW GUIDE

I. Type of Information Accessed on Toto Health Mobile phone platform

- How do you source for information you provide on the Toto Health Mobile phone platform?

II. Utilisation of Information Received (How do expectant mothers use the information received from the Toto Health mobile phone platform?)

- How often did you get follow up questions to your responses?
- Have you had instances of complaints from Toto Health mobile phone platform users about the quality of information? How did you manage that?

III. Impact of Toto Health Mobile phone platform

Can Toto Health mobile phone platform improve the lives of mothers and children below the age of five?

What did you like best about Toto Health mobile phone platform? What did you not like?

Would you recommend for other nurses and midwives providers to join/incorporate platforms like Toto Health mobile phone platform in their work? Why/Why Not?

IV. Challenges faced by Toto Health Mobile phone platform

Any challenges you encountered while using the platform?

What is your opinion on the future of SMS platforms that provide essential information on healthcare like Toto Health mobile phone platform? Is there competition?

APPENDIX V: CERTIFICATE OF FIELDWORK



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This is to certify that all corrections proposed at the Board of Examiners meeting held on July 25, 2018 in respect of M.A/PhD. Project/Thesis Proposal defence have been effected to my/our satisfaction and the project can be allowed to proceed for fieldwork.

Reg. No: KGO/89057/2016

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PLATFORM ON MATERNAL AND CHILD HEALTH CARE

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