

Original Research Article

Assessment of community health promoters' experiences and perspectives on mHealth utilization in Busia Teso North sub-county, Kenya

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ABSTRACT

Background: The use of mobile health (mHealth) technology to manage health-related issues has shown great potential in enhancing the quality of healthcare and reducing maternal and child mortality rates. Many Low- & Middle-income countries (LMIC) countries have implemented this innovation in small scale programming and in pilot stages. In Kenya, mHealth technology was scaled nationally across all community health promoters (CHPs) providing an opportunity to gather insights on the CHPs experiences and perspectives on mHealth use for service provision in Busia's Teso North Subcounty.

Methods: A qualitative study design was used to collect data between August–September 2024 and involved three focus group discussions with 24 community Health promoters aged between 30-55 years. Participants were purposefully sampled and only those residing in Busia Teso North subcounty were eligible. Data analysis was done using thematic analysis.

Results: Findings showed that CHPs perceived the use of mHealth app as a beneficial tool for their work. They reported that the app had significantly simplified and reduced their workload, facilitated easier access to information from previous visits, track which families needed to be visited and enabled them to visualize their performance through an in-built dashboard. Some of the barriers that emerged included Unreliable power supply that significantly disrupted service delivery, network challenges and technical barriers such as app logouts and errors loading.

Conclusions: There is need to address emerging issues such as app logout, errors loading and power challenges. Further, integrating Basic trouble shooting skills into the training curriculum to help reduce turnaround time.

Keywords: Community health promoters, Community health workers, mHealth, Service provision

INTRODUCTION

The use of mobile health (mHealth) technology to manage health-related issues has shown great potential in enhancing the quality of healthcare and reducing maternal and child mortality rates. In sub-Saharan Africa, where 28% of deliveries take place at home increasing the risks of deaths, improving maternal, neonatal and child health is a top concern.¹ Community health workers (CHWs), who are lay healthcare providers, have been leveraged to

act as the initial point of contact and offer vital connections to clinical services. Delivering last-mile treatment in underprivileged areas, community health workers (CHWs) are essential members of the health profession.² Traditionally, CHWs have utilized manual reporting forms that are periodically submitted to their supervisors. This manual paper-based system presented several challenges, including ineffective filing system, inadequate supervision of records, data loss, limited storage capacity, time consumption and challenges in

tracking client referrals made by CHWs.³ Additionally, manual forms are tiresome and clients often worry about the privacy of the information recorded.⁴ Mobile phones are the most common way people communicate around the world and their use is growing quickly, especially in countries with low and moderate incomes where health issues are most serious.⁵ CHWs worldwide have used mobile devices to improve health outcomes in areas like maternal and child health, HIV/AIDS and sexual and reproductive health. Mobile phones are also used to collect health data, receive alerts and reminders, run health education sessions and communicate directly with people. Using mobile phones for data collection speeds up the process, reduces errors and improves the completeness of the data.³

In Kenya, community health program has been lagging regarding digital health, with many of its reporting systems being manual based and therefore error-prone and inefficient. The lack of basic tools for collecting and reporting community health data hindered the effective use of this information in shaping public health responses and distributing resources at both the county and national levels.⁶ In response to this challenge, the Kenyan government commenced a journey of developing legal frameworks that could govern and support the execution of e-health in the country. Introduction of National e-Health Strategy (2011–2017) followed by the National e-Health Policy (2016–2030), which stressed the importance of creating an environment that supports the adoption, implementation and use of e-Health at all levels of healthcare delivery.^{7,8}

Additionally, in October 2023, the government launched the community health promoters' program integrated CHPs into the health system. Further providing them with mobile phones with an mHealth application (eCHIS) to support service delivery. To Understand the extent of integration, this study sought to assess the experiences & perspectives of Community Health Promoters with using mHealth in providing community health services in Teso North, Busia County. In addition identifying the barriers to utilization of mHealth. The findings will be crucial to inform and influence the government and policymakers on effective approaches to enhance and strengthen systems on mHealth use by the CHPs.

METHODS

Study place

This study was carried out in Teso North Subcounty, Busia County between August -September 2024. The area is situated in the far Western part of Kenya and has an estimated population of 893,653. The major activity for the Busia people is agriculture with a combination of rural and peri-urban setting. Busia county has an estimate of 2190 community health promoters, 232 functional community health units and 173 community health assistants. The study area was selected because of its

features of both rural and peri-urban setting that would provide valuable insights from the CHPs.

Study design

A cross-sectional qualitative study design was conducted between August 2024–September 2024 to understand the experiences and perspectives of CHPs on using mHealth tool in their daily work. 24 Participants were purposively sampled and three focus group discussion conducted. CHPs aged 25-55 residing in Teso North Busia County formed the study population. Participants sampled were those with experience working with mHealth tools and could share their experiences and perspective on digital tools on their daily work.

Data collection

Focus group discussion guides were used to collect data on the experiences and perspective of CHPs on utilization of mHealth. Three FGDs were held in three selected health facilities. Participants in each FGD were invited to discuss their experiences in utilizing mHealth tools. With the permission from the participants, FGDs were audio-recorded and transcribed verbatim

Ethical approval

Approval to carry out the research was obtained from the MKU institutional Ethics and Scientific Review committee (MKU/ISERC/4303), The National Council for Science, Technology and Innovations (NACOSTI/P/24/39633) and the county research committee of Busia. All participants signed an informed written consent with a promise to treat the information they provided with the utmost respect and confidentiality. Verbal informed consent was obtained from all participants. Interviews were conducted in controlled environments ensuring that the respondents are relaxed and able to respond to the questions

Data analysis

The data was read and re-read for familiarity. FGD were audio recorded and transcribed in Microsoft word. Two coders coded the data separately, but they were routinely discussed to address any coding biases and improve inter-coder reliability. The researcher created a coding guide, which was followed during the coding process. Coding was done in Microsoft word. Decoding of data was done and thematic analysis used where themes were created based on the research objectives and questions of the study.

RESULTS

Social demographic characteristics

Table 1 summarizes the results from sociodemographic characteristics analysis. Majority of the participants were

female 62.5 % compared to male 37.5%. Most participants were aged between 45-54 years (43.8%). CHPs with primary education were 21.8%, 71.9% had secondary education and 6.2% had tertiary. Most of them (50.1%) had worked between 6 to 10 years.

Experiences and perspectives of community health promoter using mHealth

The findings revealed that integrating mobile phones into community-level service delivery had significantly streamlined and reduced CHPs' workload. Previously, CHPs spent up to 2 hours per household, but with mobile phones, this had reduced to just 20-30 minutes. Moreover, CHPs no longer worried about their work being damaged by rain, a common issue in the past when they carried large, bulky registers into the field. mHealth app has not only eliminated the need for physical registers but also enabled CHPs to easily input, review and amend data directly on their devices, ensuring greater efficiency and accuracy in their work. A quote from one of the CHPs: "I'd like to appreciate the mHealth app because it has really eased our work. When we were using paper for dosages, we had to confirm everything manually, but now the mHealth app provides the dosages clearly. It makes work easy. When I visit a household, it normally takes 20-30 minutes" (42 years old, male CHP).

Organization and task oriented

The CHPs reported that the mHealth app was easy to navigate and well-organized, providing clear guidance between various tasks. The app supported a wide range of services, including pregnancy registration, antenatal care, family planning, assessments, postnatal care, immunization and referrals. The app also provided guidance on conducting assessments, ensuring that CHPs effectively identified and addressed client needs. Referrals were streamlined through the app, particularly when stockouts occurred or danger signs were observed. This timely referral process helped safeguard client health and well-being.

To complete the referral process, CHPs issued physical referral forms to clients, ensuring continuity of care at healthcare facilities. During the FGD one of the CHPs narrated that: "Before the app, we used forms like 513 and 514, which was very hectic. Now all those forms are in the mHealth app, making it easy to use. The paper forms were confusing because you could write data in the wrong form, but with the mHealth app, everything is structured clearly, so you can't get confused." (40 years old, female CHP).

Guide and decision making

The results showed that the mHealth app was equipped with real-time decision-support features. When confronted with a patient exhibiting severe symptoms, the app would promptly identify the urgency and suggest

necessary interventions, including expedited referral to a healthcare facility. This immediate feedback loop enhances the accuracy and timeliness of care delivery. Before the implementation of these tools, healthcare providers heavily relied on memory and paper-based guidelines, which could be time-consuming and prone to human error. Now, CHPs are empowered to handle intricate cases with greater confidence, as access to current guidelines and protocols is readily available as illustrated by the following excerpt: "The app has eased my work because it gives me guidance on the services, I need to provide like on assessments it will guide me on when a child has a danger sign and I need to refer. Before I used to rely on my memory which I could at times get confused." (48 years old, female CHP).

Logical flow and reminder

The qualitative interviews indicated that the mHealth app significantly improved the efficiency of CHPs' work. The app's automated task reminders helped the CHPs keep track of which families they needed to visit and facilitated timely follow-ups and reduced the risk of overlooking critical tasks. As quoted by one of the CHP: "The app has really helped me a lot because everything is there to guide me on service delivery no paperwork." (52 years old, male CHP). The reminders ensured that CHPs provided continuous care for patients to include completing prescribed treatment and preventive services. Additionally, the app's user-friendly interface and clear navigation made it easy for CHPs to access and complete various tasks. The app also provided essential clinical guidance, such as appropriate dosages for different illnesses, reducing the need for manual reference materials and enhancing the accuracy of treatment recommendations.

Communication and support

The results also showed that the mHealth app had a dashboard that facilitated rapid communication especially the ability to visualize if i was on track with my targets for the month or when i am out of commodities. The supervisor is able to see when faced with a complex case that was beyond their scope or required additional support. The CHP could use the app to communicate with the supervisor or link facilities immediately. This streamlined communication has proven essential during emergencies or when referrals are necessary. Reported speech during FGD discussion below "If I have a challenge, I call or flash my supervisor and I will be helped. For example, if I lacked drugs, the supervisor would bring them". (40 years old, female CHP)."

Improved access to care

The results also showed that the introduction of the mobile phone for service provision at community level had improved access to health care as clients would at times call when they need clarity or opt to visit the CHPs

homestead to seek service. Further, the CHPs expressed their ability to conduct different health services through the mHealth app with ease to include, pregnancy registration, pregnancy visits, family planning, assessments, postnatal care (PNC), immunization and referrals which are typically guided by the app, except when the CHP is out of stock or when the client exhibits any danger signs. The app helps ensure that appropriate actions are taken promptly, ensuring the client's health and safety. A quote from one of the CHPs: "The experience has been good. For example, on the 1st PNC visit, when the client has not delivered, it allows you to edit the estimated delivery date (EDD). The tasks will also remind you of the 1st, 2nd and 3rd PNC visits." (39 years old, female CHP).

Improved quality of service

The mHealth app provided step-by-step guidance for assessment and management of common illnesses like malaria, diarrhea and pneumonia. CHPs could systematically record patient symptoms, perform rapid diagnostic tests and determine appropriate management based on evidence-based protocols embedded within the app. This structured approach minimized the risk of omission and ensures consistent care delivery. The mHealth tool enhanced CHPs' diagnostic accuracy and reduces the likelihood of errors, even in complex cases.

Barriers to effective communication

Power outage

The results from the qualitative interviews revealed that frequent power outages significantly disrupted service delivery. Some stated that their homes did not have power to charge the mobile phone and thus had to take the phones to the shopping center for charging which would take time. This made it difficult to work during such periods as their work heavily relied on the phone.

The issue was exacerbated during the rainy season and those along the border of Uganda and Kenya as the lack of a reliable electricity supply made it even harder for CHPs to keep their phones charged, further hindering their ability to provide essential services. Quote from the CHPs: "If there's no power and my phone dies, like the other day when we didn't have power for two days, my work gets delayed and I end up with a lot of tasks in my task bar" (39 years old, female CHP). I want to mention the power issue. There was a time we lacked power for two weeks and I missed a lot of tasks (42 years old, Male CHP)."

Technical barrier and Network connectivity

Results showed that poor network connectivity made it difficult to upload data or access real-time decision support. In some areas, network problems arose,

especially near the border, where roaming occurred. Such challenges would sometimes make the supervisor collect the CHPs phone for app updates or syncing and during this time, the phones couldn't be used. As illustrated by the quote: "In some areas, we experience network problems, especially near the border, where roaming occurs. Such challenges, makes the supervisor collect the CHPs phone for app updates (54 years old, female CHP)." There were also issues with app logouts and errors when loading, which required supervisors to take the phones for rectification, leaving the CHPs without access to their phones.

Additionally, when the phone would hang, it became unusable until it was fixed. Occasionally, the app could be uninstalled accidentally and CHP could not reinstall it on their own. A quote from one of the CHP, "The phone was working perfectly, but sometimes the app won't work due to logouts or error loading and it has to be taken to the office for repair." 45 years old, female CHP)

Challenges in service provision for some technical areas

In addition to mHealth barriers identified the CHPs acknowledged to other challenges related to service provision. One of the most challenging areas was family planning services, particularly for male CHVs. Packaging and delivering information, especially to young Women of Reproductive Age (WRAs), was difficult. Many male CHVs felt uncomfortable discussing topics like condom use, especially if they were pastors or held religious roles in their communities. Talking about family planning with WRAs aged 18 to 20 was particularly tough, as parents often did not permit CHPs to discuss these matters with their children.

Additionally, some clients would lie about their family planning status, which made it difficult for CHVs to verify the information. As quoted by one of the CHP: "Talking to young women of reproductive age (WRAs) about family planning was a bit difficult. Some parents didn't like their children being introduced to the topic. Mothers claimed that family planning would affect their daughters' wombs and they believed in taboos. If you don't talk to them well, they won't allow you to discuss family planning with their children." (38 years old, female CHP)".

Pregnancy registration also posed challenges. Pregnant women in their first trimester were often reluctant to disclose their pregnancies, making it difficult for CHVs to gather this information. Similarly, Postnatal Care (PNC) visits, especially the first visit, were challenging for some male CHVs, as cultural norms prohibited them from visiting their daughters-in-law immediately after childbirth. Pregnancy visits could also be challenging, as pregnant women sometimes became irritated during these visits, making it harder for CHPs to provide the necessary care.

Table 1: Socio-demographic characteristics of participants.

Category	Item	Frequency	%
Gender	Male	12	37.5
	Female	20	62.5
	Total	32	100
Age (in years)	25-34	6	18.7
	35-44	9	28.1
	45-54	14	43.8
	55-64	3	9.3
	Total	32	100
Level of education	Primary level	7	21.8
	Secondary level	23	71.9
	Tertiary level	2	6.2
	Total	32	100
Work experience	1-5 years	6	18.7
	6-10 years	10	31.2
	More than 10	16	50.1
	Total	32	

DISCUSSION

The study aimed at assessing the experiences and perspective of community health workers on utilization of mHealth. The results revealed that most CHPs perceived mHealth app to be a beneficial tool for their work. The app had significantly reduced their workload as they no longer needed to carry papers to record the services provided in a household. Prior, this used to be challenging as the paper registers would pluck off and get lost or be rained on. Mobile phones were also more portable and user-friendly than paper-based registers which were bulky. A study by, found similar trend, that mHealth app when incorporated to CHW work was beneficial in making their work more efficient.⁹

The app facilitated easier access to information from previous visits, helped them track which families needed to be visited each month and reduced the amount of paperwork and physical load they had to carry daily. Earlier studies conducted by and also showed, the use of mobile phones for data collection sped up the process, reduced errors and improved the completeness of data helping to overcome the challenges of manual paper-based system including ineffective filing system, inadequate supervision of records, data loss, limited storage capacity, time consumption and challenges in tracking client referrals made by CHWs.^{3,4} Additionally, manual forms were tiresome and clients often worried about the privacy of the information recorded.⁴

The CHPs reported mHealth app to be well organized and easy to navigate providing logical flow and reminders on what needed to be completed. Further it provided real-time data, especially when they wanted to visualize their performance in the dashboard to determine if they were on track. This saved the CHPs and their supervisors considerable time and effort, eliminating the need for

manual data entry and compilation of paper-based forms, such as the MoH 514. The mHealth app was able to summarize and autogenerate work done by the CHPs thus the only process required by the supervisor is validation of the information. Real-time data collection through mHealth contributed to improved data quality. Reducing delays and eliminating manual data entry errors associated with paper-based systems thus enhanced the accuracy and reliability of health data. The report concurred with a study conducted by, in Uganda where use of mHealth had improved data timelines and prompt reporting by the VHTs leading to more efficient data collection and management.^{10,11} also found similar results that mHealth technologies empower CHVs to collect more accurate, comprehensive and timely data from the field compared to traditional paper-based methods.

The ability of the mHealth app to perform a wide range of services enabled the CHPs to easily navigate through the platform. The well-organized interface supported service provision to include pregnancy registration, antenatal care, family planning, assessments, postnatal care, immunization and referrals. They stated that mhealth app had enabled them to assess children under five years to establish their health status and follow-up on the sick ones as they recuperate. The app provided guidance on conducting the assessments, ensuring that CHPs effectively identified and addressed client needs.

Referrals were also streamlined through the app, particularly when stockouts occurred or danger signs were observed. Similar results were reported by 9 in a study conducted in Brazil where the Geo health computer helped the CHWs to efficiently complete a number of their required tasks such as gathering data on families served and generating counts of priority disease conditions of families served (e.g., diabetes) and recorded family home visits completed each month. While most

CHPs acknowledged that the mHealth app was a useful tool, the study found out that there were also barriers that posed a challenge to the effective utilization of mHealth app. Among the primary barriers included instances when their phones ran out of battery, compounded by a lack of access to power in the community. Network connectivity issues and system updates would require the supervisors to collect their phones for updates, interrupting their work temporarily. Unreliable power supply significantly disrupted service delivery. Some stated they did not have power supply in their homes thus they had to take the phones to the shopping center for charging which would take time.

Rainy seasons would also exacerbate the situation causing erratic power supply hindering their ability to provide essential services. study conducted in Uganda by, found similar results where Unreliable power supply/electricity would affect the charging of phones and yet the success of mHealth relied on having fully charged phones.¹⁰ The power shortage and unreliability at individual and community level affected data quality, delay reports and made data collection expensive and time-consuming for CHWs. A study conducted in Ghana found that the purchase of a solar power bank could be useful to counter this barrier. Disabling applications that have considerable data usage may also save phone battery life thus increasing the shell life of the phone battery.

As much as mHealth app had been whitelisted allowing the CHPs to report without paying for internet, access to network emanated as one of the challenges, with poor network coverage making communication challenging. Unreliable network connectivity would affect data collection and submission processes especially those who resided along the border of Uganda and Kenya. This barrier resulted to delays in submitting real time data as CHPs would have to work offline and wait for a time when they had good internet coverage. A study by 12 found similar results where poor mobile network coverage affected usability and resulted in frustration such as delays in addressing contact emergency services. Further It also resulted in data submission delays, affecting data timeliness.

Technical barriers such as app logouts and errors loading were a major impediment to the CHPs work. The app would at times take too much time to load thus causing inconvenience while at a household. At times the supervisors would be required to take the phones for rectification, leaving the CHPs without access to their phones. When the phone hanged, it became unusable until it was fixed. Other reported barriers were on user error, where data entered incorrectly, had no option to revert. In a study conducted in Brazil, CHW would prefer writing on paper and later transferring the data later as they found the mobile application to be slow, taking too much time to load and would some time freeze The CHPs reported that occasionally, they would uninstall the app accidentally and CHPs could not reinstall it on their own.

The finding gives insights on the need to sensitize the CHPs on basic troubleshooting to enable them address challenges they can easily manage at their level thus minimizing disruptions to do their work.

Notably, CHPs also grappled with service provision of some technical areas such as family planning services, pregnancy management and how best to package the information. CHPs felt uncomfortable providing this service during their day-to-day activities. A study done in Tanzania by 13 on gender differential and experience of Community Health volunteers, found out that female CHWs were best suited to respond to the needs of pregnancy and other reproductive health issues among women in the village, as male CHWs generally found it difficult to identify or discuss pregnancy with women.

CONCLUSION

The integration of mHealth tools into the community health promoters work in Kenya had improved their work significantly however barriers to effective utilization must be anticipated and addressed promptly. To address the issue of power supply challenges the study recommends provision of solar power backs to CHPs as a backup to ensure continuity of. Provision of refresher trainings incorporated with basic troubleshooting skills would help mitigate the turnaround time a CHP would require to wait for the supervisor to address basic phone challenges. While all CHPs were equipped with a digital phone this study further recommends the Ministry of health to also provide mobile devices to supervisors to ensure uniformity in service provision and effective performance management. To counter the barrier of network connectivity the Ministry of health collaborates with telecommunication vendors to install additional boosters to strengthen network connectivity in the area.

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