



Circulation of Data, Knowledge and Expertise: A Qualitative Study on the Integration of Mobile Phones in the Process of Supervision within ICCM in the Hard-to-Reach Areas of Western Kenya

Agnetta Adiedo Nyabundi^{1*}, Erick Nyambedha², Sonja Merten³

¹Department of Health Sciences, University of Pretoria, Pretoria, South Africa

²Department of Health Sciences, Maseno University, Kisumu, Kenya

³Department of Health Sciences, Swiss Tropical and Public Health Institute, Socinstrasse, Switzerland

ABSTRACT

Introduction: Since the 1990's, Kenya has substantially progressed towards reducing child mortality. Despite the progress, Kenya still lags behind regional and global averages in child mortality rates. Furthermore, like other developing countries, Kenya faces constraints in health system performance and access to services, especially in hard-to-reach areas such as Nyaguda sub-location. Evidence shows that integrating basic mobile phones in integrated Community Case Management (ICCM) could address the challenges of under-five child morbidity and mortality due to common childhood illnesses. In Nyaguda sub-location, mobile phones are integrated informally through their everyday use by the various health stakeholders. There is, however, less evidence of the CHVs' experiences with the informal everyday use of basic mobile phones in support supervision. This study aimed to explore the experiences of various health stakeholders in ICCM during their day-to-day use of basic and own mobile phones. The concept of spaces in global eHealth by Vincent Duclos 2015 guided this study. The concept of spaces reveals how technology has linked bodies, knowledge and care practices in new spatial and temporal configurations.

Materials and methods: Using the qualitative study design, the study population consisted of 25 CHVs trained and supervised in ICCM and having access to mobile phones, 20 caregivers, 4 Key Informant Interviews (KIIs) with the in-charge of Nyaguda dispensary, Community Health Extension Workers (CHEW) Nyaguda sub-location, a clinical officer and matron in-charge of Maternal Child Health clinic (MCH) at Bondo sub-county hospital, 4 Focus Group Discussions (FGDs) with the caregivers, CHVs, 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. Content analysis was used to analyze data by examining emerging themes.

Results: The health workers viewed the mobile phone as an essential tool for tracking cases, promoting health, ensuring adherence to treatment regimen and providing real-time information.

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Corresponding author: Agnetta Adiedo Nyabundi, Department of Health Sciences, University of Pretoria, Pretoria, South Africa; E-mail: agnetta.adiedo14@gmail.com

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Conclusion: Integrating the mobile phone within iCCM has strengthened the existing initiatives and practices in integrating mhealth in the Kenyan healthcare system and contributed to improving healthcare supervision and promotion.

Keywords: Community health volunteers; Integrated community case management; Mobile phones; Supervision; Health promotion

INTRODUCTION

The leading causes of mortality among children less than five years in sub-Saharan Africa are pneumonia, diarrhea and malaria. Correct treatment is necessary to reduce child mortality due to these common childhood illnesses. In high-mortality countries, facility-based services alone do not provide adequate access to treatment within 24 hours after the onset of symptoms. Therefore, World Health Organization (WHO) in the 1990's developed Integrated Management of Childhood Illness (IMCI) to help address childhood illnesses at the community level. Further on community-level interventions to manage common childhood illnesses, in June 2012, WHO and UNICEF issued a joint statement to support integrated Community Case Management (iCCM) to improve access to essential treatment services.

iCCM is a strategy whereby frontline workers at the community level (Community Health Volunteers-CHVs) are trained, supplied with commodities and supervised to diagnose and treat children for malaria, pneumonia and diarrhea, using artemisinin-based combination therapies, oral antibiotics, oral rehydration salts and zinc. Growing evidence shows that CHVs in sub-Saharan Africa have helped achieve adequate, high treatment coverage and delivery of high-quality care to sick children [1]. Despite its positive impacts, iCCM faces several challenges, such as a lack of sufficient supportive supervision, the tendency for health workers to follow protocols less rigorously over time and insufficient resource and policy support. It also faces the limitation of poor infrastructure, particularly in rural and hard-to-reach areas.

Integrating mobile phones within the healthcare system is an emerging way that holds promise for improving healthcare quality and reducing challenges associated with accessing quality healthcare. Technology helps stakeholders in the health system to exist in the social relations they create. In this light, mHealth can potentially improve the frequency and quality of supervision and mentoring. This potential, however, has not been thoroughly investigated to assess the experiences obtained by various stakeholders in its implementation to ascertain its impact on expanding access to quality health services. Several studies have been conducted on mHealth technology and iCCM implementation. For example, a study in Malawi evaluated the effect of mHealth technology on improving the quality of iCCM [2]. This Malawian study found that CHVs using mHealth technology tended to adhere better to the iCCM guidelines than those using paper-based forms. However, there was no impact on treatment. The authors, therefore, recommended

more studies on mHealth to improve community-level quality of care. Another study conducted in Uganda assessed the impact of mobile phone deployment on iCCM effectiveness in terms of appropriate treatment for pneumonia, malaria and diarrhea. The study reported that CHVs supported by mobile phones instituted 'appropriate' treatment in 97.1% of fever cases, 88.2% of pneumonia cases and 92.4% of diarrhea cases, based on the algorithms, which are a component of iCCM training. However, none of the above studies assessed the impact of mHealth technology on supportive supervision as a pathway to improve appropriate treatment among children with common childhood illnesses. Inadequate supportive supervision remains a crucial challenge to implementing iCCM.

On the other hand, studies have shown that onsite training and supervision of CHVs would improve clinical practices. These studies were, however, conducted with a wide range of mobile technology applications. The current research focused on integrating daily mobile phone use in the hands of the CHVs within a hard-to-reach rural area in western Kenya which had no support for complex mobile devices.

A study conducted in Zambia explored whether using mHealth technology would strengthen supervision. The study concluded that it could not determine that and proposed longitudinal studies to assess the impact of mHealth-enhanced iCCM on health outputs and outcomes. The present study further endeavored to qualitatively examine health workers' perceptions of integrating mobile phones within the context of iCCM, including the supervision process. The successful integration of innovations results from many skills and development over a long time within a given socio-cultural context. Qualitative studies would provide a further understanding of the integration of mobile phones as technology and culture within the context of iCCM. Context is necessary to understand how social relations evolve and influence well-being across time and space.

iCCM implementation in Bondo sub-county, Western Kenya, was established under the community strategy. It had a positive impact on the health of children. For example, it reduced child deaths, as evidenced by a drop in requests for burial permits and funeral services. However, challenges arose, such as a lack of money from the county sufficient to ensure regular supervision. Most CHVs enjoyed the status that providing iCCM gave them in their communities. However, the small size of the stipend forced them into other activities to generate income, activities that Kenya, prompted this study to provide a detailed and in-depth examination into the potential of integrating basic mobile phones in the hands of the CHVs within the process of supervision in iCCM.

Contribution of the Concept of Spaces of Care in Global eHealth to the Study

This study was guided by the concept of spaces of care in global eHealth by Vincent Duclos. Duclos reveals how technology has linked bodies, knowledge and care practices in new spatial and temporal configurations. Mobile phones are a contemporary arrangement that creates new spaces for the care of lives [3]. This concept has guided this study by mapping out how mobile phones shape, generate and distribute knowledge in ways that encode and enforce existing relations. It also helped this study to document how these relations are entangled in a multitude of force relations, mobilities and strategies aimed at the government of human life. The healthcare system entails a connection among patients, medical practitioners, hospitals and laypeople that determines the circulation of knowledge, expertise and data. The concept of spaces of care in global eHealth guided the choice of qualitative study design and qualitative methods to have an in-depth perspective on integrating mobile phones. Data was also analyzed and interpreted and findings were discussed in light of the concept of spaces in global eHealth, which helped show the different connections among stakeholders within ICCM.

MATERIALS AND METHODS

This study employed the qualitative research design. This design helped provide detailed descriptions and meaningful explanations of the health workers' perceptions of integrating mobile phones within support supervision in iCCM. The researcher interacted daily with the participants for nine months. This study was conducted in Nyaguda sub-location, Siaya county in Western Kenya. Nyaguda sub-location is located near lake Victoria and in a malaria-endemic area. Nyaguda sub-location is situated in a rural area 112.4 kilometers from Kisumu town. Nyaguda is located in Siaya county and Bondo sub-county, which has one of the highest infant mortality rates in Kenya, at 110 infants per 1,000 live births and an under-five mortality rate of 208 per 1,000 live births. KNBS and ICF macro further note that this is thrice the national under-five mortality rate of 74/1,000. The high burden of disease, high levels of poverty and underdevelopment have led to the declining health status of the population in Bondo. Nyaguda sub-location comprises seven villages: Minya, Nyaguda, Orengo, Otuoma, Uhendo, Wichlum and Wichlum Uhendo.

Nyaguda sub-location has approximately 1552 households. The primary healthcare facility in Nyaguda sub-location is Nyaguda health center. According to the health facility's records, approximately 10-12 sick children visit the local health facility (Nyaguda dispensary) per day. Nyaguda sub-location has 25 community health workers trained and supervised in iCCM. The economic activities in the study area are mainly fishing and subsistence farming. The location of Nyaguda sub-location at the shores of lake Victoria, coupled with high levels of poverty and underdevelopment, makes the place more susceptible to common childhood illnesses.

Several strategies and policy initiatives-such as the MOH's reproductive health policy; national implementation of Integrated Management of Childhood Illness (IMCI): Policy constraints and strategies and the MOH's Kenya health policy 2014-2030 all aimed at improving health indicators, especially for children less than five years [4]. However, there is still limited access to and use of health services in this study area. These challenges within the health system prompted the current study to examine how integrating mobile phones could expand healthcare relations and spaces of care for common childhood illnesses in difficult-to-reach places in western Kenya.

The entry point of the study was Nyaguda health center in Nyaguda sub-location. Health workers trained in integrated community case management for children less than five years and residing in Nyaguda sub-location were recruited for the study. The second phase entailed a follow-up of the health workers within their natural work setting. Rapport was created and maintained throughout the study to ensure the researcher and the participants could interact and share information freely.

The target population was the health workers tasked with managing childhood illnesses. The CHVs and the caregivers were selected purposively to provide information on integrating mobile phones in support supervision within iCCM. The total population of 25 CHVs in Nyaguda sub-location was chosen as a representative sample for in-depth interviews since the number was small. The community strategy advocated that each CHV be responsible for 100 households. Twenty caregivers with children less than five years with common childhood illnesses were selected purposively. The caregivers were supposed to have interacted with the CHVs *via* mobile phones from the different villages. The number of caregivers was arrived at when A.N reached data saturation.

A piloting phase preceded data collection, a process that determined the validity and reliability of the data collection instruments. The study sought data through in-depth interviews, Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). A.N conducted informal discussions and observations of the day-to-day interactions with the CHVs and caregivers in the villages. The informal discussions were prompted by the nature of discussions that could not just fit into the in-depth interviews as some of the participants opened up further in stories though still focused on the study's primary objective. A.N conducted key informant interviews with the Nyaguda dispensary in charge, a 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. FGDs were conducted with homogeneously selected groups of participants. 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 and members of the Bondo sub-county health management team who are often involved in the iCCM

supervision process-each of the FGDs comprised of eight participants.

The FGDs were concluded once the level of data saturation was achieved. During the FGDs, a field assistant assisted with the note-taking as the audio recording was also taking place. This study embraced the note-taking process during the interviews and discussions, which were audio-recorded and later transcribed. A.N observed how caregivers and community health workers manage common childhood illnesses by integrating mobile phones. The researcher also observed how community health volunteers and other health personnel handle children with common childhood illnesses. Information obtained through observations helped corroborate the data from the other data sources used in the study [5]. An observation checklist guided these observations. The use of the different methods for data collection was for triangulation purposes. The study used various data collection methods to understand better the health workers' perceptions of integrating mobile phones within support supervision.

Data were analyzed using latent content analysis. A.N identified the units of meaning, coded and sorted data into categories later developed into themes. A.N first prepared the data and organized it for analysis. A.N further transcribed the audio-recorded data for further familiarization. Codes were then assigned to the entire data set, focusing on the experiences, statements and reflections connected with the study's objectives. The codes are at first predetermined and descriptive even as the researcher frequently returned to the previously coded data and assigned additional codes in line with the concepts and ideas directly related to the study's objective. The concept of spaces of care in global eHealth, which guided the study predetermined the codes. Categories, the aggregate individual codes related conceptually or analytically, were then developed. A.N created themes by bringing together related categories and recognizing the created categories' similarities, differences and relationships. A.N then assigned statements to the various themes.

This study received ethical clearance from Maseno University Ethics Review Committee (MUERC), permission was sought

from the assistant chief of the area, the in-charge of Nyaguda health facility and the district management officer in charge of health in Bondo sub-county to conduct the research. The participants were informed about the study through the assistant chief's meetings (Baraza). A.N obtained oral and written informed consent from the participants. A.N prepared a consent form explaining the aim of the study, how the study would be conducted, how the participants and the data collected would be protected and the benefits of the study. Both A.N and the individual participants who orally consented to participate signed the consent form. A.N gave a copy of the consent form to each participant. While obtaining consent, rapport was created and sustained throughout the process.

A.N assured the participants of confidentiality during the research process. Confidentiality was achieved by not using names in any instance while collecting data. The study results were presented without referencing the participants' names for privacy. A.N further assured the participants of anonymity and confidentiality for the recorded interviews [6]. During the recorded interviews, the names of the participants were anonymized, and the data was kept safe only to be accessed by A.N. A.N shared the research findings were shared with the participants as a main benefit of the study.

RESULTS

Socio-Demographic Characteristics of Participants

Tables 1 and 2 summarizes the socio-demographic characteristics of the study participants. A majority of the CHVs and the caregivers were female with 88% of the CHVs being female and 12% male. 90% of the caregivers were female and 10% were male. The average age of the CHVs was 42 years while that of the caregivers was 32 years. Both the CHVs and the caregivers had the basic level education (primary education). 60% of the CHVs had primary level education and 40% had secondary level of education. 80% of the caregivers had primary level of education in addition 20% had secondary education.

Table 1: Socio-demographic characteristics of CHVs.

Variable	Number (n=25)
Gender	
Male	3
Female	22
Age	
50-59 years	3
40-49 years	15
30-39 years	5
20-29 years	2

Education	
Secondary level	10
Primary level	15

Table 2: Socio-demographic characteristics of caregivers.

Variable	Number (n=20)
Gender	
Male	2
Female	18
Age	
50-59 years	2
40-49 years	3
30-39 years	3
20-29 years	12
Education	
Secondary level	4
Primary level	16

Tracking the Number of Cases and the Common Childhood Illnesses in the Community *via* Mobile Phones

The study found that during supervision, the Community Health Extension Workers (CHEWs) would call the CHV to find out and confirm treatments they have done and referrals made [7]. During an informal discussion on matters of supervision with one of the CHVs, she narrated that: Using mobile phones, the CHEW would call me and most of us as the CHVs and find out how many cases of malaria or other common childhood ailments we have treated or referred to in a certain period. Sometimes weekly or in two weeks. She would use the records to ask for more commodities or update her records ready for the Bondo sub-county health management team (45-year-old male CHV).

During an FGD, the CHEWs mentioned using mobile phones to conduct spot-checks. For example, they would call the CHVs to establish the number of clients attended. Using mobile phones helped them keep track of the work done by the CHVs. The information provided by the CHVs helped the CHEWs and the Sub-county Health Management Team (SHMT) to make projections on the number of cases for various common childhood illnesses. This study found that by integrating mobile phones within iCCM, CHEWs would track ailments in children less than five years.

The mobile phone helps us to achieve spot-check information that the sub-county hospital needs. We get information on

the ailments that affect the children more and we can also track the use of commodities through the frequency of specific illnesses (FGD among the CHEWs).

Determining the Level of Client Satisfaction through Mobile Phones

The CHEW would use the mobile phone to call some of the caregivers to determine their level of satisfaction with the treatment procedures they were receiving from the CHVs. Most of the caregivers confirmed that they were delighted when the CHEW called them to find out about the health of their sick children [8]. The calls helped to improve the relationships between the caregivers and the healthcare system through the actions taken by the CHEWs and follow-up on the concerns of the caregivers. During an in-depth interview, one of the caregivers narrated that: It excites me to receive a call from the CHEW to find out how my child is doing. It is encouraging to know that the CHEW also cares (29-year-old female caregiver).

After talking to the CHV and finding out about the children the CHV has treated, the CHEW follows the caregiver up to determine their satisfaction level. One of the aspects of supervision entails an interaction between the CHEW and caregivers who have sought health care from the CHVs. Given that Nyaguda sub-location has one community CHEW, most of the supervision was done *via* mobile phones between the CHEW and the CHVs and the CHEW and the caregivers, given the vastness and the poor terrain of Nyaguda sub-location.

The supervision process helps establish the relationship and trust between the caregivers and the CHVs. All these processes work towards addressing the health needs of children less than five years old.

Health Promotion through the Integration of Mobile Phones in iCCM

The process of supervision in iCCM also entails the provision of health messages to community members. An in-depth interview with one of the CHVs showed that: Other than treatment and follow-up of cases, we also provide health messages. Through mobile phones, we can remind caregivers to ensure that their families sleep under treated mosquito nets. We also remind those who have not yet dug pit latrines to do so. We also educate the community members on the benefits of having dish racks. It is also always our pleasure to engage in other forms of health communication within our jurisdiction as CHVs. (36-year-old female CHV).

The health messages offered by the CHVs work towards helping to further avert child morbidity and mortality among members in Nyaguda sub-location. For example, when community members heed the call to sleep under mosquito nets, malaria cases will reduce significantly. When pit latrines are dug and used by the community members instead of helping themselves in the gardens, it will help avert the incidences of diarrhea. This study found that the CHVs not only offer treatment for sick children but also engage in health promotion activities as part of iCCM.

Integrating mobile phones into the CHVs' activities in a vast and rugged terrain, such as Nyaguda sub-location, helped the CHVs work effectively even as they later followed up with the physical visits. These health promotion activities included the CHVs mandate to inspect the surrounding of the caregiver in terms of cleanliness and accessibility to common sanitary facilities. The researcher also observed the inspection sessions to help corroborate information received from the other data collection methods. Upon inspecting the caregiver's surrounding, the CHV advised the caregiver accordingly with frequent follow-ups. The physical follow-ups by the CHVs ensured the caregivers' adherence to instructions given *via* mobile phones.

Most CHVs noted reduced incidences of malaria due to mosquito nets; reduced incidences of diarrhea resulted from the members' adherence to building toilets and treating the drinking water [9]. Adherence to health promotion messages was proof of the saying that 'prevention is better than cure.' Most caregivers concurred with the CHVs that the health messages helped address preventable illnesses to some level. Through an in-depth interview, one of the caregivers illustrated the effectiveness of health messages received from the CHVs.

The CHVs would consistently call to confirm if I dug the pit latrine as agreed during our mobile phone conversations. The CHV inquired if I had stopped airing my utensils on a mat on the ground and instead built a dish rack. Her

persistence in calling and coming to check put a lot of pressure on me and I eventually put up a dish rack and dug a pit latrine. Since then, the reoccurrence levels of diarrhea among my children have reduced (36-year-old male caregiver).

Ensuring Adherence to Treatment Regimen through the Integration of Mobile Phones

During an informal discussion, one of the CHEWs (a key informant) narrated how they integrated mobile phones into their work. The CHEW narrated how they consistently communicate to achieve better health care for children less than five years.

During the feasible implementation of iCCM, CHVs were trained by trained healthcare personnel to provide appropriate healthcare for common childhood illnesses here in Nyaguda. As CHEWs, the Sub-county Health Management Team (SHMT) has mandated us to supervise CHVs. As CHEWs, we inspect and monitor the quality of care. We have received cases where caregivers do not duly follow the instructions given by the CHVs [10]. For example, we have received cases of defaulters and those who refuse to adhere to the treatment regimen. Such circumstances necessitate that the CHV would need to inform us. Most of the time, we first receive such reports *via* calls. After the notification from the CHVs through mobile phones, we arranged how to visit the families and help solve the problem (44-year-old female CHEW).

Most CHVs would also use the mobile phone to ask for assistance from the CHEW on the defaulting clients who have been having recurrent malaria cases because of not completing the set dosage of drugs. The CHEW would then find a way of helping the CHVs and the client to ensure that the child's health is not put at risk. The supervision process entails finding the adherence rates and the necessary actions to avert the dangers of non-adherence to the drug regimen.

Several times the CHEW called to find out and eventually visited me when attending to a sick child. The CHEW can then establish if I am following the correct procedures. The visit by the CHEW was beneficial in the beginning stages of iCCM when we were still new to some of the procedures especially using the Rapid Diagnostic Test (RDT) kit to test for malaria. Now that we have been doing it for some time, we are better at our work. However, the CHEW still has visited me to ensure all is well [11]. If I encounter any challenge, I do not hesitate to call the CHEW for advice over the mobile phone before she eventually makes it to come and visit me on the ground (32-year-old Female CHV).

The above narrative reveals how the CHEW can organize to visit the CHV as she attends to a sick child. For supervision purposes, the CHV informs the CHEW immediately she has been told of a sick child. During those routine rounds, the CHEW would be stationed at the local health facility waiting for the CHV calls. The CHEW visits the CHV to ascertain that she follows the correct treatment procedures. Part of the supervisory role of the CHEW is to ensure that the CHVs keep

high standards of procedures in caring for children less than five years.

The Mobile Phone as a Troubleshooting and RealTime Communication Device

The mobile phone was also valuable to most CHVs in finding out what to do when facing particular challenges, such as when an RDT kit has no buffer or pricker. One of the CHVs narrated this experience during an in-depth interview: When picking commodities from the health facility, we do not open the RDT kit packets to ascertain whether all the necessary items are in the kit. But during our work, we find that some kits have no buffer or pricker, so we can quickly alert the CHEW for her knowledge and the records. There was a time when one of my RDT kits missed a buffer, without which I could not conduct the test [12].

The lack of buffer in an RDT kit forces me to open a new kit to complete the test. Due to accountability purposes, I have to immediately call the CHEW and inform her of the faulty RDT kit before the next time for picking commodities. When I go to collect the commodities for work, I also carry the defective commodities as evidence to the CHEW (30-year-old, CHV).

For accountability purposes, the CHV had to immediately report any issue with the commodities, whether fewer drugs in a packet or faulty RDT kits. Most community health volunteers use mobile phones to receive information, ask for advice, re-order medications and receive feedback from the otherwise distant formal health system.

During a key informant interview, a facility CHEW revealed that: Sometimes we need to have impromptu meetings with the CHVs, especially when a particular donor has come on the ground and wants to meet them and discuss the interventions they want to bring to the community. During such instances, we call the CHVs and inform them of the meeting (Facility CHEW).

Meetings between the CHVs and the CHEWs or even with the sub-county health management teams are usually scheduled in advance. However, different healthcare stakeholders use mobile phones to communicate in case of an impromptu meeting. The healthcare stakeholders use mobile phones to provide real-time information to the CHVs, who will ensure they attend the meetings on time [13]. As stated above, whenever donors visit the sub-county health management team and the team sees the need to involve the CHVs, they would quickly schedule a meeting to discuss the specific interventions that would benefit the community. Integrating mobile phones within iCCM has helped break the barriers of supervision, made information accessible and provided prompt health care for children less than five years.

DISCUSSION

Integrating mobile phones within iCCM was considered to have improved the interactions between the patients and the health services delivery system. Healthcare stakeholders deem that mobile phones have removed the interactive and

communicative barriers to proper healthcare. This interactive mode of health service delivery finds its relevance and appropriateness within ecological settings of places such as Nyaguda sub-location. Nyaguda sub-location is vast and experiences topographical difficulties which have posed challenges to accessing and utilizing health services for under five-year-old children. In their study of 'mobile' health needs and opportunities in developing countries, Kahn JG, Yang JS and Kahn JS noted that mobile health might help by removing physical barriers to care and service delivery. They further revealed that using mobile phones in healthcare would help improve weak health system management, unreliable supply systems and poor communication. Whereas their study focused on non-communicable diseases and the economic outcomes of mobile health, the current research provides an understanding of the context of iCCM. iCCM addresses common infectious childhood illnesses such as malaria, diarrhea, pneumonia and malnutrition. The main focus of this study was hard-to-reach contexts such as Nyaguda sub-location. In the context of this study, the hard-to-reach contexts are resource-limited settings with topographical challenges. Using mobile phones as a contemporary arrangement creates new spaces in which lives are cared for, and healthcare relations extended.

Mobile phones have created health awareness and brought behavioral change. A study conducted in India showed that men used SMS successfully to receive information on lifestyle modification. SMS has helped lower the incidence of diabetes in men aged between 30-35 years. In another study conducted in rural India, health workers passed health information through passive means of text and automated voice calls. They also used a system where people call a phone number, select the type of information they want by keying in codes for a particular topic and listen to pre-recorded information. The passing of information through mobile phones helped to improve the health of the community members in rural India [14]. Other than using passive means to pass information, in Nyaguda sub-location, using voice calls to pass health information was highly embraced. The considerable levels of illiteracy among the various stakeholders in health care for children less than five years prompted the exploitation of the interactive nature of voice calls.

One of the observable cultural aspects and values within Nyaguda sub-location is the value among individuals on the need to have a one-on-one touch with each other. Therefore, voice calls would be appropriate for contacting neighbours, other health networks, and stakeholders. The rugged terrain and the distances from one home to another made voice calls a real-time form of communication for prompt healthcare actions. The mobile phones thus served as an adaptive mechanism to enhance networking and in the process, improve the interactive mode of health services delivery in settings in Nyaguda sub-location.

Integrating mobile phones within the supervision process of iCCM forms the primary means by which people establish their viability, as documented by Frog and UNICEF in their

article, mobile technologies and community case management-solving the last mile in health care delivery. The supervisory constraints imposed by the CHVs' environment of work and the demands of social integration necessitate using mobile phones within iCCM. The concept of spaces by Duclos also notes that mobile phones connect patients, medical practitioners, hospitals and laypeople, affecting the circulation of knowledge, expertise and data. Mobile phone use within the hard-to-reach area of Nyaguda sub-location helped to address accessibility issues, especially within health care for children less than five years [15]. The supervision process within iCCM revealed the vital need for networking and communication in addressing childhood illnesses. Integrating mobile phones within iCCM was also believed to bring about the efficiency of services by breaking the barriers of accessibility given the vastness and the rugged terrain.

A review conducted in developing countries also concurs with the present study that mobile phones help the process of communication and networking. The interactive nature and everyday use of mobile phones within the context of Nyaguda sub-location revealed the usefulness of communication and networking to provide quality healthcare for children less than five years. The need to identify everyday uses of mobile phones prompted the current study to provide a deeper insight into the interactive use of mobile phones within the context of support supervision within iCCM. The use of qualitative methods provides an in-depth analysis of how the use of mobile phones changes the user-provider interaction, the health worker's identity, the job's representation, and the involvement of other stakeholders in the communication chain.

LIMITATIONS OF THE STUDY

This study mainly focused on health workers' perceptions in a hard-to-reach area who had been trained in iCCM and used their basic phones, which they had bought for their everyday use. The study can, therefore, not advise in totality recommendations for application in areas that are not hard to reach and the rural context like Nyaguda sub-location.

CONCLUSION

This study found that using the interactive and everyday use of mobile phones within the support supervision process of iCCM has created new spaces in which lives are cared for. The regular use of mobile phones in the hands of the CHVs and other stakeholders in child health has extended healthcare relations. The networking function of mobile phones has helped distribute knowledge towards ensuring that the ties between various health stakeholders are still reinforced. This study found that within iCCM, CHVs used mobile phones in support supervision to track the number of cases and the common childhood illnesses in the community, determine the level of client satisfaction health promotion, ensure adherence to treatment regimens, troubleshoot problems and provide real-time communication. The current study is,

therefore, helpful in enhancing practices and interventions at the community level, especially in the hard-to-reach areas.

AREAS FOR FURTHER RESEARCH

There is a need, however, to further look at how sustainable the process of integrating mobile phones into the process of support supervision would be given the cost implications on use especially given the rural and hard-to-reach context. The achievement of accessible quality care for children less than five years would help attain the sustainable development goal of reducing child morbidity and mortality rates.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was sought from Maseno University Ethics Review Committee (MUERC) and permission was also sought from the gatekeepers at the community level and the Bondo sub-county hospital. The participants were informed about the study, and oral and written informed consent was obtained. The participants were also assured confidentiality and privacy by anonymizing their names.

CONSENT FOR PUBLICATION

Not applicable.

COMPETING INTERESTS

The authors declare no competing interests.

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AUTHORS CONTRIBUTION

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