IMPROVING HEALTH CARE DELIVERY BY COMMUNITY HEALTH WORKERS THROUGH MOBILE PHONES

By

Khisa Kevin Nandasaba

Bsc.Biomed,MPH

Part time Lecturer, Kisii University

Faculty of Health Science

Eldoret Campus.

Paper presented at Machakos University, 2nd annual international conference

(ORAL PRESENTATION)

April, 2019

ABSTRACT

Community health workers (CHWs) play a critical role in delivery of basic health care especially in rural communities where access to health care is a challenge. Most of these “first line” health care workers are ill equipped and do not have much support in their role. Majority of Community health workers are low skilled and operate far from formal health care system.

Mobile phones have provided a unique opportunity for Community health workers. This technology has allowed access of health information through the internet to facilitate their work. They are able to acquire updated information on how to deal with certain ailments, protocols to be followed and even consult with medical practitioners. It has improved the attendance to clinics immensely through reminders sent to patients in the form of text messages. Adherence to medication has also been enhanced through the same approach. It has made the collection and transmission of information to relevant authorities easier, faster and efficient.

This paper presents the application of mobile phone technology specifically among community health workers. A review of literature available on chwcentral.org, a platform devoted to research linked to community health work, forms the core of this paper. It delves into the opportunity that this technology provides for improvement of health care delivery to communities. It provides evidence that indeed mobile phones can contribute immensely to improving health care delivery through community health workers to communities in dire need of these services.

Key Words: Community Health Workers, health care delivery, Mobile phones, improving

INTRODUCTION

The Umbrella term ″community health worker″ embraces a variety of community health aides selected, trained and working in the communities from which they come. A widely accepted definition was proposed by World Health Organization. A Community health worker should be a member of the community where they work, should be selected by the community, should be answerable to the community for their activities, should be supported by the health system but not necessarily a part of its organization, and have shorter training than professional workers (WHO, 2007).

Community health workers (CHWs) play a critical role in the delivery of health services in areas with limited health infrastructure or workforce. They provide basic health and health-promotion services regarding hygiene and sanitation, immunizations, growth monitoring, antenatal care, family planning and disease surveillance (Dahn et al., 2015).

In low- and middle income countries, many of those who do seek health care see a community health worker, the lowest cadre of health provider. Typically, CHWs are lower-skilled members of the community and are not based at a health facility. Research shows that, despite heavy reliance on CHWs in places like sub-Saharan Africa and South Asia, CHWs are not effectively trained, remunerated, or retained (Redick et al., 2014).

Supervision of CHWs by qualified health professionals is the main link between this lay workforce and the formal health system. The quality of services provided by lay health workers is dependent on adequate supportive supervision. It is however one of the weakest links in CHW programs due to logistical and resource constraints (Laktabai et al., 2018).

Widespread use of mobile phones in low income countries has created momentum to use these devices to strengthen supervisory systems for CHWs (Crigler et al., 2014). Mobile devices may enable supervisors to overcome resource constraints and geographical distances to monitor CHW activity in real time, provide remote guidance, deliver timely feedback, or send automated motivational messages or reminders (Callan et al., 2011). Campbell et al., (2014) demonstrate that use of mobile phones, accompanied by provision of good technical content, can markedly strengthen the role that CHWs play in delivering health services.

More mobile and electronic information tools have been developed, tested and implemented with CHWs to support their work roles. The tools help the CHVs in surmounting challenges such as lack of appropriate work tools and inadequate supportive supervision and training (Braun et al, (2013). These tools have been instrumental in improving access to care by marginalized population groups subjected to stigma and those in hard-to-reach areas by reducing both time and cost of travel (Bakibinga et al., 2017).

TYPES OF MOBILE PHONES USED TO IMPROVE HEALTH SERVICE DELIVERY BY COMMUNITY HEALTH WORKERS

Agarwal et al., (2016) examined active programs that use mobile phones and tablets to support front line health workers (including CHWs). Nearly 60% of the phones used by CHWs were smart phones, followed by feature phones (14%).

Experts were asked about the type of mobile devices that are currently being used by Frontline health workers. 35% reported the use of only one type of device (e.g. feature phone only) and 65% reported the use of two or more type of devices being used by different types of providers within the same project (e.g. CHW use feature phones to report to their supervisors, and supervisors use tablets to monitor all CHW activities as part of the same intervention). This might suggest how within the health system, type of devices are being tailored to the type of user and their expertise, as well as the unique needs of the procedures that are conducted at that level of the health system. Simple phones (i.e. SMS and call functions only) and feature phones are less frequently used at 7% (data repositories) and 27% (Agarwal et al., 2016).

The types of phones used for health programs involving Community health workers are determined by a set of criteria related to their usability. Some of the usability metrics include (Grevendonk, 2013):

- Transmit information in a language (script or voice) that is understood by the user population
- Emphasize ease of use and learnability to reduce training costs
- Allow users to find features in two clicks or less

- Easy end-user interactions

  Ease of use can refer to use by the end user (the FHW), but can also refer to use by the data users and the project managers.

MOBILE PHONE FUNCTIONALITIES USED IN IMPROVING HEALTH SERVICE DELIVERY BY COMMUNITY HEALTH WORKERS

1. Short Message Service (SMS)

This is one of the most basic functionalities found on even the simplest of phones. It allows for the user to send and receive text messages. The cost of sending these messages is usually relatively cheaper compared to making a call, especially across different network providers. It does not require internet connection and can be used in remote areas without complications.

Most mobile health projects for CHWs employ SMS-based strategies involving 1- or 2-way interaction, whereas few projects have adopted multi-way communication strategies to promote health priorities (Kallander, 2013).

A study conducted by Mushamiri, et al., (2015) in Western Kenya to investigate the use of mobile phones and mobile technology to enhance PMTCT efforts established that Using any standard mobile phone, readily available in Sub-Saharan Africa, CHWs are able to use SMS to register patients during ANC and report their health status to a central system that provides a real-time view of the health of a community. Paper-based methods of data recording, the national norm in Kenya, proved to be laborious and prone to error. CHWs would often either forget to remind women of their upcoming ANC appointments or not be aware of the next appointment. The ANC/PMTCT Adherence System (APAS, informally referred to as “PMTCT Module”), which is a mobile Health (mHealth) tool that uses text messages (SMS) to facilitate and coordinate CHW activities around ANC and PMTCT, was implemented in the MVP cluster in October 2010 to help alleviate some of the issues

In Malawi, SMS messaging for pregnant women and caregivers of children under 1, often sent through CHWs as intermediaries, was effective in improving both the knowledge and intended positive behavior of clients (Crawford et al., 2014).

In another study conducted by Campbell et al., (2014) in Malawi, the mobile phones linked CHWs with each other and with district supervisors/coordinators through an SMS hub located at the 2 District Hospitals. The CHWs cited their ability to get immediate help for their clients by sending a message to the Hub and getting a rapid response. CHWs explained that timely responses from district hospital staff to CHWs' requests for important technical information resulted in gains in expertise.

They also described the reduction in stockouts that resulted from expediting the timely reporting of family planning/reproductive health and HIV/AIDS commodity shortages. There was an increase in prompt responses to emergencies (obstetric) and outbreaks (measles) and to queries from CHWs to their supervisors. CHWs reported a wider service coverage accompanied by lower costs.

2. WhatsApp

Henry et al.,(2016) conducted a study on enhancing supervision of community health workers using whatsapp in Kenya. Group of Kenyan CHWs and their supervisors used the WhatsApp mobile messaging platform for supervision and professional development over a 6-month period. Choice of WhatsApp reflected existing patterns of technology use in Kenya, where an estimated 49% of mobile phone users use WhatsApp as their preferred mobile messaging tool (Adika, 2014). This cross-platform application for basic, feature, and smart phones requires a mobile Internet connection to operate, allowing users to send and receive text messages, photos, videos, and audio recordings.

CHWs posted 48% (n = 872) of all messages, with 1 CHW alone posting 12% (n = 218) of these messages. One supervisor posted 15% (n = 270) of all messages, with the remaining supervisors posting 11% (n = 198) of messages, for a combined total of 26% (n = 468). The NGO and academic partners each posted roughly 7% of the total number of messages each (n = 130 and n = 132, respectively), while other MOH representatives at the district and local level posted 10% (n = 179) of messages and the local CHC leader 3% (n = 49) of messages. Interviews suggested that in general the use of WhatsApp was viewed very positively and was taken up very easily by participants (Henry et al., 2016)

One supervisor in the study explained: I think it has been a platform for us to communicate, and actually I can say it has reduced some costs when it comes to communicating with the community health volunteers because if I know people are in the [WhatsApp] group, I don't have to SMS everyone because the SMSs have a cost So the communication is good between us [the supervisors] and the community health workers. We really communicate and in case there is any problem, like when there was this outbreak of cholera, we really shared a lot. You give the information you know, they [the CHWs] give you what they know, and [you] can advise ''do this, do this, concentrate on this area,'' so that that thing [cholera] can end. This [is] through the WhatsApp (Henry et al., 2016).

WhatsApp capability to allow capturing and sharing of videos and photos greatly contributes to document the work of community health workers. Henry et al., (2016) reports that Supervisors posted photos of supervisory visits, meetings, and training sessions that had taken place that day, followed by words of praise, motivation, and appreciation. CHWs posted photos to document the quality of services they delivered, with posted messages often referring to the photos as ''evidence'' of CHW work practices in the community: They used captions to describe the content of the photos. Supervisors followed up with guidance, encouragement, and/or thanks while fellow CHWs added words of praise and encouragement (Henry et al., 2016).

3. Phone Calls

The mobile phone was an absolute upgrade to the traditional telephone that was dependent on wire connections from one point to the other. These phones were stationed at a fixed point. Mobile phones allow for movement of the user due to their wireless connection. Community health workers are able to make calls to health staff at the facility from the homes of their clients, as long as there is adequate network. They are able to consult their supervisors and other health professionals in the management of the health conditions of their clients. They can make real time requests to the health facility especially in the case of emergencies, where an ambulance may be required.

A study conducted in Uganda by Ayiasi et al.,(2015) to investigate the use of mobile phone consultations during community health worker visits for maternal and newborn care explored

this functionality. In this setting, community health workers are reffered to as village health teams (VHTs). They were of the opinion that phone calls have contributed to reduced incidences of maternal complications like miscarriages in their community because of the prompt attention that the women received. Sometimes health workers provided instructions to the VHTs on phone. Most VHTs perceived that the feedback that they received through phone calls improved the accuracy of information and were reassuring for the women and their families (Ayiasi et al., 2015).

Instructions given on phone from professional health workers to VHTs saved the women and their families of the long distance, the time and finances needed to reach the health centre. Nearly all VHTs (15/16) said that direct consultations through the use of mobile phones has helped them to reduce on the turnaround time needed to receive feedback since some of the consultations do not require physical movements of women to the health centre (Ayiasi et al.,2015).

In Kenya, Henry et al., (2016) reports that supervisors regularly used voice calls and WhatsApp in general to communicate one-on one with individual CHWs to understand more about the services provided to households.

4. Program specific Applications

Mobile phones have greatly evolved. New applications are often developed to meet the various needs of their users. These applications are commonly found on smart phones, tablets and other mobile devices. They can be downloaded from app stores located in the devices or pre installed by the manufacturer. Community health programs have developed unique applications to cater for their specific projects. These applications can deliver educational information to the community health workers. They provide a platform for input of information in the field and reduce the paperwork that the community health workers have to deal with.

A project conducted in Benin by Centre for Human Services (CHS, 2013), funded by USAID utilized the use of a mobile application designed to assist community health workers in delivery of family planning information to the community. The project only worked with female CHWs due to the sensitivity of the family planning subject matter, which is often considered taboo in Beninese households.

The application was based on Dimagi's Commcare (Dimagi, Inc., Charlestown, MA), an easy-to-configure data management and work flow application, with functionality for both data collection and case management. Commcare can adapt traditional health communication tools (visual aids, counseling cards, etc.) with the possibility of adding additional pictures and audio or video illustrations, as needed. Another useful feature allows for automatic data recovery in close to real time after the user has completed data entry. The application developed under PRISE-C (Partnership for the community management of child health) can be used on cellular phones, Android, tablets or Smart phones (CHS, 2013).

The application for community health workers is comprised of the following modules (CHS, 2013):

- Registration, which enables the CHW to register women as FP clients.
- Advice is used for counseling clients, using a combination of images and audio messages in the local language.
- Choosing a method registers the specific method chosen by the client after counseling. Monitoring FP methods allows for recording of possible side effects noted by clients after the adoption of a method.
- Product sales helps CHWs record any FP products that they sell.

In rural Zambia, Schuttner et al.,(2014) assessed a mobile-based community health worker program for referral, follow up and service outreach. CHWs captured data using survey instruments programmed onto a mobile phone provided by the project. The surveys were created with existing free, open-source software called CommCare (Dimagi, Inc., Charlestown, MA) that runs on Java enabled phones (Mhila, 2009). Four surveys were developed: a household visit, patient follow-up, referral, and monthly activity summary. The surveys collected data on demographics, disease symptoms and severity, and care-seeking behaviors and correlated with the patient clinic visit forms (Schuttner et al., 2014)

In the field, CHWs entered surveys on mobile phones in ''real time'' to document the client interview. Completed surveys were submitted if cellular network coverage was available. If not, or if the phone was powered off, the data were temporarily stored on the phone until network

coverage became available and then removed after submission. Data were transmitted to the central server via GPRS and then back to the district servers (Schuttner, 2014).

In Kenya, Bakibinga et al.,(2017) explored the role of a decision-support smart phone application in enhancing Community Health Volunteers effectiveness to improve maternal and newborn outcomes in Nairobi. The project sought to strengthen the healthcare delivery system in the urban informal settlements to be more responsive to the health needs of mothers and their children through enhanced service delivery public–private partnerships (Bakibinga et al., 2017).

The mobile PAMANECH (mPAMANECH) application was developed as an integrated data capture tool running as a mobile app with selected reporting forms for CHVs in Kenya. The mobile decision-support tool/ system (mDST/S) mobile application (app) is an Android app that installs from the phone and runs as an application. The application was hosted at Google store and accessed for download via the internet automatically to the user handset. The CHVs were provided with a mobile phone running the mHealth app for data collection which was then relayed to the head office (Bakibinga et al., 2017).

Schoen et al, (2017) also report on the effectiveness of mobile phone applications among community health workers in Brazil. CHWs believed that the mobile application helped make their work more efficient. They appreciated the Geohealth mobile application for the ease with which it let them access information from previous visits. The application helped them keep track of which families they needed to visit in a given month. Finally, the mobile application eliminated the amount of paper CHWs had to work with and lightened the load that they had to carry on a daily basis (Schoen et al., 2017).

CHALLENGES IN USING MOBILE PHONES TO IMPROVE COMMUNITY HEALTH WORKERS DELIVERY OF HEALTH SERVICES

There have been several challenges associated with the use of mobile phones to improve health service delivery by community health workers. Limited availability of Electricity to charge the device has been highlighted by Ayiasi et al (2017). The problem of limited electricity for regular battery charging is important in a rural setting where adequate infrastructure is lacking.

Not all phone calls made by VHTs were attended to by professional health workers because they were either out-of-station, or their phones were not available on the network, or they were overloaded with extra work. When VHTs calls were not attended to, women and newborns could not receive the needed professional attention (Ayiasi et al., 2017).

In two group discussions VHTs reported that their calls to professional health workers were received with anger and this caused them to become reluctant to make future consultations with health workers (Ayiasi et al., 2017).

Schoen et al.,(2017) reported Social barriers among community member's especially their perception of the mobile application and safety concerns among the community health workers about carrying around an expensive smart phone. The application took a long time to load, froze frequently and shut down without warning. Thus, they concluded that they could write paper notes faster than using the application. The CHWs mentioned that data were frequently lost from the system when the application froze (Schoen et al., 2017).

Many Community Health Workers mentioned that poor cell phone service was a barrier to using the mobile application. They also commented on the keyboard size, battery life, and lack of access to someone to fix the phone if it was broken. Using the application changed the nature of the home visit; it required that the CHW concentrate on typing and prevented them from maintaining eye contact with community members. Many community members, especially the elderly, felt that the application interfered with social interaction (Schoen et al., 2017).

CONCLUSIONS

The literature reviewed reveals the viability of mobile phones in improving health service delivery by community health workers. Smart phones are widely used in most programs due to their vast applications.

Short Message Service (SMS) functionality is found in all phones including basic phones. Community health workers can send text messages and make inquiries from their supervisors using this functionality. It can also be used to send reminders to community health workers and their clients about clinic appointments.

WhatsApp features present a greater advantage to the community health workers. They are able to take photos and videos and share them through the application. These can act as evidence of their activities in the field. They can get feedback from other community health workers and their supervisors on how to deal with cases in the field.

Phone calls provide immediate feedback to the community health workers. They are able to consult health professionals in the health facility regarding challenges they experience when delivering health services to the community.

Program Specific applications are very efficient. They allow the community health workers to fill in the information from their clients directly into the platform. This cuts down on the tedious process of carrying papers and filling them in and in putting them into a computer. The automatic update of the system and links to program servers allow the information to be retrieved by supervisors at the health facilities. These applications also provide an interface that can be used to educate the clients served by community health workers as well as prompts that inform them on what to do when dealing with specific cases.

RECOMENDATIONS

Affordable smart phones should be made available to community health workers to enhance their service delivery.

The cost of solar chargers should be reduced to enable community health workers charge their phones in the rural settings where they operate.

Mobile phone network connectivity should be enhanced in the rural areas to facilitate the work done by community health workers.

Community health workers should be trained on the dynamics involved in interviewing the clients and filling out information on the mobile phone applications.

Health Professionals at the health centre should improve on their responses to calls by community health workers.

REFERENCES

Adika O. *49% of Kenyan mobile users are on WhatsApp.* Techweez [Internet]. 2014 Mar 5 [cited 2015 Jul 21]. Available from: http://www.techweez.com/2014/03/05/49-ofkenyansmobile-users-on-whatsapp/

Agarwal S., Rosenblum L., Goldschmidt T., Carras M. Goal N., Labrique A.B.,(2016) Mobile technology in support of frontline health workers. A comprehensive overview of the landscape, knowledge, gaps, and future directions.john Hopkins university global mhealth initiative, 2016.

Ayiasi R.M., Atuyambe L.M., Kiguli J., Orach C.G., Kolsteren P., criel B. (2015).*Use of mobile phone consultations during home visits by Community Health Workers for maternal and newborn care: community experiences from Masindi and Kiryandongo districts, Uganda.* BMC Public Health (2015) 15:560 DOI 10.1186/s12889-015-1939-3

Bakibinga P, Kamande E, Omuya M,(2017). *The role of a decision-support smartphone application in enhancing community health volunteers' effectiveness to improve maternal and newborn outcomes in Nairobi, Kenya: quasi-experimental research protocol*. BMJOpen 2017;7:e014896. doi:10.1136/bmjopen-2016-014896

Braun R, Catalani C, Wimbush J,(2013).*Community health workers and mobile technology: a systematic review of the literature*. *PLoSOne* 2013;8:e65772

Callan P, Miller R, Sithole R, Daggett M, Altman D., (2011). *mHealth education: harnessing the mobile revolution to bridge the health education and training gap in developing countries*. Cork (Ireland): iheed Institute; 2011. Available from: http://www.himss.org/ResourceLibrary/ResourceDetail.aspx?ItemNumber=10586

Campbell N, Schiffer E, Buxbaum A, McLean E, Perry C, Sullivan TM., (2014). *Taking knowledge for health the extra mile: participatory evaluation of a mobile phone intervention for community health workers in Malawi*. Glob Health Sci Pract. 2014;2(1):23–34. CrossRef

CHS, (2013*).*"*Texting for Maternal Wellbeing" Use of mobile phones by CHWs to offer family planning services*. Centre for Human services. https://www.urc-chs.com/resources/texting-maternal-wellbeing-use-mobile-phones-chws-offer-family-planning-services

Crawford J, Larsen-Cooper E, Jezman Z, Cunningham SC, Bancroft E.(2014). *SMS versus voice messaging to deliver MNCH communication in rural Malawi: assessment of delivery success and user experience.* Glob Health Sci Pract. 2014;2(1):35–46. CrossRef

Crigler L, Gergen J, Perry H.,(2014). *Supervision of community health workers.* In: Perry H,Crigler L, editors. Developing and strengthening community health worker programs at scale: a reference guide and case studies for program managers and policymakers. Baltimore (MD): Jhpiego; 2014. p. 10.1–10.26. Available from: http://www.mchip.net/sites/default/files/MCHIP_CHW%20Ref%20Guide.pdf

Dahn B, Woldemariam AT, Perry H, (2015).*Strengthening primary health care through community health workers: investment case and financing recommendations.* 2015. Available from: http://www.who.int/hrh/news/2015/chw_financing/en/

Henry J.V., Winters N., Lakati A., Oliver M., Geniets A., Mbae S.M., Wanjiru H.,(2016). *Enhancing the Supervision of Community Health Workers With WhatsApp Mobile Messaging: Qualitative Findings From 2 Low-Resource Settings in Kenya*. Global Health: Science and Practice 2016 Vol 4 No. 2

Grevendonk, J., & Brigden, D. (2013). Planning an information systems project.

Källander K, Tibenderana JK, Akpogheneta OJ,(2013). *Mobile health (mHealth) approaches and lessons for increased performance and retention of community health workers in low- and middle-income countries:* a review. J Med Internet Res 2013;15:e17.

Laktabai J, Platt A, Menya D, Turner EL, Aswa D, Kinoti S, et al. (2018) *A mobile health technology platform for quality assurance and quality improvement of malaria diagnosis by community health workers.* PLoS ONE 13(2): e0191968.Available from: https://doi.org/10.1371/journal.pone.0191968

Mhila G, DeRenzi B, Mushi C, Wakabi T, Steele M, Dhadialla P.(2009). *Using mobile applications for community-based social support for chronic patients*. 6th Health Informatics in Africa Conference (HELINA). Pan Africa Health Informatics Association, Abidjan, Cote d'Ivoire, 2009.

Mushamiri I., Luo C., Liams-Hauser C., Ben Amor Y.,(2015). *Evaluation of the impact of a mobile health system on adherence to antenatal and postnatal care and prevention of mother-to-child transmission of HIV programs in Kenya.*BMC Public Health (2015) 15:102 DOI 10.1186/s12889-015-1358-5

Redick C., Dini H.S.F., Long L.,(2014). *The current state of CHW training programs in Sub-Saharan Africa and South Asia: What we know, what we don't know, and what we need to do.*One Million Community Health Workers Campaign. mPowering Frontline Health Workers. Intel,USAID.Availablefrom: http://1millionhealthworkers.org/files/2013/01/1mCHW_mpowering_Litreview_Formatted.compressed.pdf

Schoen J., Mallet J.W., Grossman-Kahn R., Brentani A., Kaselitz E., Heisler M., (2017). *Perspectives and experiences of community health workers in Brazilian primary care centers using m-health tools in home visits with community members*. Human Resources for Health (2017) 15:71 DOI 10.1186/s12960-017-0245-9

Schuttner L., Sindano N., Theis M., Zue C., Joseph J., Chilengi R., Chi B.H., Stringer J.S.A., Chintu N.,A (2014). *Mobile Phone-Based, Community Health Worker Program for Referral, Follow-Up, and Service Outreach in Rural Zambia: Outcomes and Overview*. MARY ANN L IEBERT, INC.VOL.20 NO. 8 AUGUST 2014.DOI: 10.1089/tmj.2013.0240

WHO, (2007).*Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impact on health outcomes of using community health workers*. Geneva, January 2007. Available from: https://www.who.int/hrh/documents/community_health_workers_brief.pdf