"I feel like a nurse and my clients learn more": mHealth, Capacity Building and Empowerment in Community Based Care

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Abstract. Community health workers, led by trained nurses who are linked to a health facility are well positioned to play an important role in improving health of the communities in low and middle-income countries. The South African Department of Health has implemented various mobile health programmes to improve community-based services. This paper presents a component of a study that evaluates mHealth interventions in South Africa. The study was conducted in Pretoria urban and semi-urban areas, with the aim of understanding how community health workers experience mHealth technologies. Three focus group interviews were conducted and data analysis followed Thorne Interpretive Description framework. An overarching theme was that the mHealth application provided clinical content that empowered community health workers to develop confidence, higher efficacy, independent decisions making and experience higher social standing with their clients. This in turn, translated into informed clients. There is evidence of strengthened capacity in the use of mHealth technology and application of knowledge to provide an engaged client care. Functionalities in the application allowed timely exchange of information and decision support.

Keywords. Capacity building, mHealth application, self-efficacy, user satisfaction, psycho-social aspects

1. Introduction

South Africa introduced re-engineering of primary health care (PHC) in 2012, to improve communities' access to health services and the quality of health care provided [1]. One of the key features of this model is the establishment of ward based PHC outreach teams for each electoral ward (WBPHCOT). The team is made up of a trained nurse (team leader), responsible for supporting, supervising and leading the outreach teams and six to ten Community Health Workers (CHWs) [2]. In many situations, community members are serving as community health workers, who perform diverse functions related to health care delivery and social care. They receive basic healthcare training developed by the national department of health in collaboration with Non-Governmental Organisations (NGO) [3].

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CHWs are well positioned to play an important role in improving health of the communities in low and middle-income countries [4], improve access to basic health care services and act as interface between the health care system and the community [5].

2. Utilization of mHealth

Mobile technologies for health (mHealth) represent a growing range of tools being applied in diverse health care settings [4]. Like many other low and middle-income countries, the South African Department of Health has implemented various mobile health programmes to improve primary health care services [6]. This mHealth strategy focuses on using the existing mobile platforms amongst others, improve access of patients to healthcare, improve access to health services and real time data management to assist addressing the current inefficiencies in the Health System service delivery" [7].

WBPHCOTs in this district, utilise AitaHealth application to keep record, manage caseloads, profile households and enroll clients. Modules in the Aita Health are used to collect patient information; support treatment plans and schedule visits. Data are transmitted and aggregated into the cloud based data management system, where healthcare professionals and managers can access it. The development of this application was a joint collaboration between the government, local academic institution and private sector [8]. This paper reports a component of the main study on evaluation of mHealth in South Africa and Sweden.

3. Methodology

The study used the Sittig & Singh 8 dimensions socio-technical model [9], with emphasis on the people and clinical content dimensions, to understand the perceptions of CHWs regarding the use of mobile health technology in community based-care. A single exploratory, holistic case study using three focus group interviews was used. 46 participants were purposefully selected from three sub-districts, with diverse contexts. Written, informed consent was obtained. Interviews were semi-structured and focused on personal experiences with mHealth. All interviews were recorded with a digital audio recorder.

The audios were translated and transcribed by local research assistants to ensure accuracy, as respondents often used indigenous language. The audio recordings were coded and analysed using Thorne interpretive description [10]. The Interpretive description is an analytical, inductive approach used to understand the subjective experiences of mHealth [10]. During the analysis, there was rigorous engagement with data and constant questioning and reflecting upon data to ensure trustworthiness. Team leaders' input was used to confirm or validate data, especially, the clinical content. Throughout the analytic process, findings were shared with CHWs, for verification [10].

Thematic patterns and commonalities and individual variations that characterised empowerment benefits of mHealth were noted. Concepts were linked to arrive at interpretive explanations. The need to use approaches that elaborate understanding of situations that occur in natural settings, influenced the choice of methods.

4. Findings

An overarching theme was that the mHealth application provided clinical content that empowered CHWs to develop confidence, higher efficacy, independent decisions making and experience higher social standing with their clients. This in turn, translated into informed clients. There is evidence of strengthened capacity in the use of mHealth technology and application of knowledge to provide an engaged client care. Functionalities in the application allowed timely exchange of information and decision support. This was made possible through the interconnectedness of the application that involves CHWs and outreach team leaders.

Table 1. Themes, sub-themes and categories.

Themes	Subthemes	Categories
Sense of empowerment	Knowledge acquisition	Access and quality of health education content
		Improved care experience
		Remote monitoring
		Enhanced compliance with national guidelines
	Educational benefits to clients and communities	Self-management and enhanced compliance
		Learning about condition
Psycho-social aspects	Self-efficacy	Enhanced self confidence in data management
		Psychological gratification
		Mobile devices and social recognition (electronic consent)

4.1. Theme 1: Sense of empowerment

The clinical content dimension includes aspects of the data-information-knowledge continuum that is stored in the system [9]. In the South Africa context, this refers to content that allows CHWs to register households and vulnerable populations**,** pregnant women, postnatal visits within 48 hours of birth, immunization, as well as demographic data of registered households.

CHWs perceived the application useful for their performance; they were very satisfied with the clinical content and its presentation in the device. Through interacting with the content, they were able to learn new terminology, new ways of managing health data of clients presenting with different conditions. According to them, the information in the device was accessible and coherent. This is illustrated by the following: *"When I go to the field, I educate my clients about different diseases such as TB, HIV, diabetes, hypertension and importance of knowing their HIV status. This is possible because, in the device, there is health education module for every condition that we encounter, so we know what to say in each situation"*.

The clinical content was perceived as superior, and it appeared that the training they received supported their understanding of what needed to be done. They were content with the standard of training for the mHealth system. In particular, they appreciated the questions and content on risk factors that are embedded in the device. They could navigate and manipulate demographic data of their clients with ease, such as closing the case of a deceased or a family that relocated. They gained adequate experience from interacting with clients to a point where they could identify gaps in the content. That gave them a sense of knowing. Some said: "*When I register a client, I ask questions in a particular sequence, I already know the questions by heart, there is questions on danger*

signs, such as bleeding, vomiting, for pregnant women and questions on adherence. I also add follow up questions".

The majority of participants believed that the content in the device has enabled them to form new knowledge pathways, where they could make associations between a specific condition and client responses to construct their responses appropriately. "*Before the visit, I get reminders regarding priority cases, I know my follow up cases and activities related to that household or a particular client".*

They also felt that household registration, which is the core of community-based care, is completed smoothly on the mHealth tool. However, they lamented prolonged registration of a vulnerable individual. They explained that this was due to the type of additional questions that follow when the client answers in affirmative for a particular symptom and the time the device takes to synchronise. Despite the time the system took to complete the registration of a vulnerable individual, they acknowledged that the series of questioning increased their knowledge about health conditions. *"Some clients refer to us as their nurses, because we give them the right information, they can see that we know. They trust what we tell them because they can see that the information or questions are from the tablets".*

Participants demonstrated greater understanding of National Indicators, policies and guidelines. This reflects an alignment between the clinical content and national guidelines. The two-way communication between CHWs and their team leaders, in addition to group chat on the device, enabled them to make decisions at the point of care. They indicated that their increased knowledge translated to greater clients' self-management. They knew more about their conditions and complied better with medical regimen. Their clients were happy with their service. *"I feel like a nurse, clients tell us we have helped them a lot".* The other one added*: "The team leader is a text-message away, when I have an emergency, I tick on the device that there is an emergency and send a text".* They all pointed out that when there were updates, they got notifications and the weekly meetings with team leaders provided further training.

4.2. Theme 2: Psychosocial aspects

The people dimension according to Sittig & Singh, represents the humans involved in all aspects of the implementation and use of the mHealth application [9]. CHWs expressed increased level of confidence with data management processes, triage, scheduling, and performance management. *"It is time for technology, the gadget helps us produce quality data. We feel good that we can monitor our performance on the gadget".* They believed that the tool enabled them to capture all the information and provide client-specific care. They were also satisfied with the security features of the tool. "*There is a field for electronic signature, we learned about confidentiality and data security. Clients sign and give consent for us to collect information."*

One said: *"I did not know what triage was until I used the device, now I can triage my clients and categorise them accordingly. Category 3 means bedridden client. These are clients that we collect and administer medication for. Honestly, we are doing nurses' tasks".*

There was a sense that they have become agents of transformation in the delivery of healthcare. They could interpret and apply clinical care, document care in the application and write free text in the open field. This gratified them: *"The tool keeps important information, we can manipulate it easily".* Another one said: "*We make a difference in the lives of people, all because of technology".* A few expressed the need to include local

languages in the application, as they left the open field blank sometimes due to '*perceived lack of proficiency*' in English language. However, others indicated that the spellcheck functionality in the tool was helpful.

A few were not aware of the automated scheduling functionality because they were doing it manually. However, one of them explained to them that it was shifted to a different location. She illustrated: *"I love the gadget, it makes my work easier. Hence, I am always searching for new things on it"*. This functionality makes scheduling easier, but they still need to meet once a week as a team to discuss plans for the week.

One aspect that came up strongly was the social recognition and acceptance they experienced from their clients because of the devices they were carrying. They believed people took them seriously and that gave them a sense of pride in their work. One said: *"The gadget gives you some status."*

5. Discussion

This study highlighted the impact of mHealth technology on performance and perceived capabilities of CHWs in community-based care. The focus of the study is based on the premise that technology is operated by people who have own perceptions of how the system should operate and its usefulness in supporting their activities. Baxter and Sommerville [11] support this stance and argue that socio-technical approaches are especially appropriate in health and social care "because the problems of developing technology for healthcare lie not with the complexity or novelty of the technology itself, but in the complex ways healthcare is practiced and organized".

CHWs appeared to have developed enhanced self-efficacy in performing their tasks supported by mHealth, including the decision support via real-time consultations with their team leaders. Braun et al agree that technologies need to be a better fit for CHWs tasks to optimize performance [12]. The increased exposure to core intervention messages in the tool, the use of information appears to have provided them the authority and job enrichment. Kane, Kok, Ormel et al, posit that access and exposure to medical knowledge is empowering for CHWs [13]. They reported efficiency in executing their tasks, such as decreased time in household registrations, the questions embedded in the tool that enhanced their understanding of the health conditions, the improved quality of data and lastly, the number of tasks they were able to execute. This study highlights evidence that AitaHealth was useful, and that it improved the activities of CHWs and health care delivery. Views regarding the need to pay attention to some areas in the programme, to maximize investment in mobile health technologies were articulated.

In addition, the educational benefits seemed to have translated to increased self-management on the part of their clients. Timely exchange of information through text messaging ensured they stayed up-to-date with relevant information. Thus, enabling them to disseminate appropriate health education messages, conduct counseling and accomplish targets set up by the national department of health. The personalised engagement with clients and households allowed CHWs to provide holistic care and respond to national indicators [14].

This study offered CHWs the opportunity to evaluate the WBPHCOT program and the related mobile technology tools. Their ability to identify the gaps in the clinical content and develop accurate follow up questions demonstrates the link between self-efficacy and generation of knowledge. South Africa recognises the contributions of CHWs and mHealth tool to primary health care. Hence, there are established policies,

protocols and formal training program in place. Currently, in this province, CHWs are acknowledged as a formal part of national health systems and work *in close cooperation with facility-based health practitioners, other government departments, non-governmental organisations, community structures and the private sector* [15]. The insights that emerged from this study are for a different context. However, there is a possibility of transferability in similar contexts.

Acknowledgement

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