

## Networked Spaces: Benefits of Mobile Phones in the Treatment and Referral Process within iCCM

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### Abstract

Kenya is still lagging behind regional and global averages in child mortality rates despite the fact that substantial progress has been made in reducing child mortality through child health programs since 1990. Furthermore, Kenya like other developing countries faces constraints in health system performance and access to services in hard-to-reach areas. Studies on the use of mobile phones in iCCM have mainly focused on malaria and neglected other common childhood illnesses, yet there is evidence to show the potential for the integration of mobile phones in iCCM to address the challenges of reducing under-five child morbidity and mortality due to common childhood illnesses. This paper aims to assess the informal uses of mobile phones in community case management of childhood illnesses in Nyaguda sub-location, Western Kenya. Ethnographic study design was employed. The study population consisted of 25 CHVs trained and supervised in iCCM and having access to basic mobile phones, selected caregivers, KIIs with Nyaguda dispensary incharge, CHEW Nyaguda sub-location, a clinical officer and matron in-charge of MCH at Bondo sub-County hospital, FGDs with caregivers, community health workers, CHEWs within the intervention sites of iCCM and Bondo sub-county health management team. Data collection methods included; in-depth interviews, KIIs, FGDs, and direct observation. Data was analyzed through latent content analysis by theoretically relating the emerging themes from the texts as per the specific objectives. Ethical standards were followed by obtaining informed consent and respecting confidentiality. This study found that the integration of mobile phone within iCCM opened further the existing and new spaces of care hence improving the healthcare system and health policy.

**Keywords:** iCCM, Informal uses, Mobile phones, Health workers

### 1. Introduction

Child health programs put in place to address under-five mortality rates in the developing countries have been faced with challenges such as limited infrastructure including limited technology, lack of hospital resources, health care workers and lack of supervisory and management systems (WHO, 2013). There have also been challenges such as the socio-economic and socio-cultural barriers to healthcare (Liu *et al.*, 2012). This has prompted the need for interventions such as Integrated Community Case Management (iCCM) which involves the use of appropriately trained and supervised community health volunteers (CHVs), provided with uninterrupted supply of medicines to identify and correctly treat most children with malaria and diarrhea at community level (Rowe *et al.*, 2007). Though embraced by most ministries of health in developing countries, it experiences some limitations which include; problems of retention of community health workers, lack of optimal strategies for supervision, shortages in supply commodities, poor data collection, monitoring and evaluation and poor referral practices (WHO, 2013). These challenges have therefore made iCCM not sufficient in providing quality management of childhood illnesses (Walter, 2009). The emerging use of mobile phones in health offers new strategies for improving quality of health care and makes significant contribution in addressing the identified challenges within the health systems (Zurovac, Talisuna & Snow, 2012, Kuepper, Stekelenburg & Mileu, 2011, Lester *et al.*, 2010). Mobile health (mHealth) is defined as the use of portable electronic devices for mobile voice or data communication over a cellular or other wireless network to provide health information (Yang & Kahn, 2010). This study has focused on the use of basic phone services in healthcare. This is especially made possible by the continued growth in coverage of mobile cellular networks (International Telecommunication Union (ITU), 2013). According to Mechael (2010), individuals around the world are using mobile technologies to access health services and information and this is often done informally. The informal use of mobile phones for health-related purposes, however, poses the challenge of ascertaining its benefits (Mechael, 2010). This is the same scenario in most sub-Saharan Africa, despite the potential for mobile phones to assist in addressing challenges faced in iCCM.

Nyaguda has been used as one of the intervention sites for feasibility study of the implementation of iCCM. It is however, located the furthest from the Bondo sub-County hospital which is the main referral hospital, where commodities were stored and where the key supervisors in iCCM were located (USAID/mcsp.org). This therefore posed the challenges of supervision, commodity stock outs and referral of severe cases of illnesses among children under five years. This prompted this study to provide a detailed and in-depth examination into the potential of integrating mobile phones in iCCM. However, iCCM did not embrace the use of mobile phones

during the implementation period.

### **1.1 Problem**

Despite the fact that there are several programs and interventions to address childhood illnesses, Kenya is still lagging behind regional and global averages in under-five child mortality. One such intervention being implemented in hard to reach areas in Kenya is iCCM. iCCM is however, being faced with challenges of transmitting health messages, lack of optimal strategies for supervision and retention of CHVs. Despite the potential for basic mobile phones to address the challenges of client accessibility, enhancement of supervision and reduction of workload, much evidence on mhealth especially in the developing countries such as Kenya is largely based on pilot studies and small-scale interventions. Whereas there are clear indications regarding the informal use of basic mobile phone to communicate common childhood illness health messages within the iCCM intervention site in Nyaguda sub-location, it has not been possible to integrate mobile phone use within iCCM due to lack of adequate information. Furthermore, this informal use, poses a challenge in ascertaining its benefits due to lack of data on its usage. The use of mobile phones in pilot projects has only been limited to less interactive methods of communication. It can, however, benefit from ethnographic studies of the suitability of scaling up the existing informal use of mobile phones by introducing more interactive approaches to communicating common childhood messages within hard-to-reach areas such as Nyaguda sub-location.

### **2. Methodology**

**Research Design:** An ethnographic study design was employed. It is both a process and product of describing and interpreting cultural behaviours such as the integration of mobile phones within the health system. It also uses rigorous research methods and data collection techniques to avoid bias and ensure accuracy and triangulation of data (LeCompte and Schensul, 2010).

The entry point for this ethnographic study was Nyaguda health center within the study area. This is where selection of health workers concerned with the management of childhood illnesses was done. The selection was based on the health workers who have been trained on integrated community case management for children less than five years old and who are consulted by caregivers who reside in hard-to-reach areas. The second phase entailed following-up the health workers within their natural setting of work and conducting interviews with them.

#### **2.1 Study population:**

The study population comprised of 25 health workers in Nyaguda sub-location trained and supervised in integrated community case management of childhood illnesses and have access to mobile phones. The study also targeted 20 caregivers who are involved in the decision making process of where to seek health care during the illness of a child less than five years old. Information was also received from 4 key informants who included community health and extension workers, key hospital workers both in Nyaguda health center and Bondo-sub district hospital where most of the children are referred to when the illness is severe will also interviewed. These will include the in-charge of Nyaguda health center, the matron and a clinical officer in the maternal child health unit at the Bondo sub-district hospital. The unit of analysis is the health workers concerned with the management of childhood illnesses among children under five and who used mobile phones informally to manage childhood illnesses.

#### **2.2 Sampling selection Procedures:**

The target population was the health workers tasked with the management of childhood illnesses. Twenty Community health workers concerned with the management of childhood illnesses were selected purposively and interviewed in each of the seven villages in Nyaguda sub-location (Minya, Nyaguda, Orengo, Otuoma, Uhendo, Wichlum and Wichlum Uhendo). The need for thick description makes it necessary that samples are small (Hammersley and Atkinson, 2007). Small samples do not permit generalization to a larger population. The aim of this study is not to generalize but rather to have an in-depth understanding of the situation without losing sight of the whole (Hammersley and Atkinson, 2007). It provides the researcher with a much more comprehensive holistic perspective than other forms of research.

The information was sought through key informant interviews, in-depth interviews and focus group discussions. In-depth interviews were conducted with 20 community health workers concerned with the management of children under the age of five with common childhood illnesses and 20 caregivers who had children under five with common childhood illnesses and had interacted with the CHVs through phone. The participants were sampled purposively. Data gathered during these interviews were audio recorded and also noted in the field note-books.

### **2.3 Data Collection**

Key informant interviews were conducted with the Nyaguda dispensary in-charge, community health and extension worker, a clinical officer and the matron in-charge of the maternal child health clinic at Bondo sub-county hospital and the assistant chief of Nyaguda sub-location. The key informants were identified through purposive sampling. Data gathered during these interviews was audio recorded and also noted in the field notebooks. FGDs were conducted homogeneously selected groups until a level of saturation was achieved. These groups included; female caregivers, community health workers, Community Health and Extension workers of areas within Bondo sub-county where integrated community case management has been implemented, members of Bondo sub-county health management team who are often involved in iCCM supervision process. The FGDs each comprised of eight participants. During the Focus Group Discussions, a field assistant assisted with the note-taking. The discussions were also audio-recorded and later transcribed. Direct observations were made on the various ways used by care-givers and community health workers to manage common childhood illnesses, especially using mobile phones and how the community health workers and the health personnel handle children with common illnesses. The behavior of people around the child with a particular common illness was also observed. Observation was made on the housing structures, cultural settings and general living conditions that may have prompted the occurrence of the common childhood illnesses among children under five and also how such conditions influence the use of mobile phones in the management of common childhood illnesses. These observations were guided by an observation check list. The reliability of the tools in this study was achieved through pre-testing of the tools by taking a sample of 10% of the various data collection tools and administering them in a setting similar to Nyaguda where iCCM has been conducted before though not within the study area. This aided in finding out if there are any errors to be addressed in the data collection tools before conducting the actual study. Validity on the other hand is concerned with the meaning and interpretation of data collection tools which was achieved through triangulation.

### **2.4 Data analysis and presentation techniques**

The study employed qualitative data analysis techniques. The interviews were recorded having obtained consent and verbally transcribed. The data was coded and themes presented through descriptive texts, analyzed reports and narratives. Information from the qualitative data was coded and analyzed using latent content analysis. This was done by theoretically relating the emerging themes from the texts. The content latent analysis examined the specific objectives of the study.

### **3. Results and Discussion**

Being located near the lake has made most women to be careless when it comes to taking care of the health of their children. They do not value taking their children to hospital but will instead state that “let me go first and look for money because when I go to the health facility to seek health care for my child they will ask me for money to buy the book, for the lab and I would still buy medicine because I would be told that there are no drugs.” But now through the implementation of iCCM health care has been brought near the clients. The caregivers just walk to our homesteads to seek care for their sick children. However, when they are busy, they send the older siblings to the child or relatives to bring the sick child to me for care as they go about their daily businesses along the shores of Lake Victoria. Some parents despite proximity to care, they still never bother to bring their children to me but during my routine rounds I find the sick children at their homes and attend to their health needs (40 year old, Female Community Health Volunteer).

The narrative above shows the peoples’ views on how iCCM has improved access to health care for children less than five years. It brings out the interaction between seeking health care for children and the varied priorities in their daily lives. The narrative reveals the great benefit of iCCM within the context of Nyaguda. Nyaguda sub-location is a hard-to-reach area. This is especially in relation to health accessibility. The distance from most of the villages to the health facility is far and the terrain is also poor. Even with the implementation of iCCM whereby CHVs are being used to help the community members’ access health care, they are still in-charge of 100 households which is still a large number. However, through the implementation of iCCM, the community members have ease of access to health care for their children. This is more so because through iCCM, the CHVs have been trained on how to identify and treat common childhood illnesses. The CHVs are located within the community and hence the community members need not to travel long distances within the poor terrain of Nyaguda to seek health care for their children less than five years. The above excerpt reveals that this proximity to health care for children less than five years old has given caregivers a better opportunity to attend to their daily work routines and still have the health of their children less than five years well taken care of. According to the CHVs, caregivers would often just visit their homesteads which are located near them and seek care for their sick children. In the event that a caregiver is too busy to take the child to the CHV due to other commitments, they would just ask other close family members to help them with task of taking the child to the

CHV for care. Caregivers would often task the older siblings or relatives with that responsibility of taking the sick child to the CHV for health care management.

In addition to accessibility to care, iCCM has also made health care for children less than five years affordable. Despite the offer of free child health services by the Kenya health policy (2014), barriers still exist. These barriers include out-of-pocket costs such as fee for buying the hospital booklet or health card, transportation to health facilities and medications when out of stock at public facilities (Brault et al., 2017). However, within iCCM no money is needed for the healthcare needs of children less than five years. This is because the CHVs provide the caregivers with the record books, the distance to the CHVs place is near and medications are out of stock, the CHVs refer the caregivers to the next CHV who has the medicines or to the health facility. The above narrative reveals that before the implementation of iCCM, caregivers needed money to buy record books, for lab tests and medication. However, within iCCM all these are provided for free. Therefore, other than the hospital charges being made free, transport costs due to the long distance from the health facility for most caregivers has also addressed through the implementation of iCCM. According to Levesque et al. (2013), access to health care is the opportunity to identify health care needs, to seek health care services, to reach, to obtain or use health care services and to have the need for services fulfilled. A study carried out in Eastern Uganda demonstrated that iCCM for malaria and pneumonia increased prompt and appropriate treatment for self-reported pneumonia symptoms (Kalyango et al., 2013). iCCM in the area was therefore deemed to improve access to care. However, the study by Kalyango (2013) only focused on symptoms and treatment of malaria and pneumonia. This is despite WHO recommendations (WHO/UNICEF, 2012) that iCCM should integrate diarrhoea and identification of acute malnutrition together with the identification and treatment malaria and pneumonia which was also implemented in Nyaguda sub-location.

The above narrative at the same time further reveals certain challenges that the CHVs encounter during their work. For example, the CHV mentioned that despite the proximity to care, some caregivers would still not seek care for their sick children from the CHVs. This was mainly attributed to their proximity to the fish landing beaches of Lake Victoria. The caregivers would be busy going about their daily chores at the fish landing beaches instead of seeking care from the CHV for their sick child. The sick children whose caregivers did not seek health care for the common childhood illnesses would further benefit from the routine rounds that the CHVs are mandated to make within the various households allocated to them. Therefore, the implementation of iCCM has made health care management for common childhood illnesses more accessible to the people living in the hard-to-reach area of Nyaguda sub-location. This challenge leads us back to the definition of access by Levesque et al., (2013) whereby for healthcare to be considered accessible, there has to be the identification of health care needs and seeking of health care services. Health care within iCCM is made accessible when the caregivers identify health needs and seek health care services. This accessibility to health care is also achieved when sick children less than five years old still reach or obtain health care services through the routine rounds made by the CHVs.

Integrated Community Case Management (iCCM) is credited to removing most barriers to health care access. For example, the narrative below reveals one of the ways iCCM has addressed the barrier of accessibility to care and increased timeliness to care.

First of all the health facility is far from my home and the road is also bad even if I am in a position to take a motorbike especially with a very sick child. The road to the hospital is so uncomfortable. The queues at the health facilities used to be so long and the doctor would take his sweet time with each client making the wait even longer to be seen by the doctor. I would end up wasting a lot of time which I would have used to do my other chores some of which are geared towards giving me money. Sometimes instead of going to hospital for the fear of the long queues, I would instead visit the chemist and buy medications for my child (Cases of self-care reduced and their implications). The introduction and implementation of iCCM has however now made it easier for me because when my child gets unwell, I just walk to the CHVs home which is near my homestead. The CHV attends to me as fast as possible then I can comfortably go back to my daily chores (35 year old female caregiver).

This narrative reveals that the distance to the health facility is no longer a barrier to accessing health services for the people of Nyaguda sub-location. Health care management for children less than five years old has now been rolled out within the villages. This is whereby the trained and supervised CHVs who live within the various villages are now mandated with the responsibility of testing and treating children less than five years with common childhood illnesses such as malaria, malnutrition, diarrhea and pneumonia. This provides the community members with efficient and effective management of their sick children. The health care services are efficient and effective due to their accessibility and timeliness. This is because the CHVs are located within the villages and any time of the day or night they can be visited to provide health care services for children less than five years with common childhood illnesses. Community members also get to save a lot of time which they use to go about their businesses. This is especially so if the child has not been referred to the health facility within Nyaguda sub-location. The implementation of iCCM has also ensured that children are given the appropriate



care needed through the professional attention provided by the CHVs. The caregivers have the great option of choosing to see the CHVs who are even visited for care free of charge than to go to the chemists whereby they may get the child misdiagnosed and still spend money.

Further to iCCM addressing the issues of access to care, mobile phones are also being used informally within the strategy of iCCM. The integration of mobile phones though informally within iCCM has further rendered distance meaningless in relation to healthcare access within Nyaguda sub-location. This study revealed that within the context of Nyaguda sub-location, mobile phones are used by caregivers to call the CHV and inform him or her of the child's illness. CHVs also reported that some caregivers called them for advice on what to do when a child for instance has fever at night. This was also affirmed by most of the caregivers who reported that they would call the CHV for advice when the child was sick. One of the caregivers stated that;

When my child is unwell, I first call the CHV to ask her for advice on what to do as I explain the problem to her. The CHV would advise me to take the child to her for check-up and this would really help me at the same time not waste time by knowing the location of the CHV and also getting good healthcare for my child (35 year old, female CHV).

The theory of cultural ecology by Steward (1955) states that, human beings adapt to their environment through the primary mechanism of culture. The mobile phone is part of material culture that the residents of Nyaguda sub-location which is a hard-to-reach area have adopted to use to further enhance accessibility to health care. Networking being the main goal of mobile phones has improved health care access for the people of Nyaguda sub-location. This has been achieved through the resulting relationships developed while using the mobile phones. Use of mobile phones for health purposes has also been noted by Horst and Miller (2014). According to Horst and Miller (2014), mobile phones are used to link up and provide intensive social networking among kin and friends within a given socio-cultural setting. They can therefore be used to educate community health workers on proper treatment procedures and correct treatment practices. The main goal of using mobile phones is networking, however, the resulting relationships can be used for economic aid, sexual liaisons, business contacts, psychological support and even provide better health access to the members of any society. The use of mobile phone in Nyaguda sub-location as revealed from the above narrative shows that mobile phones are key tools for acquiring real time knowledge of what needs to be done in various health situations. According to Duclos (2015), technology helps bridge the gap in knowledge, interaction between health professionals and their clients. This function of the mobile phone of improving interactions within the community members has brought health care even closer to the clients within the context of Nyaguda sub-location. This concurs with the assertion by Axel (2006) that, technology and material culture form the primary means by which people establish their viability given the constraints imposed upon them by their environment and the demands of social integration.

### **3.1 Reduction in child morbidity and mortality**

The study further found out that iCCM has contributed to the reduction of the previously reported high child mortality rates in the study area. This was one of the overarching themes revealed by the study during the several interviews conducted by all the stakeholders in the healthcare of children less than five years. One of the CHVs narrated that;

Malaria used to kill children in this village. This is because most caregivers would not seek health care for their sick children and some would just buy medications from the chemists for the sick children. However, since the implementation of iCCM, the number of deaths have reduced. The number of funerals we now attend for children have greatly reduced unlike those days before iCCM when we would attend funerals for children who had died of common childhood illnesses every other day. The decline in child deaths is evident even in our monthly reporting to the sub-county hospital (45 year old female CHV).

Previously, as narrated by the CHV, malaria used to contribute to high child mortality rates in the area. However, with the empowerment of CHVs to test and treat malaria, a decline in death incidences has been reported. It has also been noted that the number of caregivers who would seek care from other sources of health care other than the health facility such as those who bought medications from the chemists without prescriptions had reduced. The narrative therefore reveals change in health seeking behaviours among caregivers. This is due to the accessibility of quality care for their children less than five years with common childhood illnesses. The World Health Organization (WHO) and UNICEF recommended iCCM as a strategy geared towards the achievement of equity in child health care provision (WHO/UNICEF, 2012). They WHO/UNICEF (2012) further stated that iCCM as a strategy is also expected to contribute towards a sustained reduction in child mortality (WHO/UNICEF, 2012). The World Health Organization (WHO) and UNICEF (2012) further note that the implementation of iCCM is expected to improve access to health care for the undeserved populations for example those living in hard-to-reach areas like Nyaguda sub-location.

According to the findings of this study, it can be deduced that the implementation of iCCM has made health care for children less than five years more accessible by reducing barriers to care. These findings concur with

that of Kisia et al. (2012) who found out that care provided by CHVs has the potential to reduce barriers of accessibility through the interactions with fellow community members who understand the family's situation. They further mentioned that care provided by CHVs was also available to caregivers outside normal "business hours" and more frequent follow-up also provided (Kisia et al. 2012). This study has found out that factors noted by Chuma et al. (2010) of affordability, accessibility and availability that interact to influence level of access to prompt and effective malaria treatment were being addressed by the implementation of iCCM. This access to prompt and effective health care has worked towards helping to reduce morbidity and mortality rates among children less than five years.

Mobile phones have improved communication and coordination within iCCM though being used informally in Nyaguda sub-location. This study established their importance during the process of diagnosing and the treatment of children less than five years with common childhood illnesses. The narrative below by a 40 year old female CHV revealed the benefit of using the mobile phone in the process of diagnosis and treatment within iCCM.

Sometimes back I tested a child for malaria and found that the child had no malaria but was convulsing. I therefore called the doctor immediately notifying him of the case. The doctor asked me to refer the child to the health facility. The phone call and conversation that I made with the doctor gave the caregiver hope. This is because she knew that on arrival to the health facility she would not take long before her child is attended to (40 year old CHV)

The qualitative data provides evidence that the mobile phone provides connectivity among the various stakeholders within the health sector. In this case, the mobile phone is used to show a lot of concern towards the life of the sick child through the initiative that the CHV takes to call the doctor at the nearest health facility, to explain the matter to the doctor and assure the caregiver that the doctor at the facility is aware of the case. This gives caregivers a lot of encouragement knowing that since the doctor has been informed about the child's problem they will be attended to immediately. The CHV also goes a step further in line with the iCCM rules to write a referral note that the caregiver gives to the doctor on arrival.

The mobile phone is therefore seen not only as an instrument of networking but as a motivating tool to caregivers to seek proper health care for their sick children. This in turn makes seeking care more efficient and effective. It is important to note that most of the time when the CHVs seek advice concerning the difficult scenarios from the clinical officer at the health facility they are requested to refer the patient to the health facility. However, the CHVs may also advise caregivers on the first aid to give the child which is mostly paracetamol in case of high fevers even as they refer the sick child. Therefore, as noted by Duclos (2015), use of mobile phones which is part of digital connectivity is closely related with access to care and protection against health-related risks. This is through the use of the connectivity nature of the mobile phones among the various stakeholders in health care and this is especially important in the hard-to-reach areas. Studies (Aysha Z et al., 2016; Asimwe C. et al., 2011; Ngabo F. et al., 2012) have shown that simple text messages delivered through mobile phones have the potential to improve coordination and communication between health workers resulting in early case identification and timely feedback from CHVs and CHEWs. These studies have however, just focused on use of text messages and not the more interactive use of voice calls to communicate.

The CHVs not only identify and treat children with common childhood illnesses but as earlier stated, a child may present with a sickness that needs the CHV to refer the child to the nearest health facility. This process is made easier through the use of the mobile phone especially given the ecological context and the distance to the health facility for some of the caregivers. One of the CHVs narrated an incidence where the phone was put to use informally during a referral process.

A child had been brought to me suffering from fever and fast breathing. I tested the child for malaria but there was no malaria. I therefore had to refer the child to the health facility. Before sending the caregiver to the health facility, I called the health facility in-charge to find out if he was available. Through the use of mobile phone the in-charge confirmed to me that he was not available at that time. I went with the caregiver to hospital and found that the in-charge was not back yet hence had to ensure that with the referral note written and handed to the caregiver she went to the nearest private health facility where the child was admitted given the severity of the illness (49 Year old Female, CHV).

This study reveals the importance of the use of mobile phones in the referral process. The distance from the village of this particular CHV to the health facility is not near and the terrain is also poor, yet through the use of mobile phone they were able to get the best solution. For example as noted from the narrative, the mobile phone was used to establish that the option of going to the nearest health facility was not viable. The mobile phone therefore made distance to the nearest health facility meaningless. This means that distance is no longer a problem to accessing health care information to the establishment of the most appropriate action of care. The people of Nyaguda sub-location have embraced the use of mobile phone to address their ecological challenges of poor terrain and long distances to health facilities. Culture is the primary mechanism by which human beings adapt to their environment. According to Dobzhansky (1972), Cohen, (1974) and Kirch, (1980), culture is the

most potent method of adaptation. Cultural responses include technology such as the mobile phone and organization.

Therefore through the use of mobile phones, networks are created, care is sought and negotiated through those networked spaces within Nyaguda from both the public and the nearest private health facility. This shows that the mobile phone helps to create new spaces of care other than the usual ways of seeking care for sick children less than five years. These new spaces of care for children less than five years provide greater access to effective and efficient health care services. According to Duclos (2015), technology such as the use of mobile phones has created new ways to show that indeed human beings matter and need timely and accessible care.

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