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Utilization of Computers and Mobile Technology by Community Health Workers in Obala Health District, Cameroon: Challenges and Implications for Performance

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Abstract

Aim: Community Health Workers (CHWs) are increasingly recognized for their role in addressing health workforce gaps in underserved communities. Although digital technologies are widely used to improve healthcare delivery, CHWs often face barriers such as limited access to devices and inadequate skills, affecting their capacity to provide quality services to larger populations. This study sought to identify the reasons for the limited use of computers and mobile devices by CHWs in implementing community health programs and to assess the association between technology adoption and performance.

Methods: A cross-sectional survey design was used with a sample of 86 CHWs selected through a purposive sampling method. Data were collected via structured questionnaires and analyzed using descriptive statistics and correlation analysis in SPSS version 25.

Results: Eighty-nine percent of CHWs owned a mobile phone, yet only 25% reported receiving training on its use for health service delivery. Nonee owned personal computers and 94% reported a lack of access to facility-based computers. A positive correlation ($r = 0.525$, $p < 0.05$) was found between access to mobile phones and frequency of use in CHW activities.

Conclusion: CHWs strongly agreed that health facilities should enable access to use computers at the health facility/institution to prepare and submit their reports and embrace ICT usage.

Recommendation: Standardized ICT training should be integrated into CHW curricula, with access to facility-based digital tools ensured and supportive supervision strengthened.

Keywords: *Community health workers, mobile phone technology, computer access, ICT training, health service delivery.*

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INTRODUCTION

Community Health Workers (CHWs) are trusted lay health professionals who serve as a vital link between communities and healthcare systems, facilitating access to essential health services, especially in underserved areas (WHO, 2018). They perform diverse tasks such as health education, referrals, and disease prevention. In different contexts, Community Health Workers (CHWs) are known by various titles that reflect their roles and community perceptions. Examples include health promoters, community health agents, and village health workers (WHO, 2018). These titles often correspond to the specific tasks performed and the way they are regarded within the communities they serve. Community Health Workers improve health outcomes in underserved populations by bridging public health systems and communities (Sabo *et al.,* 2017).

Malcarney *et al.* (2017) refer to CHW as people who connect others to services and offer their services free to their people. They stand for the community, represent them, and support them in navigating through services that they do not master well and offer specific services to individuals and families. They are not clinical workers, but their services complement the work of health staff.

Community Health Worker activities within the various communities are diverse. They include meeting people at home or duty post, mobilizing people for events like vaccination of children and mothers, contacting patients after being discharged from the hospital, following up with people and patients, especially those whose treatment is on a long-term basis and those terminally ill. Their activities equally include carrying out infection control activities during the outbreak of disease, providing family planning and general referral to services, home visit, mobilization of communities to utilize health services, community information sharing, health promotion and education, management of common illnesses, follow-up of pregnant women/newborns (Kuule *et al.,*2017).

The relevance of ICT in health has received growing recognition. Mastello *et al.* (2018) confirm the increasing uptake of ICT in healthcare. The study further lays emphasis on the fact that CHWs cannot use digital methods as they carry out their activities. There is a need to assess the role of ICT in community health service delivery for mass coverage promptly to save lives. In Cameroon, 78% of the population owned a mobile phone by 2014 (HSS, 2017), yet CHW integration of digital tools remains low. Effective use of ICT could enhance CHW performance by enabling real-time reporting, patient tracking, and community mobilization. In this work, we have tried to assess the role of ICT in the activities of CHW and volunteers to see whether its adoption can optimize their work while improving the health of the community.

LITERATURE REVIEW

Emergence of Community Health Workers

The emergence of CHW as a health workforce became visible to many in the twentieth century from the population growth, its consequences and changes in the human environment (Perry *et al.,* 2014). This period was characterized by the discovery of diseases and the public health interventions like the provision of clean water, environmental management and waste disposal. During this same period, Lay people who lived in the community were engaged or worked closely with the local community and provided basic health services, including health education. The world had seen that the prevention of disease was equally important as the cure provided by trained health staff and that involving the local communities in public actions could save lives and money while reducing several problems related to diseases. Several

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countries started engaging and working with community health workers due to the shortage of trained health workers, while others were influenced by scientific work (King, 1966). This included engaging ordinary people in society for the delivery of basic services to their people. In China in the 1920s, farmers were trained to record births and deaths, vaccinate against smallpox and other diseases, offer first aid services and provide health education talks on how to prevent diseases and keep their water source clean (Perry *et al.,* 2014). They received only three months' training. They received training on recording deliveries, child mortality, vaccinations, first aid assistance, water sources hygiene, and personal health.

The activities and importance of CHW gained more recognition in 1978 following the world meeting that brought together several nations to discuss the health of their population and how communities could be involved in their healthcare. Several governments and International NGOs started initiatives and support for CHW programs both in developed and less developed countries. This was to fill the gap in the health workforce shortage and gaps because trained health care workers were migrating to lucrative jobs in industrialized countries. By 2005, the United Nations Millennium project encouraged nations to intensify efforts to add their human resources towards meeting the Millennium Development Goals (MDGs).

Ballard (2022) traces the inception of this health workforce program in the 1960s, sparked by the failure to eradicate malaria by facility-based approaches. Then the phase that took a universal view following the 1978 first international conference at Alma-Ata, Kazakhstan, establishing Primary Health care as essential with CHW as its foundation stone. The researcher also found out from reviews that the projection and bringing together huge numbers of CHW and designing large programs for them was during the period that the Human Immunodeficiency Virus (HIV) affected many countries. They were considered due to the slow pace of strategies to reach the expected goals. Today, CHW programs have evolved with WHO providing guidelines for governments and their partners, who in turn adapt to suit their context and other specificities. (WHO, 2018).

Functions of Community Health Workers

CHWs carry out a set of fundamental health services and have been officially trained outside the recognized formal nursing or medical curricula. They have a defined role and task as they function with the community where they reside, while interacting with the larger health system. They are generally part of their community and are empowered to deliver one or more health-related activities. Their tasks are numerous and include education services for parents and their children. They reach their patients through home visits, appointments at the community, or the Health Facility (Crigler, 2013). CHWs are part of their community and part of the country's health workforce engaged to enhance the health of the population (WHO, 2021).

They are at the forefront during crises and outbreaks. They serve within their communities where they understand their weaknesses, strengths, and specific challenges. They are accepted and chosen by their community members and earn a very high level of trust and confidence. They stand out for their people advocating when necessary for improved health conditions for target groups such as women, children and other at-risk groups. They cover the community and can penetrate the most inaccessible and underserved communities or people abandoned to themselves due to barriers. They act as change agents, empowering themselves, their communities and other individuals and influencing positive changes in the health behavior of the population. At the frontline, they have succeeded in building trust with vulnerable populations and have worked through community-based organizations to bring health assistance to the neediest populations in several countries. During the COVID-19 emergency,

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this workforce was highly valued and engaged in a period that witnessed a dramatic increase in home delivery services. A period where patients could not move out of their homes or communities. Their activities are acknowledged, especially as health services cannot reach everyone at the right time. In healthcare settings, they are the middlemen and women functioning between patients and healthcare institutions and help in improving their outcomes. Embedded in the community, they are a link with their communities and the structures providing health services like clinics and hospitals. They also position themselves to address the obstacles to patient-centered care (George *et al.,* 2021). They are the main strategy to address health personnel scarcity (The Lancet Global Health, 2017)

Use of ICT in CHW activities.

Information and communication technology refers to various ways, including tools that people use to pass information, create, store, share and manage this information with others in society (Singh, 2021). It is widely used in all spheres of life and embraces several tools and appliances like cellular phones, computers and networks, hardware and software satellite systems, as well as various services associated with them. Growing health challenges faced by countries that frequently place them in crisis have necessitated new strategies that require modern technologies like ICT for prompt identification and response. The Cameroon Health Sector strategy 2017 to 2027 highlights the need for access to digital management by all sectors. It indicates that by 2014, about 78% of Cameroonians used a mobile phone (15.8 million). It also indicates that the use of ICT and networks is increasingly used for the mobilization and education of the population. This facilitates and enhances healthcare delivery in communities during economic crises and healthcare facilities insufficiencies, making the role that CHWs play a key role in providing health and seeking to establish good health for all in the 21st century (HSS, 2017).

Mlambo *et al.* (2022) found that digital activities have the potential to bring a change in resource-limited areas and underserved populations. The study highlighted that if ICT is effectively used, it can significantly decrease preventable maternal disease. CHW effectiveness in health activities in the community and health facilities has been demonstrated in several key areas in the health system. These include the health of newborn children, their mothers and activities around vaccination, family planning, diabetes, maternal health, HIV, malaria, TB, Multiple primary health care interventions and other infectious diseases (WHO, 2018).

Health Workforce shortage is a threat, and it provides a rationale for the urgent need for lay health workers. In 2006, the WHO launched the "treat, train, retain" strategy to solve critical and severe shortages of HIV related service providers, particularly in the developing world. (WHO, 2006). Naomi *et al.* (2023) view the low health workforce in Africa south of the Saharan as the region has 25% of global disease and only 3% health workers globally. Therefore, this is a severe shortage requiring fat action. They recommended the CHW program to help enhance service delivery (Naomi *et al.,* 2023).

In most health facilities in Cameroon, the private, public and faith-based institutions, it is common to see the use of digital tools in calculating bills and in the management of stock, where monitoring and reports are done. These available tools function as independent systems and do not work at full capacity.

Problem Statement

In Obala Health District, there is limited specific information on how computers and mobile technologies are applied in CHW activities, despite the frequent involvement of this workforce

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in various district-level health interventions on an almost daily basis. The only available electronic platform reflecting digital activities is the District Health Information System (DHIS2); however, it is underutilized, and district reports rarely highlight the use of digital strategies in CHW service delivery. In contrast, documented evidence from other settings shows that the integration of digital tools has significantly enhanced the implementation of healthcare activities, yielding substantial benefits for CHWs, program implementers, and the populations served. For example, the Millennium Villages Project (MVP), implemented by the United Nations and the Earth Institute at Columbia University, reported progression in CHW information systems from paper-based tools to SMS, and subsequently to internet-enabled smartphones, enabling simultaneous data collection and service delivery (Tozan *et al.,* 2011).

This shift eased CHW workloads, supported timely decision-making, and improved service quality. Similarly, Mastellos *et al.* (2018) highlighted the value of ICT in CHW activities, noting its potential to enhance efficiency and expand population coverage. The practice of ICT, especially computer and mobile phone technology in health worker activities, is a global call by the international community. The WHO (2018) report emphasized the need to gather sufficient evidence to enable decision-makers to positively influence CHW activities. This evidence-gathering process can be accelerated through the integration of ICT into CHW work. The report highlighted that CHWs can learn and use ICT to capture field information, document and share activities, send notifications, actively provide support, enhance supervision, and improve communication among themselves.

In Cameroon, like in other developing countries, there is a poor health workforce policy and planning, a shortage and inequitable distribution of health workers and limited availability of health workforce information. The issue of health workers not being sufficient is critical and is compounded by a lack of data and tools needed to optimize the existing health workforce and advocate for more resources. This opens the doors for new opportunities that can contribute to creating more job opportunities while making progress towards addressing the national healthcare strategy sought by the Ministry of Public Health of Cameroon. Information on the health workforce and density shows a huge gap in size, distribution and composition. Poor health workforce density for Cameroon shows that the country is not adequately prepared to provide healthcare for everyone in the world by 2030, as expected by the WHO (WHO, 2021).

Data from 2018 indicated that Cameroon had no recorded Community Health Worker (CHW) density (0.00 per 100,000 population), far below the Sustainable Development Goal (SDG) threshold of 4.45 health workers per 1,000 population, and well under the African regional average CHW density of 4.5, with 15 countries exceeding this average. WHO data for 2021 similarly reported a CHW density of less than one per 100,000 in Cameroon (WHO, 2021). This underreporting is largely attributed to the absence of an effective digital system for tracking and managing CHW activities, even though thousands of CHWs are actively involved in immunization, deworming, malnutrition sensitization, and other community health initiatives. The evidence underscores that increasing CHW density is directly associated with improved Universal Health Coverage (UHC) service coverage, highlighting the urgent need to train, supervise, and adequately document the CHW workforce in Cameroon. The Obala Health District lacks a comprehensive CHW master list as a single source of information, with notable deficits in records on CHWs' active status, official counts, accreditation, competencies, service locations, and availability of essential supplies.

CHW training is often short-term, tied to specific funded projects or targeted health interventions, with limited consideration for long-term community engagement. Moreover, training content is neither uniform nor standardized (George *et al.,* 2021). Despite widespread

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mobile phone ownership in Cameroon, CHWs in Obala Health District have limited training in and access to ICT tools, resulting in underutilization in community health service delivery. This limitation affects data management, timely reporting, and health intervention coverage, highlighting the need to examine factors influencing ICT adoption among CHWs.

General objectives: To examine factors influencing the utilization of computer and mobile phone technology in CHW activities in Obala Health District.

Specific objectives

1) To determine the extent of computer and mobile phone technology use among CHWs.

2) To identify barriers to ICT utilization by CHWs.

3) To assess the relationship between access to mobile phone technology and CHW performance.

METHODOLOGY

Design

A descriptive, cross-sectional quantitative design was employed in this study, making use of a structured questionnaire administered to CHWs.

Participant & Recruitment

The target population consisted of active CHWs in Obala Health District, recognized by their Health Area Chief of Service. Inclusion criteria were CHWs who were currently delivering community health services during the study period. A purposeful sampling approach was used to include all available CHWs, as identified by district records. Participation was voluntary, with informed consent obtained before data collection.

The CHW received and responded to a structured questionnaire focused on socio-demographic information, accessibility to computers and mobile technology and use of ICT, and suggestions to address identified challenges. The awareness of CHWs' supervisors and the importance of the study played an important role in the quality of the study, as they facilitated the process to reach the CHWs where they reside.

The questionnaire was translated fully into French and pilot tested for understanding, content review and the ease of administration. This pilot exercise was carried out with eight CHWs and stakeholders in the Nfou Health District. Nfou was chosen as it has similar characteristics to Obala Health District. Nfou Health District is close to Yaoundé and has both rural and Urban characteristics like Obala. The interview for CHW took about 15 to 20 minutes. However, there were wide differences in some cases concerning the time spent per question depending on individual characteristics.

Study Area

Obala Health District is found in Lekié Division of the Center Region of Cameroon. It has a population of about 37,888 with four distinctive clans-Esselle, Mvong Kan, Nkol Edoma & Menyagda.(Obala Council development plan, 2013). In line with the functional structures of the health system in Cameroon, this district is divided into 12 Health Areas: Batchenga, Efok, Ekabita, Mendoum, Endinding, Essong, Etoud Ayos, Minkama, Nkol Mekok, Nkolguem, Nkometou, Obala, Yemesoa (DHIS2-MINSANTE, 2016). Following the structure of the Cameroon Health system, CHWs belong to a Health area controlled by an assigned lead called "Chief of Health Area". The health areas are the lowest level of the Cameroon Health Pyramid,

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where the population is reached and the impact of programs is felt. Each of these health areas has several CHWs who implement various community health projects. Obala Health District was suitable for this study due to its vastness, its rural and semi-urban characteristics and the large number of health areas to cover for better representation of the results.

Sampling Procedure

Of 96 CHWs identified from district records, 86 participated (92.4% response rate). A None-probabilistic purposive sampling method was applied to include all available CHWs during the study period.

Data Collection

Structured questionnaires with 30 questions under four major sections were developed to collect information from respondents. From the list of names and numbers given by the chief of the Heath area, district team and community stakeholders, the data collection team went ahead to contact participants. Some CHWs were contacted by phone to take an appointment, while others were contacted during their regular visit at the health facility and during health area end-of-month meetings. Participants were free to choose the time, date and place for the interview. During face-to-face contact, consent was taken after explanation of the importance of the study and the procedure of participation. For some CHW, the questionnaires were self-administered under the directives of the data collector. For others, it was done with the help of the data collector.

Data Analysis

Hard-copy data were cross-checked for completeness and numerical order, then arranged accordingly before being entered into the statistical software SPSS version 25 for storage and analysis. Descriptive statistics (frequencies, percentages, means) were computed. Associations between ICT use and socio-demographic factors were tested using Pearson's correlation at a significance level of $p < 0.05$.

Ethical Consideration

Ethical clearance was obtained from the ICT university. This was then presented to the district. An official authorization was obtained from the district medical officer for Obala health district as the representative of the Ministry of Public Health at the level of the district. Informed consent was obtained from informants through their signature on consent forms. Participation was voluntary, and no incentives were provided. Informed consent was obtained in writing from all participants. Data were aNoneymized and stored securely.

RESULTS:

Socio-demographic

From table 1, we observed that there is a nearly equal distribution between male and female CHWs, with a slight female predominance (51.2%). On age range of community health workers, there was a predominance of CHWs in the 25-34 age group, which may suggest higher potential adaptability to mobile technology, though this is not fully realized in practice. As shown in Table 1, 32.6% of CHWs had completed secondary school, and 38.4% had attended high school, giving a combined total of 71%. In terms of proximity to their referral health facility, 40.7% lived more than 5 km away, while 33.7% lived within 3–4 km; together, 74.4% resided 3 km or more from their facility. Regarding travel time, 37.2% reported taking 1–2 hours to reach the facility, and 30.2% took 30 minutes to 1 hour; overall, 67.4% required 30

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minutes to 2 hours. These referral facilities are where CHWs submit reports, receive supervision, and refer patients.

Table 1: Socio-demographic Information Collected from Participants

Variable	Category	Frequency	%
Gender	Male	42	48.8
	Female	44	51.2
Age	14-24	1	1.2
	25-34	40	46.5
	35-44	3	3.5
	45-54	29	33.7
	>55	13	15.1
Level of education	Nonee	3	3.5
	Primary	13	15.1
	Secondary	28	32.6
	High School	33	38.4
	University & above	9	10.5
Distance from home to the referral health facility	less than 1Km	7	8.1
	1-2Km	15	17.4
	3-4Km	29	33.7
	5km and above	35	40.7
Time in hours to reach the referral health facility	Less than 30min	15	17.4
	30mins to 1hr	26	30.2
	1hr to 2hrs	32	37.2
	3hrs to 4hrs	12	14
	5hrs and above	1	1.2

In terms of ICT access, while 94.1% reported having access to some form of mobile phones or computer technology, nearly all, 98.8% lack access to computers at their primary health facilities.

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Table 2: CHW Access to Computers and Mobile Phone Technology

Variable	Category	Freq	%
How many types of computers and mobile technologies do you have access to?	None	2	2.3
	1	29	33.7
	2 or more	55	64
Number of computers available at the health facility or institution which you work with at the disposal of CHW?	None	85	98.8
	1	1	1.2
	2 or more	0	0
Number of computers accessible to you at family level to carry out some work-related activities?	None	57	66.3
	1	12	14
	2 or more	17	19.8
How many types of mobile technologies do you have access to? (For example, Cell phone, tablet)	None	5	5.8
	1	59	68.6
	2 or more	22	25.6

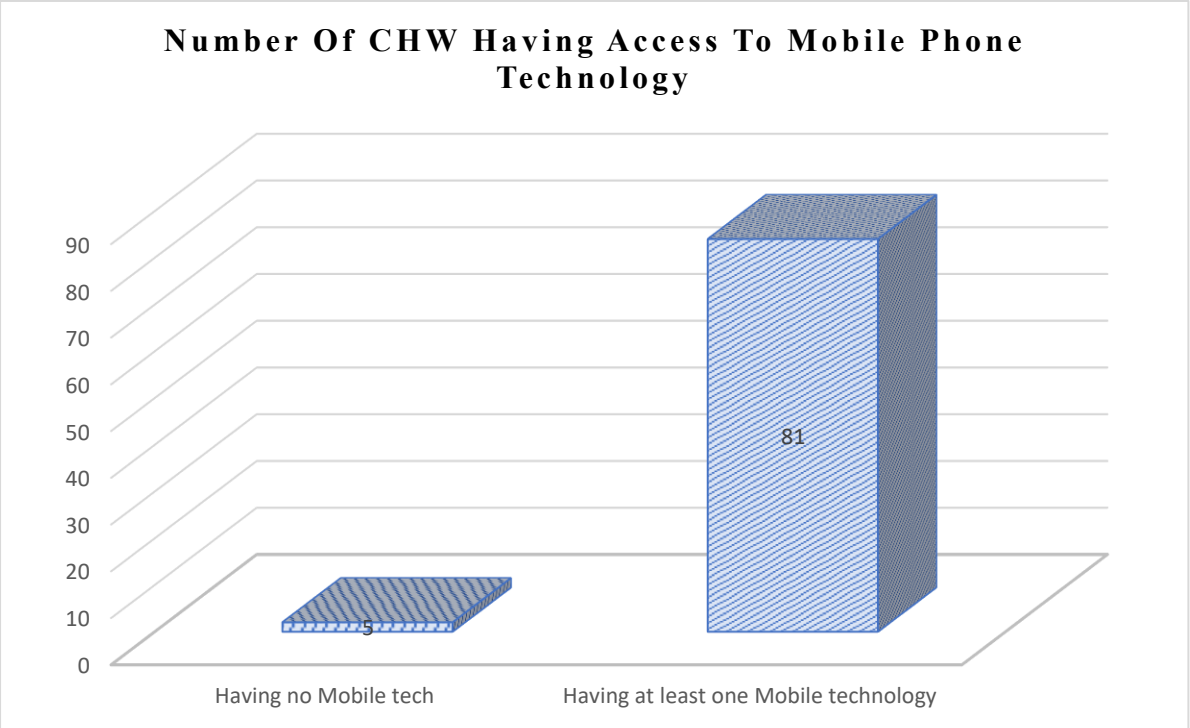

Figure 1: Proportion of CHW Participants with Access to Mobile Phones

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Mobile phones are primarily used for reporting and patient follow-up, with 68.6% submitting at least one report per month via mobile technology. However, online engagement is nearly absent, with no CHW participating in online courses and only 3.5% attending Zoom meetings. This limited online engagement aligns with the finding that majority have not received formal training on digital tool usage.

A total of 88.4% of CHWs reported having received no training or orientation on the use of mobile phone technology or computers. Table 3 presents the suggestions proposed by CHWs and community volunteers to enhance the use of these technologies in the implementation of their work. Nearly half (47.7%) recommended that supervisors provide dedicated access to computers for training and report preparation, while 77.9% emphasized ongoing field support. This highlights a demand not only for hardware but also for sustained mentorship.

This study hypothesized that there is no significant relationship between CHW access to mobile phone technology and the number of persons they serve. The correlation analysis presented in the following table examines this proposition, specifically assessing the relationship between the availability of computer/mobile phone technology and the number of individuals served by CHWs in the field.

Table 3: Activities Carried out with the Use of Computer/Mobile Phone Technology During the Last 12 Months

Variable	Category	Freq	%
How many times do you prepare your report using a computer in a month (self, public, family)	None	55	64
	1	28	32.6
	2 or more	3	3.5
How many times in a month do you prepare your report using mobile technology (taking pictures, sending summaries, storage, entry into a form)	None	14	16.3
	1	63	73.3
	2 or more	9	10.5
How many times do you use your phone to search/browse/send emails in a day?	None	61	70.9
	1	21	24.4
	2 or more	4	4.7
How many times do you use your phone to search/browse/send emails in a week?	None	66	76.7
	1	15	17.4
	2 or more	5	5.8
How many times do you submit your activity reports via your mobile phone technology?	None	27	31.4
	1	34	39.5
	2 or more	25	29.1

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How many people did you have exchanges related to your work using mobile technology during the last month?	None	32	37.2
	1	4	4.7
	2 or more	50	58.1
How many times have you attended Zoom meetings within the last 6 months?	None	83	96.5
	1	1	1.2
	2 or more	2	2.3
How many times have you taken part in online learning (self, courses, trainings, supervision follow-up) during the past 6 months?	None	86	100
	1	0	0
	2 or more	0	0
How many times have you received training on computer and mobile phone usage?	None	76	88.4
	1	10	11.6
	2 or more	0	0

The Pearson product-moment correlation between CHWs' access to mobile phone technology and the number of people reached with community health services was found to be moderately positive and statistically significant ($r = 0.525$, $p < 0.05$). An r-value of 0.525 indicates a moderate positive relationship, meaning that CHWs with better access to mobile phone or computer technology tend to serve more people and engage in a wider range of community health activities. The p-value of less than 0.05 indicates that this relationship is unlikely to be due to chance and is therefore statistically significant. Consequently, the study's null hypothesis - that there is no significant relationship between CHW access to mobile phone technology and the number of persons served - was not supported.

Similarly, the Pearson correlation between CHWs' use of mobile phone technology to communicate and exchange important health information with their communities and the number of people reached was also moderately positive and statistically significant ($r = 0.411$, $p < 0.05$). An r-value of 0.411 means there is a moderate positive association, indicating that increased use of mobile phone technology in CHW activities is linked to reaching more people in the community. Again, the p-value of less than 0.05 confirms the statistical significance of this finding, suggesting that expanding the use of mobile technology can enhance CHW service coverage.

DISCUSSIONS

In general, the study found that there were more female CHWs and community volunteers (44; 51.2%). Women are often more engaged with health issues, take responsibility for caring for sick relatives, and are among the most vulnerable groups. Their perspectives are crucial to ensuring fair community representation in health matters. Recent evidence confirms that digital

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technology can positively influence women's participation in community health initiatives. For example, Upadhyay *et al.* (2023) reported that ICT integration has significantly enhanced women's involvement in community health in India, with similar observations in sub-Saharan Africa (Mumo *et al.,* 2021; Wekesah *et al.,* 2022). Other studies have reiterated that women in these roles often face additional vulnerabilities, including exposure to violence and health-related risks (Okeke *et al.,* 2021). Assuming CHW or volunteer responsibilities benefits women, their families, and their communities, as they become both beneficiaries and providers of essential health services.

A greater proportion of CHWs and community volunteers in this study were aged 25–34 years (46.5%), indicating a youthful workforce. This aligns with Cameroon's youthful demographic profile, where individuals aged 15–35 represent 54.8% of the population (UN DESA, 2022). It also reflects the semi-urban context of Obala, where youth are more likely to remain in the community due to local economic opportunities. Equipping this demographic with digital communication skills could significantly enhance community health service delivery.

Most CHWs had attended secondary or high school (61; 70.9%), consistent with Cameroon's high literacy rate of 78.2% in 2022 (UNESCO, 2023). This suggests that the majority possess the basic educational foundation to adopt ICT tools effectively, provided they receive targeted orientation. Given this educational background, the challenges of report preparation, planning, and budgeting are not major limitations (Hajizadeh *et al.,* 2021). Many youths in this age bracket are engaged in private-sector activities such as agriculture, construction, transportation, and small-scale commerce, which provides flexibility to also serve as CHWs.

Similar CHW reporting patterns have been documented in other African contexts. Mupara *et al.* (2023) noted that in Ghana, Community Health Officers submit data to District Health Management Teams before onward transmission to the Ghana Health Service. However, NGO-led programs sometimes operate parallel reporting systems, resulting in fragmented information flow. This is similar to findings in Obala, where reporting is often irregular and concentrated during campaigns or outbreaks, with some bypassing district structures entirely. These gaps highlight the importance of integrated, digital reporting systems to consolidate community health activity data for timely and strategic decision-making.

Volunteer selection ideally prioritizes individuals living in the communities they serve. However, 35 (40.7%) of participants lived more than 5 km from their referral facility, which may deter others from serving due to lack of remuneration and irregular transport reimbursement (WHO, 2021). Some CHWs trek one to two hours to reach a facility, losing up to four hours on a round trip for referrals or report submission. Incorporating CHW transport costs into health facility budgets and using ICT for remote reporting could mitigate these barriers.

Access to ICT tools was varied. According to Cameroon's 2020–2024 National Digital Health Strategic Plan, only 32.1% of health facilities own computers and 16.8% rely on privately owned devices (MINSANTE, 2020). In this study, 97.6% of CHWs had access to mobile phones, with 64% owning more than one device, but 99% lacked access to facility-based computers. Limited reliance on public or family computers compromises data confidentiality, particularly for sensitive conditions such as HIV/AIDS, where stigma and intimate partner violence remain concerns (Nyoni *et al.,* 2021). Institutional computers remain the most secure option for CHWs to prepare reports while enhancing their ICT proficiency.

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While most CHWs use phones for calls and SMS, they lack appropriate software to perform functions such as report writing, or attending virtual meetings. Consequently, ICT use in CHWs' activities in Obala is not fully optimized. CHW's recognize ICT's value for follow-up, appointment scheduling, and feedback from supervisors and clients. However, 86% reported no prior exposure to online training or meetings, highlighting the need for digital capacity-building initiatives.

Most CHWs in this study owned mobile phones, with many using them daily in their work. These devices were used for patient communication, guiding individuals through complex health facility processes, making follow-up calls post-discharge, facilitating referrals, and liaising with supervisors at health facility, health area, district, municipal council, CBO, or NGO levels. In this study, 34 (39%) CHWs submitted their reports once a month via mobile technology, and 25 (29%) submitted twice or more, totaling 59 CHWs using mobile technology for reporting. Reporting is a fundamental CHW activity for demonstrating work performed and ensuring the visibility of their contributions; the method of report preparation influences its quality and timeliness.

Fifty (58%) CHWs engaged in patient follow-up and community communication using computers or mobile devices. However, none had participated in online training or courses, and 83 (96.5%) had never attended a Zoom meeting. Furthermore, 76 (88.4%) had not received formal training on mobile phone or computer use. The COVID-19 pandemic highlighted the feasibility of sustaining projects virtually, highlighting the urgent need for digital literacy among CHWs. Preparing for future health crises will require targeted training in modern digital tools.

From Table 5, 55 (64%) of CHWs did not prepare their reports using a computer, while 29 did so themselves. Only 2 CHWs used mobile phones for report-related activities. Monthly frequency analysis showed that 54 (62.7%) used mobile technology in their activities, while 32 (37.2%) did not. Recent work by Owhor *et al.* (2023) suggests that the future success of ICT in health will depend on the digital competence of different health workforce teams. Sustained mentorship and supervision - suggested by CHWs in this study - remain essential for effective ICT adoption.

Correlation analysis showed a moderately positive, statistically significant relationship between mobile phone access and the number of people reached with community health services ($r = 0.525$, $p < 0.05$), rejecting the null hypothesis of no association. Similarly, the use of mobile phones for health communication was also moderately positive and statistically significant ($r = 0.411$, $p < 0.05$). These findings indicate that greater access to and use of ICT is associated with increased service coverage. Increased computer access correlated with broader CHW activity implementation.

CHWs and volunteers also facilitate early referrals, accompany patients to facilities, and help them navigate complex service pathways - tasks made easier through mobile technology, which enables appointment scheduling and reminders. Recent studies in Africa confirm that digital health tools, when coupled with good internet access, adequate equipment, user competence, and supportive networks, improve care quality and reduce costs associated with delayed care (Nguyen *et al.,* 2022; Abokyi *et al.,* 2023). A District CHW Master List was developed in Obala as a centralized database to uniquely identify, describe, and locate all CHWs. This tool supports work plan development, training design, supply distribution, payments, supervision, and monitoring and evaluation, reinforcing the role of CHWs as essential frontline health resources.

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CONCLUSION

This study identified key barriers to the use of computer and mobile phone technology among CHWs in the Obala Health District and examined how access to these tools relates to their performance. While nearly all CHWs own mobile phones, most lack the skills, training, and institutional support to use them effectively, and access to computers is almost none-existent. Findings indicate a positive relationship between mobile phone access and improved service coverage, highlighting the potential of digital tools to enhance CHW performance. CHWs emphasized the need for regular training, access to computers, and stronger supervisory support to facilitate reporting, communication, and service delivery. Empowering CHWs with digital skills and tools is an essential step toward improving community health service delivery and strengthening health system resilience against future crises.

RECOMMENDATIONS

On capacity building and training, the Ministry of Health should develop and integrate a standardized ICT curriculum into the national CHW training package, focusing on community health and primary healthcare applications. They should also provide regular refresher training and on-site mentoring to ensure CHWs can effectively use mobile phones, computers, and other digital tools in their work.

To improve access to digital resources, the government should ensure CHWs have regular access to computers at health facilities for report preparation, skill practice, and access to internet resources, with technical support available on-site. Furthermore, the government should prioritize supplying essential digital equipment, job aids, and standard operating procedures promptly to enable CHWs to deliver services confidently and efficiently.

To enhance data management and workforce tracking, the health ministry should establish a digitized master registry of CHWs at district, health area, and facility levels, capturing key details such as training status, workload, and performance indicators. They should also develop a national geo-referenced CHW registry integrating district-level data to enable accurate workforce mapping, program planning, and resource allocation across all 10 regions.

Institutional integration and support should be embraced by formally integrating CHWs into public and private health systems, including their participation in work schedules, budgets, and institutional planning. Furthermore, the government should strengthen supportive supervision systems to address field-level challenges promptly and provide continuous guidance.

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