MOBILE PHONE USE AND REPRODUCTIVE HEALTH CARE IN NAKURU PROVINCIAL HOSPITAL, KENYA

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Abstract:
I examine the feasibility of mobile phone use in reproductive health care in Kenya using a stakeholder pragmatic perspective based on users, health providers and policy implementers. Use of Mobile phones in reproductive health care strengthens the currently weak health systems in Kenya where there is 86% geographical coverage of phones but less than half of the population accesses appropriate reproductive health care. A stakeholder perspective offers a mechanism through which the health sector stakeholders are identified, categorised and analysed based on their respective salience in terms of power, influence, interests and roles. I use in-depth interviews with 15 participants: 12 Users, two health providers (midwives) and 1 policy implementer focusing on phones use, the problems associated with use; perceived benefits; goals and; change measures required. I use Content analysis for qualitative data. Phones are used in reproductive health but there remains technological, social-cultural, gender, motivational and regulatory framework problems. Mobile phone technology has been accepted in reproductive health care even without a clear regulatory framework. Problems relating to household decision making, costs and motivation need to be addressed. There is need for social mobilisation of communities to raise awareness of phone efficacy.

Keywords: Mobile phones, IS evaluation, eGovernment, stakeholders, reproductive health, ICTs
1 INTRODUCTION

1.1 Background

“There are 4 billion cell phones in use today. Many of them are in the hands of market vendors, rickshaw drivers, and others who've historically lacked access to education and opportunity. Information networks have become a great leveller, and we should use them together to help lift people out of poverty and give them a freedom from want”\(^2\).

1.1.1 Telephone Statistics Worldwide and in Kenya

There were about 5.3 billion mobile cellular subscriptions worldwide and access to mobile networks was available to 90% of the world population and 80% of the population living in rural areas (ITU, 2009). In 2008, there were 246 million mobile cellular subscriptions (ITU, 2009) and of these, 21.4 million out of 38.6 million were in Kenya (CCK, 2010; Kenya National Bureau of Statistics, 2010). This growth translates into a nationwide tele-density of 55 lines per 100 inhabitants (CCK, 2010), while the population under mobile coverage stood at 86%, against landline coverage of 35%.

1.1.2 Reproductive Health: World and Country status

Concomitantly, Sexual and Reproductive ill-health affects one-fifth of the burden for the whole population (Global Health Council, 2003). The most recent estimates of maternal mortality developed by the World Health Organization (WHO), the United Nations Children’s Fund (UNICEF), the United Nations Population Fund (UNFPA) and The World Bank in collaboration with scientists from academia, show that at least half a million women have died due to pregnancy-related causes in 2005 (WHO/UNICEF/UNFPA/The World Bank, 2007). In the same report, only 65.7% of women accessed a skilled health worker (nurse, mid-wife and Doctor) globally, 46.5% in Africa, and 33.7% in Eastern Africa. Sub-Saharan Africa accounted for 86% of the maternal deaths in 2005 (Eastern Africa accounted for 440/100,000 live births). Kenya had 41.6% attendances of skilled health workers, maternal mortality rate of 488/100,000 live birth in 2008 down from 414/100,000 live births in 2003, only 47% women attending at least 4 antenatal sessions, and a 39% contraceptive prevalence rate (UNDP Kenya, 2011).

This presents disconcerting statistics yet the Millennium Development Goal (MDG) #5, Target #5.B: is meant to achieve, by 2015, universal access to reproductive health. The disparity between the adoption of mobile phone technology and ominous health statistics remains perplexing.

1.1.3 The Role of Mobile Telephones in Reproductive health

Given the contradictory health concerning mobile phone statistics in a country like Kenya, it is interesting to enmesh the two concepts for the betterment of primary healthcare (PHC). Recently,

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\(^2\) Hillary Rodham Clinton
there have been diverse efforts to exploit mobile technologies in health communication, including collection of health data and provision of health information (Muheebwa, 2009) especially in malaria and Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS). Note that a mobile phone is a small wireless device that has at least the same functions of a standard wired telephone but is smaller and more mobile with more computer-related devices.

Reproductive Health Care (RHC) implies freedom to choose and enjoy sexual and reproductive life by both men and women (WHO, 2010). Research in this area is infant and yet to yield clear theoretical and methodological models from a stakeholder perspective in the health and Information and Communication Technology sector.

1.2 Statement of the Problem
The gamut of primary health care (PHC) is for health units to operate with ease of access, utilization and efficiency towards reproductive health services (Tashobya and Ogwal, 2004). However, the health system faces a plethora of problems: unavailable health workers, low quality of service delivery with inept user behaviour; who cannot demand, and access services of their choices leading to mortality, high fertility and contraceptive prevalent rates (CPR) (Ssengooba, Neema, Mbonye, Sentubwe & Onama (2003). In order to address this challenge, electronic health systems have been suggested as an efficacy to the problem. However, any attempt to introduce computerised health care information systems should, therefore, guarantee adequate protection of the confidentiality and integrity of patient information (Smith & Eloff, 1999) and perceived ease of use as well as access. Yet, this has been used in other health sectors such as HIV/AIDS (Lim, Hocking, Hellard, and Aitken, 2006; Juzang, Fortune, Black, Wright, and Bull (2011). In view of this discrepancy, there is need to examine the feasibility of utilising mobile phones in Kenya’s reproductive health sector.

1.3 Research Aim
The aim was to evaluate from a stakeholders view point, the feasibility of utilising mobile phone technology in the Kenya’s reproductive health sector in Nakuru Provincial Hospital basing on Users, health providers and policy implementers. A stakeholder perspective offers a mechanism through which the health sector stakeholders are identified, categorised and analysed based on their respective salience such as power, influence, interests and roles.

1.3.1 Research Questions
The study was guided by the following research questions
1. Do stakeholders use mobile phones in reproductive health matters?
2. What problems do stakeholders perceive in the use of mobile phones in reproductive health?
3. What are the perceived benefits of using mobile phones in reproductive health by stakeholders?
4. What goals are to be achieved when different stakeholders use mobile phones in reproductive health?

5. What change requirements are necessary in the provision of reproductive health through mobile phones?

2.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK
The perception that electronic health is in the best interest of health care is widely held in e-government literature. So strong is this perception that the literature has not sufficiently interrogated whether it enhances reproductive health care through the use of mobile phones but concentrates on general electronic health and mobile applications. Similarly there is a general orientation that mobile phones provide a strong platform for reproductive health in general without considering the limitations. But how well does the existing literature holistically address the use of mobile phones in reproductive health care from the perspectives of the stakeholders and the wider regulatory framework in Kenya? This is the philosophy behind the review based on Users, providers and policy implementers. Some previous studies exist on the utilisation of mobile phones in development initiatives and especially in the health sector generally. Jones (2005) highlights the role of mobile phones in the management of HIV/AIDS in Kenya and Zimbabwe where sufferers and their carers cope with the challenges. There are benefits accruing from the technology include text messaging being easy, cheap and popular, and people can have access to information which is anonymous. However, policy and regulatory aspects are not addressed, yet the International Telecommunication Union (ITU, 2008) argues that structural and regulatory issues need to be considered at the onset to avoid risks in mobile health use. Archer (2005) also investigates the factors which affect adoption of technology, such as usability; user satisfaction; trust and enjoyment of technology. Kang, G., Ouyang, Y., Liu, D., Wang, H., and Zhang, P. (2007) established in a study in China that Users were positive toward mobile phone use in the health industry. Susanto and Goodwin (2010) highlight sixteen factors influencing (positive and negative) citizen’s adoption of SMS-based e-Government services modelled on the Unified Theory of Acceptance and Use of Technology by Venkatesh; Morris; Davis (2003) The article captures the perceptions of the user and leaves out government and other service providers.
Some studies (Free et al., 2010; FHI/USAID & Progress in Family Planning, 2010 in Kenya and Tanzania) focus on the use of mobile health technology in general and developed a conceptual framework that helps track important variables relating to users, providers and nature of messaging. These studies are ongoing and being conducted on a global focus but it is not yet clear on their implication in the Kenya health sector. Osborne (2009) focuses on the successful use of songs and ringtones as a way of communicating with people via mobile phones and providing information on pregnancy and motherhood (Cheek, 2010). Bobock (2010) states that countries such as Kenya and Ghana are focused on country-based leadership can scale up proven programs, develop sustainability, and provide practical and integrated models for cooperation.
between the government, mobile service providers, the medical community and the private sector.

Ouma and Herselman (2008) in their study on e-health in rural Kenya note that health workers were positive to e-health initiatives if only infrastructure, training, cross-sector linkages and government policy are addressed. The latter’s methodology was limited to views of hospital managers and staff and left out the Users and policy makers and implementers. Success in mobile and electronic health use in Kenya may need to capture the policy and regulatory challenges to ensure completeness. Nordham (2009) conducts a desk review and interviews with Master of Public Health students, on mobile phones in maternal and newborn babies care in developing countries. Whereas her findings are policy-oriented, they didn’t include policy makers, implementers and Users’ views.

The United Kingdom (2006) Parliament emphasises the role of the health provider, health beneficiary and the macro environment such a state of infrastructure and regulatory environment in the scheme of things. Issues of mobile phone loss or lack of signal or airtime when needed are prevalent (Lester & Karaya, 2008). This shows the dynamic use of mobiles during times of crisis (Cheek, 2010). UNICEF (2009) notes that lack of prioritization in the sector of ICT4D may be an inhibiting factor to use of mobile phones in reproductive health.

The National Information & Communications Technology Policy of Kenya (2006) based on four guiding principles: infrastructure development, human resource development, stakeholder participation and appropriate policy and regulatory framework aims at addressing the lacuna in the previous laws and among its policy framework. It aims at ensuring affordability and access to ICT nationally and addresses issues of privacy, e-security, ICT legislation, cyber crimes, ethical and moral conduct, copyrights, intellectual property rights and piracy. However the policy is beset by challenges: investment in ICTs, network versatility, training, ethical dilemmas (protection of personal data), and legal/regulatory gaps (The Commonwealth Health Ministers Book, 2008).

Progress has been made on the e-health front but there remain several challenges: coverage, training, curricula, awareness, legislation, partnerships, and infrastructure among others (Commonwealth Secretariat progress report, 2008).

Lagsten (2011) while evaluating Information Systems develops an interpretative, stakeholder based method for evaluating information systems aiming for change and betterment. The pragmatic model includes stakeholders participating in questions relating to activities, problems, strengths, goals and change needs and measures of an IS. This study can be used as an ex-ante evaluation in relation to the feasibility of using mobile phones in two ways: raising similar questions to multiple stakeholders; and for organising the data collection, analysis and interpretation of information for acceptable changes to be included in the proposals.

It is established that some studies exist on e-Health and m-Health generally as well as focussing on mobile phone use in reproductive health care. The gap identified is that they seem to deal with some actors and factors in isolation. This proceeded to develop a conceptual framework that may
address interventions by healthcare professionals, the Users, as well as other stakeholders such as government and the private sector.

2.1 RESEARCH MODEL
I considered several models from the effectiveness evaluation paradigm such as goals, results, systems, Users and stakeholder sub-models were considered but the latter was seen as more appropriate as well as impact-oriented (Vedung, 1997). I adopted with amendments the IS evaluation framework developed by Lagsten (2011) which focuses on Use/activities, problems/gaps, strengths, goals and change requirements. The evaluation model as used in this study assumes that each stakeholder is asked about activities such as the prospects of using mobile telephones in reproductive health leads to problems, contextual, process and conceptual factors that may hinder or inhibit mobile phones use, being identified. The strengths of introducing mobile phone use if identified and then a goal, which is a desired or ideal state of using mobile phones is stated. Ultimately, change requirements and measures of efficacy are enumerated to ensure feasible implementation of mobile phone use. The model establishes whether stakeholders are satisfied and the evaluation is formulated by the stakeholders (Hansen, 2000). In this model, no expert knowledge is required but rather experiences from all the stakeholders. Interactivity, plurality and diversity of participants are paramount in this model of evaluation. This framework guided the data collection, presentation and analysis of findings (appendix 1).

3.0 METHODS
3.1 Study Design
I present cross-sectional data from in-depth interviews (IDIs) involving fifteen adults using qualitative design. A qualitative approach -an inductive process in which data is organised into categories, after which patterns are identified (McMillan & Schumacher, 1993) was taken to get the stakeholder's perspectives of mobile phones in reproductive health in Nakuru Provincial Hospital. Qualitative research is grounded in a philosophical interpretivist sense that is concerned about how the social world is interpreted understood, experienced, or produced (Mason, 1996, 4).
A qualitative approach was chosen as it helps an in-depth and holistic perspective of the reproductive health service users through closer interaction with the informants (Farber, 2006). The assessment of scholarly contribution was based on articles reviewed in the Örebro University library using hard and soft journal copies, elin@Örebro and Google scholar.
The data collection analysis and presentation was made to fit within the conceptual framework developed by Lagsten (2011). Interactivity, plurality and diversity of participants are paramount in this model of evaluation. This framework guided the data collection, presentation and analysis of findings (appendix 1). This framework focuses on individual goals for users and health providers that are later aggregated. For the policy implementer, the goals were focussed on ICT health policy.
3.2 Study Population and Sample Selection
I interviewed users, providers and policy implementers related to reproductive health in Nakuru Provincial Hospital and Nairobi Metropolitan City, Kenya in April 2011. The choice of Nakuru was due to its mixture of rural and urban settings. Nakuru is 160kms north-west of Nairobi. It is located within the formerly Kenyan Rift Valley Province. Nakuru was chosen because it is a provincial hospital serving 47 counties by August 2010 with a population of 10 million inhabitants and a surface area of 182,413 Km$^2$. It has a tribal synthesis but majorly the Kalenjin and Masaai and thus ideal for consideration. Users included twelve attendants at reproductive health unit, two midwives, and a person in charge of e-health care in Kenya. These are the people directly related to prospective use of mobile phones in reproductive health, thus including them in the study is worthwhile as it would yield the best results. This is premised on the fact these stakeholders are part of the general hypothesis that ICTs have got a role to play in ensuring that e-government is effective in the health sector and these are the first points of contact in that process. I accessed them based on two specific days, Tuesdays and Thursdays (when RH clinics are held), with the help of health workers, after meeting them for specific appointments; they linked them to me for interview. I accessed the participants based as they arrived from counselling and examination and based on identification from health providers. Most were shy at the beginning, based on probably a gender difference but later after assurances on the nature of the topic, they relented to provide information. The presence of a female research colleague was equally re-assuring on both occasions. Her role was that of concierge in the research process. Most interviews lasted 60 to 80 minutes and were recorded on mini-cassettes and hand notes. By age, the youngest client respondent was 19 years and the oldest was 29 years. All the users on those days were female.
This could possess limitations in the data evaluation. Religion-wise the participants included Moslems, Roman Catholic, Anglican-protestant and the Christian (born-again). The client with the highest level of education was Primary teacher (fourteen years of education) as is the case with one high school leaver. The health providers are enrolled registered midwives with average of fifteen years of service. Of the 12 users interviewed, only 2 did not possess personal cell phones.
Since the study took a qualitative approach, it was not possible to cover all aspects of mobile phones and RHC (Lindlof & Taylor, 2002) thus emphasis was laid on depth, not breadth (Ambert, Adler & Detzner, 1995).

3.3 Data collection
I collected data during the month of April 2011, using IDIs. An interview guide was used (appendix 1). All participants were sampled purposively given the nature of the study. The respondent’s relationship was based on collaboration and ethical grounds. It was prudent to readjust the questions especially on goals and change measures as they originally were not easily understood. Later simplified operant indicators of those variables were used.
3.4 Analysis and presentation of data
I edited, and classified the data were where applicable to capture emerging themes that were later fitted into the conceptual framework. This study sampled scholarly references for review as part of building a body of knowledge. I analysed the data using content analysis of individual responses and subsequently included it in a joint interpretation process for stakeholders proposed by Lagsten (2011). The presentation was thematically based on goals, problems, strengths, and change requirements.

In qualitative research, Wiersma (1995) suggests that post hoc, rather than priori conclusions should be drawn from the data. To draw a line between responses and their interpretation, quotations were used to clearly state what had been said, and what it was interpreted to mean.

3.5 Ethical considerations
I sought formal consent from each respondent and their rights were re-affirmed to them prior to IDIs. Besides, the convenience, confidentiality, privacy and comfort of the participants were considered. Confidentiality was for example guaranteed by giving each respondent a code which is maintained throughout the study.

4.0 RESULTS
4.1 Use of mobile phones in reproductive health matters
I investigated whether participants used mobile phones in the provision of reproductive services. Participants were categorised as (i) users, (ii) health service providers, and (iii) policy implementer in the Government of Kenya.

4.1.1 Users
All Users indicated using phones in reproductive health as a communication tool when accessing family planning activities. This more so happens when they have a health concern and the cost of reaching a health unit is high. They use the opportunity to call a known health worker for advice. Equally, cell phones assist them when they need to consult their spouses on decision making over family planning issues and when in hospital for immunisation purposes. To them, this is a dual process for mother and child-birth.

\[ I \text{ once brought my child for polio immunisations and on the way she picked very high temperature and we were admitted. So I called my husband to alert him and get us medical support (Female, 19).} \]

They affirmed to using cell phones when in remote places during and after emergency child-birth by a traditional birth attendant and had to seek guidance on managing the infant.

\[ \text{Phones are helpful when we start experiencing labour pains and do not have care givers as they may be far so we call them to come and provide support. Also sometimes there could be problems such as considering emergency caesarean section and husbands need to be around (Female, 27).} \]
During complications where a midwife had failed to provide an appropriate answer, a cell phone was used to access a Doctor for advice. Users also noted the use of cell phones to receive messages from the government (Ministry of Health) through telecommunication networks immunisation for children and mothers.

It’s clear to the users that the onus is on them to initiate phone calls when in need.

*The phone call should be initiated by me (user) because I require the medic’s service and it’s me in pain. So I don’t wait for the medic.*

No instance of text messaging was cited as used between Users and their health providers.

### 4.1.2 Health Service Providers

To the health providers, cell phone use for reproductive health is non-operational at an institutional level but many providers use them at a personal level when users consult on specific issues. Some areas for consultation include: antenatal complications; birth-related issues, postnatal complications, infant care and complications; immunisations and its side effects; birth-control methods and their side-effects. One health provider affirmed to the presence of a cell phone in the maternity ward by the Ministry of Health, and some users have communicated through it to when inquiring about date for appointments. Others communicate when they experience complications. There is a book for recording client’s cell phone numbers and those of their partners, if necessary and one cell phone provided by the Ministry of Health to deal with emergency circumstances. Another health provider stated that client’s cell phone numbers are used for instance in maternity:

“When she (woman delivering) has started labour, so we ring the husband”

This clarifies how far the hospital has gone to address cell use in reproductive health care.

### 4.1.3 Policy Implementer

The concept of cell phone use are not yet strengthened at provincial and district levels in relation to reproductive health as may be for other areas such as HIV/AIDS but the case may be for personal relations between health providers and users. This is still in its infancy at an institutional level.

### 4.2 Goals of Cell phone

#### 4.2.1 Users

To the users, the goals include swift and low cost support to users, effective referral of complicated cases, reduced caseloads at hospital and constant availability of network connectivity.

#### 4.2.2 Health Providers

The health providers stated the same goals as those of the users. However they stated the need for more the official phones with support infrastructure and finances.
4.2.3 Policy Implementer
According to the policy implementer, the goals are improved access to emergency health services, improved efficiency of health service delivery, reduced child and maternal mortality and morbidity.

4.3 Perceived Problems
4.3.1 Users
Problems highlighted arising from cell phone use includes language barriers when messages are sent in English (official language) but not a barrier when communicating one-on-one with health workers. There is a problem of spousal misunderstandings in cell phone use.

*My husband determines my phone use as he is the provider. If I can’t call, he has to find a way of dealing with my reproductive health problems. The problems are that if you insist, there could be a conflict* (Female, 23).

Cell phone theft and/or loss may jeopardise phone use. Also, transfer of personally known medical personnel especially the midwives affects the inter-relationships between users and service providers. This is because after several meetings, there is a personal psychological contract that develops into confidence between client-medical personnel. Trust by medical person to give out personal numbers is a challenge to many users. If a client is facing a severe problem it may require physical attention than consulting on phone. The expertise/skill level of the person/medic may require more consultation or referral on the phone by the providers. The availability of money (airtime) may be a challenge to both users and providers. There are costs related to the number and duration that a person should call and this is dependent on the intensity of the issue.

*It is difficult to explain the “intensity of the sickness”. You may underrate the condition of the condition of the patient or exaggerate it and my result in wrong treatment* (Female, 21).

Users felt that the personal encounter with health workers is psychological and physiological fundamental.

*It denies the patient the face-to-face encounter with the medical personnel which sometimes provides a psychological healing [rapport]* (Female, 22).

She further quipped that,

*There is no chance for physical examination if need be and in case of network interruptions, there is a risk of message misinterpretation.*

Participants stated the problem of lack of resources to buy a phone.

4.3.2 Health Provider
Some of the perceived problems by health providers include lack of ICT support systems and expertise at the local level. Hospital also lacks manpower at the medical level. Connectivity
problems may also hamper the consultation process. It was also established that some Users do not own let alone know how to use cell phones. One health provider affirmed that:

You may ask a mother and is not aware of the husband’s number (cell phone).

The Ministry of Health provides one cell phones for emergency use against a number of health workers. There is a financial constraint at the hospital coupled with the lack of a financial vote for phone credit (air time).

4.3.3 Policy Implementer
According to the policy implementer, there comprehensive regulatory framework may be a problem in terms of confidentiality and security of patient data, though a draft policy exists. Also, financial and sustainability issues at both levels of the providers and users may affect its efficacy.

4.4 Perceived Benefits
4.4.1 Users
Users feel that the perceived benefits include consultation under emergency at odd hours away from hospitals and when to make decision involving the partners for example caesarean section. It can be used when both the user and providers are remote from each other. It also saves money and time when it is related to distance.
Specifically, participants noted that it would provide greater opportunity to make inquiries that one would be interested in. Users are enabled to make appointments hence saving long queues that tend to discourage some people. One respondent noted that information is exchanges on phones quickly thus time-saving.

The client would not be limited to the subject/topic as it is done for example during antenatal trainings, where the topics are selected without considering the patient’s differences. It is also convenient to the employees who find it difficult to secure time of to attend reproductive health centres (Female, 29).

4.4.2 Health Providers
The perceived benefits according to health providers include consultation under emergency circumstances and addressing challenges related to distance between health providers and users. Trust and confidentiality is built around health providers and users.

4.4.3 Health Providers
According to the policy implementers, some of the perceived benefits include quality and timely decision making between client and medical personnel.
4.5 Change measures and requirements

4.5.1 Users
The users noted several change measures and requirements: availing low cost phone for households and communities and having alternative language options on phones. There is need for data phone tracking when lost or stolen. Training of medical personnel in people management skills and providing correct information to health providers upfront.

4.5.2 Health Providers
According to health providers, there is need for ICT support and training; provision of equipment for data handling and phone network connectivity especially in the rural areas. The motivation of usually stressed health workers is vital as well as a stakeholders approach to senscitise on benefits of phone use in reproductive health for example local community leaders (both adminisrative and political). There is need to continually monitor and also evaluate the systems.

4.5.3 Health Providers
The policy implementer noted the urgency of a comprehensive regulatory framework on RHC, ICT Investment in Health sector and Monitoring and evaluation of the system.

5. Discussion

5.1 Use
Results indicate that users are already utilising mobile phones in reproductive health care and this supports the Technology Acceptance Model in Health Care (Holden and Karsh, 2009). This supports the original question on whether mobile phones are being used in RHC.

5.2 Goals
Goals and change requirements are highlighted and this study extends the frontiers of knowledge by emphasising the role of stakeholder involvement in the design, implementation and evaluation of ICT health programmes.

5.3 Challenges
It is only that these are being used outside a clear regulatory framework (Mechael, 2008). There are prospective policy issues (The Commonwealth Health Ministers Book, 2008); socio-cultural, behavioural, technological and financial challenges facing stakeholders. Istepanian & Lacal (2003) note that legal frameworks and liability boundaries are needed to guide the appropriate use of tele-medical systems nationally and internationally. There is need to highlight legal issues and data protection, as well as challenges of safety in authenticating drugs by phone (Zenpe, 2009). Many African households share mobile phones hence users’ confidentiality is a challenge and yet secure information within mobile communication environments is crucial to maintaining patient’s rights to confidentiality (Mechael, 2008).
Equally, the study emphasizes the need to understand the dynamics of spousal involvement in RHC wider than those proposed by Ijadunola et al. (2010).

5.4 Benefits
The perceived benefits accruing are well enumerated though they go beyond to address issues of personal trust and confidence between user and health provider. These findings are in line with Jones (2005).

5.5 Change Requirements
There is need to taken into account the knowledge, attitudes and practices of users and health providers in design of Health ICTs through joint consultations as this leads to cost-effective designs, implementation and evaluation system.

6.0 LIMITATIONS
By the end of the study, most of the primary participants were female, and of childbearing age while some (16%) did not own personal phones but used for partners, and the study was limited in sample. Equally the network of stakeholders is wider than that used in the study hence more studies involving them. This may affect the wider application of the study elsewhere except in Nakuru. However the study highlights the need for feasibility and inclusion of primary stakeholders in ICT health programme management.

7.0 CONCLUSION
I evaluated from a stakeholder perspective the feasibility of cell phone use in reproductive health care. Cell phones are used but seldom of clear regulatory framework. Whereas there are challenges upfront, several benefits will accrue from utilising mobile phones. Goals and change requirements are feasible. Further studies are necessary in relation to reproductive health life of users, quality of demand, access and choice; health seeking behavioural change and acute disease management; security and confidentiality; mobile phone based diagnostic and treatment support for users; negotiation of use of ICTs by couples to validate the present study, and also both individuating and engendering the study.

Generally, with people participating in this feasibility of mobile phone use in reproductive health, it amplifies their contribution in needs assessment, design and implementation of programmes as well as contributes to the perception that ICTs may support health systems in developing countries (Espinoza, 2005).
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Appendix 1: Interviews for m-Health Research in Kenya

Research Questions and specific questions

1. Do they use mobile phones to address reproductive health matters? Activities

2. What Challenges do they perceive in the use of mobile phones for maternal health?

3. What are the perceived benefits of using mobile phones in RH?

4. What goals are to be achieved when different stakeholders use mobile phones in RH?

5. Change requirement for Users, healthcare professionals and governments
Executive Summary

This research was conducted on a hospital providing reproductive health services in Nakuru District, Kenya. The hospital has for decades been the regional artery for health services in the Kenya Rift Valley. The study was conducted to examine the feasibility of using mobile phones in the provision and support of reproductive health services. It aimed at building a body of knowledge for better and more effective engagement of stakeholders in the use of mobile reproductive health.

A review of the literature in the fields of Information and Communication Technologies (ICTs), electronic Governments, Reproductive Health, Information Systems Evaluation, electronic and mobile health, found no studies focusing on clear feasibility and ex-ante evaluation of mobile phone use in reproductive health in a developing country context.

Four (4) research questions were addressed in this study. The first question was whether identified stakeholders use mobile phones in reproductive health. The second question was which goals could be behind using mobile phones in reproductive health. The third question what perceived problems different stakeholders thought would arise during and after introduction of mobile phones in reproductive health. The fourth question was what perceived benefits would accrue out of mobile phone use in reproductive health. The fifth question was what change requirements and measures were necessary to ensure the efficacy of mobile phones in reproductive health in Nakuru Hospital.

The study was undertaken using the following methods: using an interview guide, literature review and the internet. I use content analysis to present results. In this thesis I have identified
Nakuru Provincial Hospital in Kenya given its wide catchment of 10 million people, mixed with rural and urban characteristics. I have also identified 15 participants in this study, twelve (12) of whom are women accessing reproductive health care at the hospital, and 2 of whom are health providers and 1, a health implementer.

The study adopted and amended a model to Lagsten (2011) to make a feasibility of the study. They include Activities or Use, the Goals of Mobile Phone Use, Perceived Problems and Benefits and Change Measures and Requirements to ensure efficacy of mobile phone use in reproductive health. In this process I have identified some of the Uses such as communication between themselves and health workers and then between spouses over issues such as emergency, appointments and choice of reproductive health methods. The goals of mobile use in reproductive health I identified include reduction in cost of health services, reduced workload of health workers, reduced distance and availability of health management information systems infrastructure. The problems perceived as arising out of phone use include network, training and motivation challenge of health workers, unclear regulatory framework and lack of investment. Some of the benefits I identified ease of communication and reduced distances and reduction in mortality and morbidity. The change requirements necessary include language options on mobile phones, regulatory framework and community mobilisation.

The thesis concludes by highlighting the interface between mobile phones and ICTs in general and reproductive health and makes recommendation to policy makers in governments, academia, corporate sector, and civil society.