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Article · November 2022

DOI: 10.1016/j.ssmqr.2022.100195

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Care from distance, yet closer together: How an SMS intervention enhanced care engagement for prevention of mother-to-child HIV transmission care in Western Kenya



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ARTICLE INFO

Keywords:

mHealth
SMS
Care engagement
HIV
Prevention of mother-to-child-transmission
Kenya

ABSTRACT

Short messaging services (SMS) for prevention of mother-to-child transmission of HIV (PMTCT) are growing in popularity, yet with little qualitative understanding of how such socio-technological mobile health (mHealth) interventions are experienced and shape continuity of care. In this qualitative study, we explore how WelTel, an SMS intervention for improved PMTCT retention in western Kenya, influenced women's engagement with PMTCT care. We conducted in-depth interviews with women (n = 14) enrolled in PMTCT care and PMTCT care providers (n = 14), across six health facilities between July 2016–June 2017. Interviews were transcribed and imported into NVivo for coding and thematic analysis. In our analysis, we approached WelTel as a socio-technological intervention and found it to neatly interface with pre-existing PMTCT care and engagement practices. Our findings revealed fitting interactions between existing PMTCT care and engagement practices, women and healthcare providers, and the intervention. We found that the WelTel intervention formalized and strengthened (in)formal phone communications already taking place between some women and their healthcare providers, enhancing phones as caring devices, with positive implications for care engagement. Despite workload and privacy concerns, this resulted in improved client recognition, with women feeling more 'seen' and 'cared for' by their providers. Health-enhancing client-provider relations were strengthened, and care provision experienced as faster. Our findings demonstrate hitherto unexplored pathways through which SMS interventions can improve PMTCT care engagement, underlining that the success of this type of mHealth interventions may be contingent on their 'goodness of fit' with, and contributions to, pre-existing care practices and resources.

1. Introduction

Ten years ago, the World Health Organization (WHO) recommendation of lifelong antiretroviral treatment (ART²) for all pregnant and breastfeeding women living with HIV, known as Option B+, marked a historical shift in the prevention of mother-to-child transmission of HIV (PMTCT) (World Health Organization WHO, 2012). Since then, there has been enormous progress in reducing mother-to-child transmission of HIV

(MTCT) across the Sub-Saharan Africa (SSA) region, which is home to 90% of all pregnant women living with HIV. Between 2010 and 2021, ART uptake for PMTCT in Eastern and Southern Africa rose from 52% to 90%, with MTCT rates decreasing from 21% to 12% (UNAIDS, 2022).

Nonetheless, progress has stalled since 2015, and many SSA countries struggle to keep women and their children enrolled in care under Option B+ (UNAIDS, 2021). For example, a systematic meta-review of 22 studies from eight SSA countries found that retention in care decreased

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² ART-antiretroviral Treatment, HCP - Health Care Providers, HIV - Human Immunodeficiency Virus, SMS - Short Messaging Service, PMTCT - Prevention of Mother to Child Transmission of HIV, SSA - Sub Saharan Africa, MTCT - mother to child transmission.

substantially over time, with pooled retention estimates of 89.9%, 79.4%, 74.5%, and 69.3% at 3, 6, 12, and 24 months after ART initiation, respectively (Knettel et al., 2018). Similarly, UNAIDS estimates that nearly 25% (19443 out of 78,000) of new HIV infections among children in Eastern and Southern Africa during 2021 directly resulted from women dropping out of care during pregnancy and breastfeeding (UNAIDS, 2022).

Kenya is one of 21 SSA countries prioritized by global initiatives to accelerate action for PMTCT Option B+ care and retention. Although Kenya has made great progress, early infant diagnosis (<2 months of age) remains low at 65% (UNAIDS, 2022). Maternal ART uptake only increased slightly from 86% to 91% between 2015 and 2021, and nearly 31% of the country's 5200 annual pediatric HIV infections in 2021 occurred because mothers disengaged from care during pregnancy and breastfeeding (UNAIDS, 2022). These trends reflect the difficult challenge of re-engaging mother-infant dyads in care, and finding children living with HIV. Kenya's increasing MTCT rate, rising from 5% at six weeks post-partum to 8.9% by cessation of breastfeeding – well above the global target of 5%, further demonstrates this trend (UNAIDS, 2022).

1.1. SMS interventions in HIV care

Widespread mobile phone use in SSA has sparked an interest to adopt mobile health (mHealth) in support of health care engagement in the region (Kruse et al., 2019). mHealth takes many forms, and text messaging being low cost and extending facility reach, is one tool used to improve health behaviors and care outcomes for various diseases including HIV (Todd et al., 2017). Short message service (SMS) is one type of mHealth interventions that have been implemented in PMTCT care, aiming to improve continuity of care for women already on ART or to support initiation and continuation for women newly diagnosed with HIV (John-Stewart, 2018). Yet, SMS interventions are rarely brought to scale (Coleman et al., 2020). A reason may be found in quantitative explorations that demonstrate limited or mixed impact on PMTCT outcomes such as early infant diagnosis, ART uptake, and retention in care (Coleman et al., 2017; John-Stewart, 2018; Kinuthia et al., 2021; Odeny et al., 2019). Qualitative explorations can add valuable understanding to the ambiguity in these results as they permeate social realities and can inform what works, for whom, in what circumstances and why (Pawson & Tilley, 1997).

The bulk of qualitative studies exploring SMS interventions for PMTCT have narrowly focused on 'acceptability', mainly to inform intervention designs (Fairbanks et al., 2018; Jennings et al., 2013; Mabachi et al., 2021; Nachega et al., 2016; Ronen et al., 2018). This approach fails to capitalize on the strengths of qualitative inquiry to capture what happens as interventions are implemented into real-life PMTCT settings and not merely whether content or design is acceptable to people enacting them. Two PMTCT studies in South Africa and Kenya did explore intervention dynamics post-implementation, one finding that one-way educational messages were timely, supportive, and assisted overworked health care providers (HCPs) (Coleman et al., 2020). Another found that community health workers administering a multi-level intervention including appointment reminders via SMS and calls, played a critical role in improving client-provider communication, peer-support, health education, and patient advocacy, while challenges related to client privacy, HCP attitudes and other health systems barriers prevailed (Dicarlo et al., 2018). In addition, qualitative evidence from general HIV care indicate that SMS interventions may improve patient/provider communication and relations (Murray et al., 2015); help clients feel cared for and seen (Ware et al., 2016); and messages perceived as 'signs of love' and psychosocial support (Geldof et al., 2020). These early observations suggest possible positive interfaces between SMS interventions and PMTCT care.

1.2. Approaching PMTCT as a socio-material practice

To further understand how SMS interventions relate to local PMTCT care and engagement realities, this paper takes inspiration from practice theory as formulated by Schatzki. His perspective allows us to explore PMTCT care and engagement as social practices spun by 'interrelated ongoing lives' (Schatzki, 1996) and the elements: materialities (e.g., objectives, things, infrastructures), competencies (e.g., know-how and skills) and meanings (e.g., cultural norms, local sayings, trust) that surround and shape these practices (Skovdal et al., 2017). Explorations of care engagement are often limited to care retention (Knettel et al., 2018; Watt et al., 2019). This is a rather restrictive way of approaching engagement with PMTCT care that does not capture the active participation of women and healthcare providers (Murray et al., 2015) nor the role of social structures, phones as material objects, and other life practices that shape women's ability (or otherwise) to engage with PMTCT care services. Taking a practice perspective heightens our attention to these social structures and practices.

A practice perspective aligns with Pols' notion of 'care that fits', which highlights the importance of technologies such as mHealth to fit into existing care relations between HCPs and their patients. For Pols (2012, p. 39) "fitting is a relational activity, a way of interacting", rather than an effect of technologies. This activity is continuously shaped and situated in practices and considers the temporal situations and needs of individuals (Pols, 2012).

In light of the scarce qualitative evidence from PMTCT settings and echoing a call to improve the qualitative evidence-base evaluating SMS interventions for PMTCT (Coleman et al., 2017; John-Stewart, 2018), we draw on concepts from practice theory and Pols (Pols, 2012) to explore the 'goodness of fit' between local PMTCT care and engagement realities and an SMS intervention, which ultimately converge in socio-material care practices. Our aim is to understand how an SMS intervention, called WelTel, interfaced with the web of elements guiding existing PMTCT care and engagement practices in Western Kenya, using perspectives from both women in PMTCT care and their HCPs. Drawing on both perspectives will allow us to understand pathways to acceptability, sustainability, and scalability of future mHealth interventions.

1.3. WelTel: The SMS intervention

WelTel is an SMS intervention that sent automated weekly messages to PMTCT clients (local terminology used by HCPs and used henceforth in this paper) in the following sequence: "Mambo?" (Kiswahili for "How are you?"), prompting them to reply within 48 h with either: "OK/Sawa", or "Shida" if they had a problem. Clients could also send "Shida" messages at any time. Answers were recorded in a database and "Shidas" sent directly to study phones at the participating facilities. A mentor mother (MM) or a PMTCT nurse in charge of the phones would call participants who responded "Shida" to identify the nature of their problem and offer appropriate assistance. A list of non-responses was prepared weekly by a study coordinator and sent to each facility. The facility staff in charge would make follow-up phone calls to establish participants' reasons for non-response and note any problems. All outcomes from phone calls were recorded in a log at each facility (Awiti et al., 2016).

2. Methods

This study adheres to the Consolidated Criteria for Reporting Qualitative Studies (COREQ) (Tong et al., 2007).

2.1. Study setting

We conducted a qualitative study nested in the multi-center parallel-

armed randomized controlled trial (WeTel PMTCT) exploring two-way interactive text messages to improve PMTCT retention at six facilities across 4 counties in Western Kenya (Awiti et al., 2016). Located within the implementing partner Academic Model Providing Access to Health Care (AMPATH) catchment area, the study locations represented an urban, peri-urban, and rural mix with an HIV prevalence ranging between 5 and 19% (National AIDS Control Council, 2015). This qualitative study was conducted at all 6 participating facilities: one health center, four sub-county level hospitals, and one national referral hospital.

Each facility employed between 5 and 9 staff members, including nurses, clinical officers, and trained peer MMs, the latter per the national PMTCT policy since 2012 (Ministry of Health Kenya, 2012). MMs are former PMTCT clients who provide education and psychosocial support to current clients. Envisioned to improve care and retention, facilities also employed a defaulter tracing mechanism where consenting PMTCT clients who miss scheduled clinic visits were followed up via calls, SMS, or home visits by MMs and outreach workers (Ministry of Health Kenya, 2016).

2.2. Participants and sampling

Baseline characteristics and inclusion criteria for the trial have been described elsewhere (Nordberg et al., 2022). In brief, 600 women living with HIV (out of 735 screened) were enrolled in the trial at their first antenatal visit between June 2015 and July 2016, and randomized in a 1:1 ratio into intervention (N = 300) vs control (N = 300). In the screening 82% were excluded due to lack of cell phone access (N = 51), illiteracy/unable to respond to SMS (N = 23), and unwillingness to participate (N = 37).

For this study, we used purposive sampling to identify those who were able and willing to share their experience of the intervention, including both HCPs (MMs and PMTCT nurses) and PMTCT clients based on principles of maximum variation, informed by the socio-economic and demographic characteristics of clients at the participating facilities (i.e., age, time living with HIV, socio-economic status, and disclosure). All respondents consented to participate in the study. Recruitment was done by 5 local research assistants, who worked for the study since trial initiation.

Twenty-eight participants were included in the study, representing all 6 participating facilities (Table 1). To ensure familiarity with the intervention, HCPs (N = 14) and PMTCT clients (N = 14) had to have been part of the SMS intervention for a minimum of 6 months and be ≥ 18 years of age. Characteristics of participating clients were captured in a baseline questionnaire administered at trial enrollment assessing social and demographic characteristics, mobile phone access and use, psychosocial aspects of living with HIV, and aspects of care engagement.

2.3. Data collection

Data were collected through in-depth semi-structured interviews between July-September 2016 and February-June 2017. The 5 research assistants who had received training in qualitative inquiry, and a researcher (KDA) with qualitative expertise interviewed the participants in a private space at the participating facilities or study office.

Two separate interview guides were developed and piloted for each participant group. Both guides explored perceptions and experiences with PMTCT care, mobile phone usage, the interaction between the parties, and engagement with care and with the SMS intervention. As interviews proceeded, guides were continuously adjusted based on observations, emerging information, peer debriefing among researchers, and preliminary analysis. Data were collected until emerging information added no further depth, following principles of data saturation (Srivastava & Hopwood, 2009). Interviews were conducted in English or Kiswahili as preferred by the participant and lasted between 20 and 60 min (median 40 min). All interviews were audio-recorded, transcribed verbatim by an external transcriptionist, and where necessary, translated

Table 1

Characteristics of PMTCT clients at enrollment into the SMS intervention and study participant sampling.

PMTCT client			Participant sampling		
Characteristics	N or median	% or range	Facility	HCPs	Clients
Sociodemographic			Facility 1: Sub-County hospital	3	3
Age	33 years	(26–38)	Facility 2: Sub-County hospital	3	3
Highest Education			Facility 3: Sub-County hospital	3	2
≤ Primary schooling	10	(71.43%)	Facility 4: Health centre	1	1
Secondary schooling	3	(21.43%)	Facility 5: National Referral Hospital	2	2
Tertiary/ vocational training	1	(7.14%)	Facility 6: Sub-County hospital	2	3
In a current relationship	11	(78.57%)	Total	14	14
Occupation					
Home maker/ housewife	6	(42.86%)			
Employed	4	(28.57%)			
Casual labourer	4	(28.57%)			
HIV-related characteristics					
Time since HIV diagnosis	2.8 years	(0.1–13.6)			
Duration at clinic					
First antenatal visit	4	(28.57%)			
6 months to 2 years	4	(28.57%)			
>3 years	6	(42.86%)			
Disclosed HIV status ^a	12	(85.71%)			
Phone characteristics					
Have own phone	13	(92.86%)			
Preference for phone contact					
Text messages	1	(7.14%)			
Phone calls	3	(21.43%)			
Text messages & phone calls	10	(71.43%)			

PMTCT: prevention of mother to child transmission, HCP: health care providers (PMTCT nurses and mentor mothers).

^a Note: Disclosed to a spouse (N = 9), friend (N = 1) or relative (N = 10), not disclosed (N = 2).

into English. Each transcript was reviewed by the interviewer and KDA.

Additionally, KDA did structured observations at the participating facilities to gain better understanding of facility structure, dynamics and procedures, closeness with facility staff, and observation of natural behavior (Gibson & Brown, 2009). Observations were initiated 8 months after trial initiation in March 2016 and were ongoing at different time points until July 2017. Observations were either audio-recorded memos or in note form and written into observation protocols closely after the observations took place.

2.4. Data analysis

Data were analyzed in NVivo software version 11 and 12 (<https://www.qsrinternational.com>), using Attride-Stirling's (2001) thematic network analysis. Data were initially read and coded inductively by KDA exploring topics raised by the participants. The coded text segments were further refined and clustered into basic, organizing, and global themes in discussion with a fellow researcher (MS). In an iterative process, a third researcher (PMO) went back into the raw data and coded it anew based on the proposed thematic network, leading to further

exploration and refinement of themes in collaboration with KDA and MS. Throughout this process, we reconsidered codes that had initially been left out for further analysis, discussed thematic labels, and finally applied basic, organizing, and global themes against coded text segments, verifying representation of the data. We also re-examined differences and similarities between the two participant groups to ensure their full representation in the findings. Finally, we triangulated our findings with observations for confirmability and to bring context and understanding to the interviews. Throughout the study we strengthened trustworthiness using various strategies including triangulation both in methods, in peer-reviewing, prolonged engagement and a transparent audit trail (Gibson & Brown, 2009).

2.5. Ethical considerations

The Institutional Research and Ethics Committee at Moi University, School of medicine, Eldoret, Kenya (FAN; IREC 1292), and the Regional Ethics Review Board, Stockholm, Sweden (2018/742-31/1) approved this study. Participants consented to be contacted about their study participation at trial enrolment and gave written informed consent before the interview. Participants were informed that: i) the SMS messages did not replace standard PMTCT care protocols; ii) they were free to withdraw from the trial any time; and iii) the intervention would be discontinued in case of withdrawal of consent, miscarriage, stillbirth, or death of either the mother or her infant during the trial period. They were reimbursed transport costs of 150 Kenyan shillings (≈1.37 USD) to attend the interviews. All physical data were stored in locked cabinets and electronic data were password protected and kept in encrypted servers. Pseudonyms are used throughout the Findings to protect participants' confidentiality.

3. Findings

Aided by practice theory, we devised a thematic network depicting six organizing themes which constitute pre-existing care practices that interfaced with the SMS intervention at the participating facilities. Fig. 1 illustrates the thematic network, and the six themes structuring the results section. The organizing themes are encapsulated by two global themes, reflecting our main finding that the SMS intervention i) formalized and strengthened pre-existing phone-based care; and ii) strengthened

other pre-existing PMTCT care practices. This dynamic strengthened the quality of phones as caring devices and enhanced engagement with PMTCT care because of the 'fit' created in interaction between the SMS intervention, participants, and pre-existing practices.

3.1. SMS intervention formalized and strengthened pre-existing phone-based care

3.1.1. Frequent and predictable phone communication

"It has eased the work of contacting or communicating with clients"

Participants' narratives indicated that the SMS intervention facilitated frequent and predictable phone communication that strengthened pre-existing phone-based care. Before the SMS intervention, HCPs used both the clinic and private phones to supplement face-to-face interactions with most communication done informally. Some participants described communicating via SMS, phone calls, and platforms like WhatsApp. HCPs described availing themselves for 24 h (including outside working hours) by giving clients their private phone numbers and bringing the clinic phone to their homes:

"... if they have any problem, they can contact us, we just give them our number. In case of anything, they just contact us." (Val, MM, facility 6).

Some HCPs, however, lamented the costly use of personal resources like phone airtime. While others found working overtime to be challenging and an infringement on their privacy, most did it out of caring and kinship. It became evident that the introduction of the SMS intervention had facilitated HCP-client communication. PMTCT nurse Hellen commented how the intervention had helped sustain "constant follow-up and communication ... unlike never before". Fridah, a MM, remarked: "... we can text regularly, like daily ...".

On a similar note, clients' narratives suggested that the intervention offered predictable and reliable phone communication with HCPs and made them more accessible. Elsie explained:

"It is helpful as in at times when I have a problem, I answer: "shida" and when I answer "shida", they call.me." (Elsie, client facility 6).

Some clients recalled the uncertainty of contacting HCPs on their personal phones before the intervention, including not knowing the best time to contact them. Zawadi elaborated:

"... at times you may send an SMS and he/she doesn't get it. So, you just have to make a call so as to know he/she is available. You know you can send, he/she may be off." (Zawadi, client, facility 1).

The SMS intervention strengthened phone-based care as it facilitated regular and predictable phone communication and access to HCPs beyond the temporal and physical boundaries of the facilities, as illustrated by the above quotes. This stood in contrast to prior private phone use which was unstructured, only practiced by some HCPs and clients, and dependent on HCPs' willingness to overextend their resources and time.

3.1.2. Concerns about HCP workload

"A question of resources"

HCPs were divided about the implications of the SMS intervention for staff workloads. Some considered the intervention to be cumbersome and others efficiency-enhancing. Some HCPs found it challenging to address clients' needs both via telephone and physically at the health facility. As explained by Jane, this could leave clients feeling neglected:

"... when there is a queue of clients, maybe because of shortage of staffs, (...) you want to respond, but because of a lot of work, you may

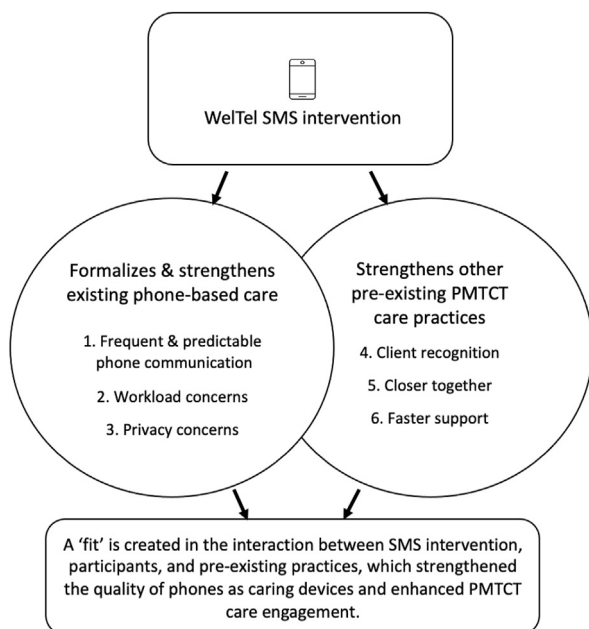


Fig. 1. Influence of the WelTel SMS intervention on PMTCT care engagement.

not have enough time, (...) and after, communicating to the clients, maybe hours have passed. This client ... may not feel well, she may think that you are not caring for her.” (Jane, MM, facility 3).

Conversely, some nurses perceived the increased workload as temporary, offset by the time saved from clients who would otherwise come to the clinic:

“It makes my work easier [...] When they come here, I am already updated how they are doing. So, I will take short time with them because I already know how they are doing.” (Akeyo, PMTCT nurse, facility 1).

Others, like Hellen, remarked that the intervention simplified their work, enabled timely response to problems, and prevented unnecessary facility travels:

“It will increase my workload, but not for that long. Because once the SMSs have come in, maybe you get to 2 out of 10 who have ‘shida’, so you will sort them out within a short time, and you are through. Rather than somebody coming all the way from home.” (Hellen, PMTCT nurse, facility 2).

Margaret, a MM, summarized:

“After sending I will wait for the feedback, and as I wait for the feedback I will continue with other duties. Everything is just about planning”. (Margaret, MM, facility 6).

HCPs drew attention to the underlying risk of the SMS intervention to exacerbate staff workloads e.g., in the way it was experienced by Jane, as a parallel system with additional duties to existing responsibilities. They also highlighted its potential to support efficient and timely care provision through integration with existing structures as illustrated by Hellen and Akeyo and that proper planning could ensure that both remote and facility-based clients be served adequately.

3.1.3. Privacy concerns

“People will know”

Despite the intended neutral message content, participants' suggested that stigma and fear of stigma would determine clients' willingness to accept the SMS intervention, particularly for clients who had not yet disclosed their HIV status to family and friends or who shared phones with their husbands. This was common across all facilities. Nelly explained:

“... I don't like because when I put my phone there, everyone in the house takes and looks at it. That is where there is a problem. I don't want people to know my things. So, if I say that I will use text message, then there are things that will be known and I don't want it like that.” (Nelly, client, facility 3).

Nurse Akeyo elaborated how some clients feared the notion of ‘being followed’ which would signal to their communities that they were living with HIV:

“... there is concern because some of the clients are like ‘Should they follow me up with the phone?’. A few, others will be like ‘People will know I am being followed; I am HIV positive.’” (Akeyo, PMTCT nurse, facility 1).

The fear of unintentional disclosure also influenced preferred means of contact, which varied among clients. Some were comfortable with both calls and SMS, others preferred calls but with the option to initiate communication instead of being called in case of a ‘shida’. Some preferred SMSs only, which could be responded to at their convenience and deleted thereafter:

“Time for receiving that call, maybe you don't have. But texting, you will just text ... you will just see and find time. (Chemutai, client, facility 5).

MMs explained that measures like confirming client identity or scheduling calls and SMS could alleviate privacy and confidentiality concerns:

“We can get her consent. We can ask her when is the right time for you? Because for the client who has issues with the husband will tell you: ‘I think you text me at such a time.’” (Lydia, MM, facility 2).

These quotes demonstrate how a perceived risk of unintentional disclosure of HIV status would prevail irrespective of phone communication means whether calls or neutral SMS. They further stress privacy concerns – underpinned by HIV-related social stigma – as a key barrier to the acceptability and sustainability of the SMS intervention.

3.2. SMS intervention strengthened other pre-existing PMTCT care practices

3.2.1. Client recognition

“I feel cared for”

Clients and HCPs explained that the SMS intervention amplified feelings of client recognition, a vital pre-existing practice used to sustain care engagement at the facilities. MMs remarked that the intervention's messages and subsequent calls communicated to clients that HCPs were supportive, remembered their clients, were appreciative, loving, and concerned. These feelings were echoed by clients, such as Aluoch:

“Okay, I feel good, and I feel at least I have a shoulder to lean on when I am being called or receive these calls from the clinic.” (Aluoch, client, facility 1).

Many clients felt cared for beyond the professional level and expressed the value of simply being asked ‘how are you?’, giving them an opportunity and a platform to air their concerns and thoughts to someone willing to listen. Kerubo explained:

“It is like they are concerned. Apart from treating you and giving you ARVs and whatever, they are concerned about you, how are you doing, they are concerned. It is very important. Very helpful ...” (Kerubo, client, facility 5).

She further described how the SMS intervention made her feel “like they have your interest at heart.” Juliet elaborated:

“You know right now, we women we have many problems, and we still have children. Maybe the husband has passed on. At least you ask her; ‘How are you doing? How are you? How are you living?’” (Juliet, client, facility 6).

Juliet demonstrates how other practices and social roles would influence clients' care engagement. Besides being PMTCT clients, participants were women, mothers, and wives with other worries, obligations, and struggles.

This section highlights how the SMS intervention extended avenues for personalized and emotional support, which furthered client recognition. They further illustrate that to simply ask ‘how are you’, and fast caring responses to *shida* messages could symbolize HCP concern and accessibility.

3.2.2. Clients and HCPs brought closer together

“We are closer”

Participants described how the SMS intervention supported and deepened existing client-provider closeness and interpersonal bonds.

Before the intervention, clients were motivated to follow care through close client-provider relationships anchored on trust, friendship, encouragement, and support. This gave clients freedom to share cares and worries. As nurse Hellen mentioned ‘they normally call and ask me anything.’. MMs also described ‘walking in their clients’ shoes’, noting that disclosing their positive status and exchanging personal stories gave clients hope and aspirations to live like them:

“My heart is all in her. Even when I sleep, I do say; “The way (name of MM) is living, is how I will also live” (Lynda, client, facility 6).

That the SMS intervention added depth and closeness to clients’ and HCPs’ interpersonal relations is illustrated by Juliet and Hellen:

“... and also, you, when you send the message. Again, like we have started communicating, you have become my closest person.” (Juliet, Client, facility 6).

“Yeah, because since the SMS came, I think I am more closer to them and it is easy to retain them ...” (Hellen, PMTCT nurse, facility 2).

These benefits gave HCPs better awareness of clients’ health, insights into their challenges, and potential reasons for care disengagement. HCPs further expounded how the SMS intervention fostered knowledge exchange that enabled early hazard detection:

“At least it is benefiting, as in it is making the clients come closer to us. They are free to air any questions that they feel they have, any issues, and we can tackle them short term before they become grave.” (Deborah, MM, facility 5).

Lydia explained how this dynamic helped retain clients:

“... you see when a client replied that “shida”, you can really respond to that “shida” [...] you can go deep to know “what is that problem?” We can help retain”. (Lydia, MM, facility 2).

Speculating on intervention benefits, Akeyo lamented the prior lack of ‘bond’ for clients who struggled with care engagement, and Kerubo spoke about the opportunity for connection during the lengthy periods between scheduled visits:

“... you know they get lost because there is nothing to follow them, there is nothing to keep them alert, or there is nothing bonding them actually to the clinic. (Akeyo, PMTCT nurse, facility 1).

“So, like the six months that you are away without [...]jerr ... a conversation, they don’t know how you are doing, [...] I think this conversation is very fine, very important. [...] It helps them follow up”. (Kerubo, client, facility 5).

Jane further noted how some clients felt more comfortable using phones to communicate with HCPs as it allowed them to speak more freely:

“Yeah, because the clients may not talk to you face to face, but when you are talking to her on phone, she may tell you the reason why she did not come to the clinic.” (Jane, MM, facility 3).

Distant care via the SMS intervention not only fostered closeness between clients and HCPs but offered opportunities to stay connected with clients not previously engaged, including those who preferred phone over in-person communication. These quotes support the instrumental value of the SMS intervention to strengthen client-provider connectedness, prevent escalation of hazards and facilitate HCP awareness of challenges to care engagement.

3.2.3. Faster support enabled

“Immediate support ... at any given time”

The SMS intervention was described to accelerate care by overcoming

existing structural barriers to care engagement. Challenges remained, like network access/electricity and clients trading valuables to meet more immediate needs: “Ay! The phone I sell them when I am broke ... and buy food”, Fatuma (client facility 2). But for clients who struggled with the physical distance to health facilities along with managing competing obligations like sustaining livelihoods and caring for family and friends, the intervention was a relief. Val and Chichi elaborated:

“Sometimes it can be a challenge because she may want to talk to you, but she has no credit. But since WelTel was introduced, when they have a problem, we chip in and call them.” (Val, MM facility 6).

“... Maybe I can write “shida” because I have no fare to go to the hospital, she will come. She will come and pick me.” (Chichi, client, facility 3).

Free of cost, the SMS intervention enabled instant client-provider communication extending care access to clients [with cell phones] who were excluded due to poverty. Chichi also illustrates how the SMS intervention integrated with existing practices of HCPs going the extra mile. Hellen shed light on this trend:

“... you can now not leave this phone at work. Because, a message could come in, a late one and maybe it needs your urgent attention.” (Hellen, PMTCT nurse, facility 2).

She illustrates how immediacy was a provider priority even after working hours, and the SMS intervention pivotal in triaging the urgency of clients’ problems. Akeyo explained that left unaddressed, a ‘shida’ (problem) could even ‘lose its meaning’ over time. Lynda who had insecurities about phone-based care, provided an example:

“So, when you write it, you now ask yourself; “How will they help me now?” maybe they may not respond or [may] respond.” (Lynda, client, facility 6).

To alleviate these insecurities, MMs also used immediacy to strengthen trust and make clients feel comfortable and prioritized, Margaret elaborated:

“Immediately, the client has written to you ‘shida’ that time when she is still holding that phone, the message has come in. If she gets the call, she will see that this person cares about me, you see. She will even tell you more”. (Margaret, MM, facility 6).

She shows how immediacy amplified feelings of recognition and encouraged clients to share more freely with their HCPs. This in turn strengthened HCPs’ abilities to provide personalized care. Client experiences correspondingly, indicated how immediate HCP responses 24/7 raised confidence and expectations of support whenever needed:

“Like when I was expecting, I could feel cramps and what what, at night, but I could SMS (...) Yeah, and they could call me back. (...) I’ll just text; ‘Shida’.” (Kerubo, client facility 5).

Getting professional health advice when needed came with other benefits, as nurse Akeyo described: it ‘keeps them [clients] alert’, help them take responsibility for their health, and motivate care engagement. This was in contrast to ‘old mamas in the village’ or after hours of waiting at the facilities being ‘pumped with health messages’ as she put it.

Resource scarcity and a desire to ensure care access 24/7 made HCPs adapt the SMS intervention and embed it into prior phone-based practices to make it fit real-life needs. This included work after hours and using private means, not intended by the intervention design. The resulting faster support, prompted by confidential ‘Shidas’, translated into client comfort, personalized care, and enhanced care engagement, which for some remained challenged by absent/unreliable network and/or electricity, phone sharing, stigma, and phones being sold or stolen.

4. Discussion

Purely biomedical interventions to improve care outcomes for women living with HIV have their shortcomings. Following the global shift to focus beyond ‘access to care’ and strengthen social and structural factors that encourage lifelong care engagement (Hsieh et al., 2014; Topp et al., 2018; UNAIDS, 2021), this qualitative study explored how an SMS intervention interfaced with PMTCT care and engagement practices, drawing on concepts from practice theory (Schatzki, 1996) and Pols’ (2012) notions of ‘caring devices’ and ‘care that fits’. We found that the SMS intervention strengthened the quality of phones as caring devices and enhanced engagement with PMTCT care. This was possible due to the creation of a ‘fit’ between participants, the SMS intervention and existing care engagement practices. The ‘fit’ formalized and strengthened phone communication, strengthened client recognition, client-provider closeness, and enabled faster support.

4.1. Phones as caring devices

Our findings illustrate that the SMS intervention permeated existing care practices in which phones acted as caring devices. Building on existing norms and practices, the SMS intervention was used to maintain and strengthen close client-provider relations and client recognition, including the extension of bond to women who struggled to engage in their care or not previously part of existing (in)formal phone-based care. We also found that regular communication starting with a simple question “How are you?” made clients feel like HCPs were even more concerned not just about them as clients, but as persons. That HCPs were only a message or call away instigated feelings of safety and being cared for. These abilities, align with Pols’ (2012) take on ‘caring devices’, rejecting the notion that technology is limited in its capacity to deliver ‘real’ human care, empathy, and affection. Our findings also corroborate existing evidence from general HIV care (Geldof et al., 2020; Murray et al., 2015; Ware et al., 2016) in which study participants described ‘feeling closer’, and clients ‘cared for’ and ‘seen’ when they interacted with HCPs via an SMS intervention. In PMTCT care, a Kenyan pre-intervention study found desires to boost emotional support and client-provider relationships via SMSs (Fairbanks et al., 2018), and in South Africa, an intervention combining community health workers and mHealth was found to improve communication and peer-support (Dicarlo et al., 2018). This growing body of literature suggests that SMS interventions such as WelTel can support care and engagement as they extend into the relational and social sphere.

Person-centered care has been highlighted as a key strategy to improve PMTCT (UNAIDS, 2020), allowing focus on the uniqueness of individuals, and the ability to negotiate one’s care (UNAIDS, 2020). A clear outcome of the improved client recognition and client-provider relations in our study was deepened knowledge of struggles that could prevent women from engaging in care. HCPs’ would follow with personalized support and advice which promoted health awareness and client care engagement, a dynamic that subsequently enabled early hazard detection. In general HIV care, Murray et al. (2015) found that the same interactive SMS platform facilitated proactive client care engagement and Ware et al. (2016) that text messages encouraged the development of adherence habits. Similar conclusions are drawn by Pols (2012) who further demonstrates how frequent monitoring, such as the weekly ‘Mambo’ messages in this study, can change the ways HCPs get to know their clients, and even assist in the detection of hazards.

Previous PMTCT studies found a link between care (dis)engagement and experienced or anticipated negative behavior from HCPs (Gourlay et al., 2016) and lack of confidence in health systems (Coleman et al., 2020). By contrast, clients in our study had trust, and confidence that they could access care and support from HCPs whenever needed, reinforced by immediate responses to ‘shidas’ as well as the freedom to use the intervention cost-free at any time. These findings align with Nahum-Shani et al. (2018) who argue that being cared for, social

interaction and immediate feedback constitute basic psychological needs and their fulfillment key to the success of mHealth interventions.

4.2. Structures, challenges, and adaptations

We found that the SMS intervention tapped into informal communication and interaction taking place after work hours and using private means. This occurred despite the SMS intervention offering an alternative to the existing clinic phone (number) and free of cost messaging (including one extra phone/facility). While studies have described how nurses in PMTCT lament workloads (Coleman et al., 2020; Schuster et al., 2016), and the value of community health workers such as MMs to bridge this workload (Dicarlo et al., 2018; Schmitz et al., 2019), we have not encountered studies describing PMTCT facility work being brought into the private sphere by HCPs. By contrast, in a Canadian setting, many HCPs felt that the use of private time and phones (numbers) were unheard of (Murray et al., 2015). Seemingly unique, both nurses and MMs in our study went above and beyond to accommodate their clients’ social realities, bringing home both the clinic and intervention phone, as well as using their own phones, money, and time to ensure 24-h access to care.

While few lamented the workload, it was done out of caring, to ensure immediacy and to mitigate potential (health) hazards despite poor remuneration – notably for MMs. It highlights how the faster support brought about by the intervention, also was a result of the way HCPs chose to adapt and engage with it. On this note, we echo arguments made by Schmitz et al. (2019) and Topp et al. (2018) that community health workers should be recognized and remunerated for their positive impact on improving the connectedness, emotional outlook, and hopefulness of women in PMTCT.

Another adaptation was seen in the way some clients would write ‘shida’ for any personal struggle, though a ‘shida’ was intended to be health-related. While both adaptations were beyond the scope of the SMS intervention, they resonate with the recommendation to adapt mHealth interventions according to individual’s ever-changing needs, contexts, and vulnerabilities (Nahum-Shani et al., 2018).

On another note, whereas several PMTCT studies recommend neutral SMS content to avert accidental disclosure (Jennings et al., 2013; Mabachi et al., 2021; Nachega et al., 2016; Ronen et al., 2018), just the fact that clients were ‘followed’, could pose a risk of unwanted questions from partners and friends in our study. Women often cohabited with multiple family members, offering limited privacy, and in their communities people ‘would know’. Participants agreed that privacy concerns were heightened among clients who shared phones or who had not disclosed their status to their partners, resonating with existing evidence that non-disclosure and phone sharing affect the acceptability of SMS interventions in PMTCT (Dicarlo et al., 2018; Jennings et al., 2013; Ronen et al., 2018). In contexts where clients are likely to share phones, SMS designs may consider family rather than couple-based approaches such as the client-selected treatment supporters’ approach in South Africa (Nachega et al., 2016). Overall, however, privacy violation concerns in SMS interventions are a critical challenge, calling for further exploration.

4.3. SMS interventions, ‘goodness of fit, and care

Our findings demonstrate that the experienced value of the SMS intervention arose in interaction with participants, and pre-existing practices. A ‘goodness of fit’ was created in resonance between the SMS intervention and: a) existing social structures that made it difficult for clients to access care, and the use of phone-based care to bridge this gap; b) norms and care practices that bolstered maintenance of client-provider bonds and client recognition.

Our findings affirm Pols’ (2012) sentiment that ‘fitness’ happens as participants modify a technology (intervention design) to fit their local realities and practices. In our study, this strengthened the quality of phones as caring devices and enhanced engagement with PMTCT care. However, a ‘goodness of fit’ was not created in all aspects of PMTCT care

and engagement. Echoing existing evidence, clients described the multitude of obligations and roles they would carry, including socio-structural challenges such as finance, stigma, and fear of social exclusion (Topp et al., 2018) which would inhibit care engagement. HCPs facing their own socio-structural challenges, did their best to mitigate these through psychosocial and fiscal support beyond official work hours. Despite its design and being free of cost, these challenges were at best only downplayed through the SMS intervention.

Previous studies have highlighted the need to consider existing care models in mHealth designs either via co-designing interventions with targeted users (Bally & Cesuroglu, 2020) or by performing workflow analyses to identify functions that can be supported by mHealth (Lindberg et al., 2019). A recent Kenyan study (Karlyn et al., 2020) and a systematic review of evidence on barriers and facilitators of mHealth interventions in Africa stress the importance of adapting such strategies to existing clinical care models and cultures ensuring buy-in, efficiency, acceptability, and sustainability (Aranda-Jan et al., 2014). Our findings speak to emerging evidence (Dicarlo et al., 2018; Omonaiye et al., 2018; Topp et al., 2018) and recommendations (UNAIDS, 2021) that combination interventions acknowledging the importance of social relations and targeting both social and structural factors are the future for strengthened and improved PMTCT care engagement.

4.4. Study limitations

This study has several limitations. First, as with all small-scale qualitative inquiries, one should be mindful in generalizing findings beyond our study setting. Only clients with cellphones attending the study facilities were included, excluding voices from women outside the PMTCT care system and without access to cellphones. We also view data as being co-constructed, subject to potential recall- and social desirability-bias, yet mitigated through substantial training in interview techniques. Second, while we acknowledge the importance of other PMTCT facility practices, such as male engagement and support groups, our findings relate to those directly influenced by the SMS intervention as perceived by HCPs and clients. Third, it is beyond this study to confirm any changes to actual PMTCT retention, but forthcoming trial results suggest that the WelTel SMS intervention had no effect on PMTCT retention 18 months postpartum (Nordberg et al., 2022). Finally, while our findings indicate that the SMS intervention enhanced PMTCT care engagement, it is beyond the scope of the study to assess whether this engagement prevailed in the long-term.

5. Conclusions

PMTCT care engagement remains a challenge in Kenya and other SSA countries. Our findings indicate that the potential of the WelTel SMS intervention to strengthen the quality of phones as caring devices and enhance engagement with PMTCT care arose in interaction with participants and pre-existing practices, including those that are less than ideal. This affirms Pols' argument that the success of mHealth interventions may be contingent on their 'goodness of fit' with, and contributions to, pre-existing care practices and resources.

PMTCT policies, including phone-based defaulter tracing, may benefit from the introduction of a routinised and interactive SMS service to facilitate faster care, extended reach and strengthen relations between women in PMTCT care and their care providers. In the strive towards 'goodness of fit, such policies should be co-developed with their target audience.

We call for further studies to explore the interaction between mHealth interventions and local settings beyond mere acceptability and retention, to understand their potential in shaping continuity of care, sustainability and scalability.

Declaration of competing interests

None.

Availability of data and materials

The data that support the findings of this study are available on request from the corresponding author, Katrine de Angeles. The data are not publicly available due to restrictions [e.g., containing information that could compromise the privacy of research participants].

Funding

Open access funding provided by the Karolinska Institute. The study was funded by European-Developing Countries Clinical Trial Partnership (EDCTP) and The Swedish Research Council (Vetenskapsrådet). Support for KDA included grants from Karolinska Institutet. Funding bodies had no role in the design of the study, data collection, interpretation of data nor in writing the manuscript or decision to submit results.

CRediT authors contributions

Katrine De Angeles: Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft, Writing - review and editing. **Phoene Oware:** Formal analysis, Writing - original draft, Writing - review and editing. **Edwin Were:** Project coordination as primary investigator for the WelTel PMTCT study, Writing - review and editing. **Anna Mia Ekström:** Funding, Project coordination as primary investigator for the WelTel PMTCT study, Writing - review and editing. **Morten Skovdal:** Conceptualization, Formal analysis, Supervision, Writing - review and editing. **Anna Kågesten:** Conceptualization, Supervision, Writing - review and editing.

Acknowledgements

We extend our gratitude to the staff at the participating facilities and women living with HIV who kindly shared their experiences with us. We would also like to thank our research assistants, study coordinator, and transcriber for their contribution to the study. Finally, we thank additional WelTel team members who provided fruitful comments and inputs to this study.

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