

Perceptions of SMS content for Pregnant and Postpartum Kenyan women Infected with HIV

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A Thesis

submitted in partial fulfillment of the
requirements for the degree of

Master of Public Health

University of Washington

2017

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Program Authorized to Offer Degree:

Department of Health Services

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Abstract

Perceptions of SMS content for HIV-infected pregnant and postpartum Kenyan women

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Background: Efficacy of Antiretroviral Therapy (ART) depends largely on treatment adherence, which has been a critical issue among pregnant women in Kenya. Mobile health technologies (mHealth) have been proposed as one approach that may help individuals optimize treatment adherence. Previous studies have shown the efficacy of Short Messaging Services (SMS) to improve ART adherence, but very few studies have looked at the impact of SMS on ART adherence within the context of Prevention of Mother to Child Transmission (PMTCT).

Objective: This qualitative study explores women's preferences for SMS content related to engagement in HIV care, and maternal and child health (MCH), during and after pregnancy.

Methods: Ten focus group discussions (FGDs) were conducted with HIV infected pregnant women seeking antenatal care services, or HIV positive postpartum women who had an uninfected child ≤ 2 years at three sites in Kenya. All transcripts were coded using Dedoose software. Transcripts were reviewed by three independent reviewers to ensure reliability of data interpretation. Transcripts were analyzed using a combination of deductive and inductive

approaches to characterize women's perceptions of SMS content.

Results: Women viewed SMS as an acceptable strategy to facilitate engagement in HIV care.

Participants desired message content that was educational, encouraging, and provided reminders to take medication or attend clinic. Participants additionally desired content related to more general maternal and child health categories. Participants indicated that SMS could assist with status acceptance and disclosure, improve patient-provider relationships, and provide support and encouragement while dealing with HIV related challenges.

Conclusion: Our results suggest some of the ways SMS could be used to encourage and support HIV infected pregnant and postpartum women remain in care, stay on treatment, and care for themselves and their children.

Keywords: HIV, ART, PMTCT, mobile health, SMS, adherence, stigma, disclosure, engagement in care, maternal and child health outcomes

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List of Acronyms

ANC	Antenatal Care
ART	Antiretroviral Therapy
CCC	Comprehensive Care Clinic
EID	Early Infant Diagnosis
FGD	Focus Group Discussion
HIV	Human Immunodeficiency Virus
IDI	In depth interview
MCH	Maternal Child Health
PMTCT	Prevention of Mother to Child Transmission of HIV
SMS	Short Messaging System

Acknowledgements

I would like to thank the women in the FGDs for courageously voicing their stories, and making this study possible. I would also like to express my deepest gratitude to Kirsten Senturia, Alison Drake, Keshet Ronen, and Kristin Beima-Sofie for the ongoing involvement, invaluable feedback and guidance through each stage of this study. I have learned so much from each of you, and I could not have asked for a more supportive group of mentors.

Background

Globally, over 90% of pediatric HIV infections are attributed to mother-to-child HIV transmission (MTCT) with 150,000 new infant HIV infections occurring in 2015 alone.ⁱ Despite the success of maternal Antiretroviral Therapy (ART) for prevention of MTCT (PMTCT) interventions in reducing MTCT, HIV prevalence in Kenya remains high at 5.9% and there are 13,000 new infant HIV infections annually.ⁱⁱ Efficacy of ART depends largely on treatment adherence, which is a critical issue among pregnant women. This has been described as the “maternal ART cascade” in which barriers to ART adherence stem from an interplay of sociocultural and structural factors.ⁱⁱⁱ Women in Kenya are disproportionately affected by the HIV epidemic due to structural inequalities such as gender inequality and lack of economic power, which serve as barriers to accessing care. It is therefore imperative to identify and assess these barriers to improve maternal and child health in Kenya. Nationwide, key strategies of PMTCT include efforts to increase knowledge of PMTCT, improve male involvement, and achieve universal attendance of pregnant women at antenatal clinics.^{iv}

Mobile health technologies (mHealth) have been proposed as one approach that may help individuals optimize HIV treatment adherence, but have not been evaluated among HIV-infected pregnant or postpartum women specifically. While there are many impediments to ART adherence in the general population, there are several challenges unique to HIV-infected pregnant and post-partum women. These include health systems challenges (e.g. ART services and MCH services provided in different care settings) as well as individual challenges (e.g.

patient readiness).^v Previous qualitative research has shown that women in Kenya are interested in mHealth strategies for receiving counseling, support services and health education.^{vi}

Therefore, we hypothesize that mHealth strategies that employ culturally and socially appropriate messages have the potential to greatly improve the PMTCT-ART outcomes. This project uses qualitative methods to evaluate HIV-infected pregnant and postpartum women's perceptions of mHealth technologies to optimize ART adherence.

Mobile Health

Kenya is one of the fastest growing mobile phone subscription markets. In 2015, there were over 37 million mobile-cellular telephone subscriptions in Kenya, equating to over 80 telephone subscriptions per 100 inhabitants.^{vii} The nation's familiarity with the use of mobile phones, and strong coverage in rural areas, lays a solid framework for implementing mHealth projects. Mhealth has been identified as having potential for tremendous impact on health systems strengthening, through improved service delivery, dissemination of health information, and a reduction in response time during crises.^{viii} With the rise of mobile technology utilization, mHealth may have the capacity to improve the health system in Kenya, and greatly reduce MTCT.

SMS to improve ART adherence

Previous studies have shown short messaging services (SMS) can greatly improve ART adherence. The World Health Organization has also included text message reminders as a strong

recommendation “for promoting adherence to ART as part of a package of adherence interventions”.^{ix} As a user friendly and inexpensive methodology, there is growing evidence that SMS can be used to improve ART adherence in sub-Saharan Africa.^x Several randomized control trials (RCTs) have evaluated SMS reminders as a strategy to improve adherence and viral suppression. One network meta-analysis looked at 14 RCTs to assess the impact of SMS on ART adherence.^{xi} One RCT conducted in this meta-analysis took place in Kenya, and compared short weekly text messages to standard care. Results from this RCT showed that SMS reminders reduced risk of non-adherence and non-occurrence of virologic failure at 1 year.^{xii}

Previous qualitative research to assess perceptions of SMS delivery found that patients were generally acceptable of SMS, but had specific preferences around content. A qualitative study conducted in Cameroon found that patients preferred SMS content that was ambiguous, such as friendly reminders or motivations to take care of their health, or greetings from providers’. In addition, they preferred to receive messages at least once per week.^{xiii} Additionally, a qualitative study among youth in Uganda found that participants desired SMS, and indicated that it ensured confidentiality of their HIV status. Furthermore, they stated that SMS could improve ART adherence by means of social support and providing them with needed reminders.^{xiv}

Gaps in the Data

While studies have shown the efficacy of SMS to improve ART adherence, very few focus on adherence within the context of PMTCT. One systematic review of 34 studies of interventions to reduce MTCT, examined the interventions to improve PMTCT service delivery, including mobile

phone-based reminders. This study found SMS may have an impact on the uptake of early infant diagnosis (EID), but they indicated the need for stronger evidence and comprehensive analyses of SMS delivery to improve PMTCT.^{xv} Additionally, data are lacking on preferences for SMS content among HIV infected pregnant and postpartum women. One study in South Africa examined acceptability and feasibility of SMS as an intervention for PMTCT-ART, but did not evaluate preferences for SMS content.^{xvi} There is strong need for qualitative research to address these barriers and concerns over patient confidentiality to determine the most effective means of communication. In this qualitative study, we aimed to characterize HIV-infected women's preferences for SMS content related to engagement in HIV care, and maternal and child health (MCH), during and after pregnancy.

Methods

Study Design and Framework

We conducted a qualitative study to inform the design of an intervention for the Mobile WACH-X study, a triple-arm non-blinded RCT designed to assess the impact of SMS messaging on adherence, retention and outcomes in PMTCT-ART programs in Kenya. These data were collected as part of the formative phase of the study, which included two rounds of data collection with three different study populations conducted between January and June 2015. This phase included: 10 FGDs with HIV-infected peripartum women, (the target of the SMS intervention), 15 individual interviews (IDIs) with male partners of HIV-infected peripartum women, and 30 IDIs with healthcare workers involved in the care of HIV-infected peripartum women. The objectives of the first round of the formative phase were to determine acceptability

of pre-developed SMS, and elicit ideas for additional messaging themes. Information from the first phase of qualitative investigation was used to refine message content. Refined message content was presented to women during a second round of FGDs with HIV-infected women. This analysis focuses on the information gathered during the women's FGDs. Institutional Review Board approval was obtained from the Kenyatta National Hospital/University of Nairobi and University of Washington. All participants provided written informed consent.

Participant Characteristics

FGDs were comprised of HIV-infected pregnant women seeking antenatal care services, or HIV-infected postpartum women who had an uninfected child ≤ 2 years. Overall, 87 women participated in the 10 FGDs. Women were eligible to participate if they: were ≥ 14 years of age, were HIV infected and pregnant or postpartum, had daily access to a mobile phone, were willing to receive SMS, and were willing to provide informed consent. Socio-demographic information was also captured, including age, marital status, educational level, employment, number of children, and partner HIV status. Sixty-six percent of women were postpartum. The majority (69%) had previously used ART for PMTCT or their own health, 21.8% used ART for only PMTCT, and 9.2% were ART inexperienced. Lastly, 55.2% of women were unemployed, and 57% had never attended secondary school.

Recruitment

All FGD participants were recruited by study staff member, from public sector antenatal care clinics (ANC), comprehensive care clinics (CCC), and maternal child health clinics (MCH) at three sites in Kenya, two in the Nyanza region and one in Nairobi. Women were purposively sampled based on their experience with PMTCT-ART, and pregnancy/postpartum status, to provide a range of experiences and perceptions.

Data Collection

FGDs were conducted using a semi-structured interview guide. Discussion guides included three main topic areas: 1) challenges attending clinic and adhering to ART, 2) using SMS to support adherence, and 3) perceptions of specific message content to guide message refinement.

Participants were asked to provide feedback on messages from four content areas including adherence without mentioning HIV, breast-feeding, family planning, and overt HIV-related messages. Pilot messages were read aloud by the facilitator. Additionally, participants were probed for additional message content they would like to receive that was not included in the initial pilot messages. FGDs were conducted in Kiswahili and Dholuo, depending on the participant's preference. FGD's ranged from 90 to 130 minutes and were audio recorded, transcribed, and translated into English by a Kenyan Social Scientist, fluent in all three languages.

Data Analysis

All transcripts were uploaded into Dedoose (version 7.6.6) software. Data analysis was conducted by three independent reviewers to ensure reliability of data interpretation. The initial codebook was inductively generated after reading four FGD transcripts, two provider IDIs and two male IDIs, and reviewed by two research scientists (KBS, KR) to ensure consistency between individual applications of codes and to capture any missing themes. Team members (KBS and KR) independently applied this codebook to four different transcripts (one FGD and one IDI each) that were not used to create the initial codebook. This iterative process required continually applying the codebook to a new set of transcripts until the team reached consensus on a final set of themes and categories from the data. Following codebook development, pre-coded transcripts were cleared and blindly coded. JF primary coded six FDG transcripts, and KBS and KR each primary coded two. Next, transcripts were exchanged for secondary coding. Following the completion of secondary coding, the team met to resolve any disagreements on the application of codes between primary and secondary coding rounds. The final product of the codebook included 154 codes. This analytic framework focused on challenges living with HIV, current resources/strategies used to engage in HIV care, preferences around specific SMS content, and benefits/challenges to using SMS to engage in HIV care. See Appendix A for the codebook outline.

This study takes a thematic analysis approach with a combination of inductive and deductive analysis.^{xvii} Completing the coding process subsequently led to running code reports of the most prominent codes, while looking at co-occurrence to view the frequency of such codes in relation to one another. A “within case” and “across case” case analysis was done to enhance the scope of our analysis.^{xviii} Lastly, a thematic document was created to outline major themes embodied

throughout the queries, and to help formulate a conceptual diagram to show relationships between themes.

Results

The conceptual diagram (Appendix B) depicts themes that were included in the interview guide, as well as themes that emerged spontaneously in the FGDs. The diagram shows how SMS messages can address the challenges women experience in receiving HIV care, and outlines the potential pathway through which SMS strategies can impact immediate outcomes. Women were specifically asked about challenges associated with ART adherence, strategies to overcome those challenges, and preferences around specific SMS content. However, these questions prompted discussion around additional challenges, strategies, and thoughts on how SMS could ultimately lead to improved health outcomes. Women felt SMS could lead to feeling cared for and supported which are shown as “immediate outcomes” in the conceptual diagram. Women also indicated that SMS could foster improvements in engagement with HIV care, and improvements in maternal and child health, which we categorized as improved long term outcomes.

Women’s discussions of desired SMS content highlighted three types of messages, with different perceived functions: education, encouragement, and reminders to take medication and attend clinic.

SMS Reminders

Women expressed desire and overall acceptability towards receiving SMS reminders to attend clinic and take medications. They conveyed that SMS reminders would serve the purpose of improving ART adherence, because they often forgot to take medication or attend clinic, regardless of their clinic reminder card. Women stated that forgetfulness was heightened during pregnancy or post-partum due to added stressors in their daily routine such as caring for their newborn. One participant explained:

“[Y]ou may forget; you are supposed to take medicine at the right time, and the baby is crying you cannot even find time to take medicine, you may forget.” (Post-partum woman, ARV for more than PMTCT)

Women also described negative interactions and feeling stigmatized by their health care providers, if they missed a clinic appointment or delayed seeking HIV care. However, women commented that SMS reminders could help avoid conflict with providers by remembering to attend scheduled appointments. One woman indicated:

“If you confuse your dates for coming to the clinic you become afraid that you will be asked why you defaulted and you may not convince the medics that you confused the dates so that may make you to fail completely to go pick your drugs. You will wait to see what you can do yet the time continues to pass then when you come too late, it gives you problems at the hospital.” (Pregnant woman, ARV for more than PMTCT)

Many women stated that, compared with in-person visits, SMS made it easier to engage with providers and ask questions they were not comfortable asking in person. Women also commented that provider-patient relationships were a major challenge of living with HIV, because negative interactions discouraged them from attending clinic. Thus, women's perception that SMS could improve engagement with providers suggests it could help overcome these barriers to care. We inferred that this improved engagement in care could subsequently lead to improved provider-patient relationships, which were indicated as a major challenge of living with HIV and a barrier to engaging in care.

While women recognized SMS as a valuable reminder to take medication, some women additionally spoke of ways their spouses or children provided reminders. Some said that if their husband was supportive of their status, or was also on ART then he was a viable resource for helping with ART adherence or clinic attendance. However, this finding was only among some of the women in the FGDs since many women had not disclosed to their family. During discussions on the role of family in reminding women to take ART, women frequently expressed the importance of accepting their status and disclosing it, highlighting the importance of disclosure as a supportive factor for engaging in HIV care. A woman highlighted this importance:

“when you live with people you have to disclose to them that you take medicine, because I have time for taking medicine and even when I forget my husband will remind me, “you have not taken medicine” and I will tell my children to bring for me the medicine. That means you should be free.” (Pregnant woman, ARV for PMTCT)

In addition to ART and PMTCT-related reminders, women desired SMS related content related to MCH. They thought reminders to attend ANC visits and reach out to the clinic staff if they experienced any pregnancy complications would be helpful. Barriers to engaging in MCH services included forgetting to write down appointment dates or losing clinic cards. When asked about their preferences for reminders, women stated they preferred SMS reminders over calling or clinic cards, and thought there was greater potential for SMS to improve both health outcomes and patient-provider relationships.

SMS reminders were universally accepted by women; yet, there were differences in their preferences for overt or covert language on HIV related content, primarily because some women had not disclosed their status. Women who had disclosed to their partner were willing to receive SMS that included explicit HIV SMS, with terms such as “ART”, “HIV” “CD4” or “CCC”. In contrast, women who had not disclosed preferred covert messages such as “take time for your health each day” over explicit HIV-related vocabulary. Women indicated that vague phrases would still remind them to take medication, without the potential of inadvertent disclosure to others who may see their phone and this risk was more pronounced among women who share a phone. Generally, the term “medication” was acceptable since women felt this referred to many types of medication and would not disclose their HIV status.

Encouraging SMS Content

Encouraging message content was strongly preferred among women. Women indicated wanting motivational SMS content to help them engage in HIV care, to accept their status, and to have a positive outlook for themselves and their babies. As depicted in the conceptual diagram, encouraging messages can be directed towards many challenges faced by HIV-infected pregnant and postpartum women. These challenges were predominately noted as stigma, status acceptance, disclosure, lack of support, and ART adherence.

While much of the discussion around encouraging SMS was related to engagement in HIV care, many participants desired general encouragement around health and wellbeing. Participants wanted encouraging SMS that encompassed living a healthy and positive life while pregnant or post-partum, rather than encouragement specific to HIV-related challenges. There was frequent discussion about SMS content to remind women to stay strong and positive for their children, and to not “lose hope”. Some women desired SMS content that encouraged them to give birth to a healthy baby and to maintain infant health by attending clinic, and checking in with their providers. Women frequently mentioned that they would feel “happy” and “encouraged” if they received an SMS by their provider, even if it was a simple check to ask about potential challenges they may be facing. One participant stated:

“It will help to encourage me that someone concerned about me by taking their time to send the messages it costs you and I get help. So I think that it helps to encourage knowing that someone somewhere is concerned and has accepted me”. (Pregnant woman, ARV for PMTCT)

During FGDs, women were asked if there was other specific content that would be helpful to include in the SMS. Overall, women desired messages that encouraged them to disclose to their partners. While disclosure and fear of partner rejection were cited as a major challenge to HIV care, they were simultaneously viewed as strategic for achieving status acceptance and combating internalized stigma. Women mentioned that if they had disclosed to their partner and were in a supportive relationship, they could rely on their partners to remind them to adhere to ART. One woman expressed this importance:

“disclosure and accepting your status will keep you free, people are afraid like now if my alarm goes off, you do not know what is in my bag but some people are afraid that so and so will see what I put in my mouth but if you’re free then you will even ask for water to take your drugs”
(Post-partum woman, ARV for more than PMTCT)

Women also emphasized that disclosure could encourage partners to get tested, which could lead to a more encouraging and supportive relationship:

“you must find ways of reaching out to him so that you can go for partner testing, you can pretend that you do not know your status and even feel hurt by finding out that you have tested positive then you can start taking the drugs together reminding each other of times for taking drugs but you must wisely reach out to him”. (Pregnant woman, ARV for more than PMTCT)

Many women mentioned that stigma inflicted by partners, family members, and the community often led to feelings of hopelessness, frustration, and fear of being seen at the HIV clinic. Stigma

was cited as a barrier to engaging in care, particularly in the context of being seen at the HIV clinic. One participant explained:

“[S]ometimes it is because of fear because when you come for your drugs you meet your neighbors or someone who knows you and you do not want them to see you and such can make you to be afraid of coming to take your drugs”. (Pregnant woman, ARV for more than PMTCT)

Participants expressed that support and encouragement would help them combat stigma, and support could be delivered through encouraging SMS. Women often stated that they wanted SMS to provide them with advice on how to discuss HIV and ARV use with their partners. One woman said SMS could potentially serve as a catalyst to engage in conversation with partners and family:

“I can say that it can help, my husband has refused to accept but he helps me financially when I have hospital appointments so I think that the SMS can help if I give him to read he can be encouraged and he may decide to come out and know his status”. (Post-partum woman, ARV for PMTCT)

The data suggest that encouraging messages may enable women to counteract stigma, achieve status acceptance and even help with disclosure, which could help. Overcoming stigma and shame with the support of SMS could help, women remain engaged in HIV care and improve MCH outcomes.

Educational Content

Participants expressed desire for educational messages to fill gaps in their knowledge and understanding about HIV care and MCH. Specific to HIV-related content, women wanted SMS that explained common ART side effects, routes of MTCT, and MTCT precautions. One participant stated:

“since they know how certain drugs may react with someone they should let you know of the possible side effects of certain drugs by SMS so that when you see any of such affects you come to the clinic immediately for help”. (Pregnant woman, ARV for PMTCT)

One of the messages tested asked about ART side effects, which prompted conversation around normal versus abnormal side effects- a differentiation many women were confused by. Many participants said they would like to be educated through SMS about common ART side effects so they know what to expect and not to be afraid. They also wanted SMS to provide directions on when and what to eat to minimize side effects. Additionally, participants wanted educational content about the benefits of ART for both mothers and infants, and guidelines of PMTCT.

“I would like to know what I can do so that my child is born negative and how to take care of him so that he grows up HIV negative”. (Post-partum woman, ARV for more than PMTCT)

Beyond HIV care and PMTCT, women showed a strong desire for more general educational content related to MCH. They were particularly interested in SMS on breastfeeding practices, the weaning process, signs of a healthy newborn and the importance of hospital delivery.

“I think you should advice women to deliver in the hospital, and to breastfeed for 6 months, and if you see any problems you should go to the hospital early” (Post-partum woman, ARV for more than PMTCT)

Women in the FGDs wanted guidance on the best practices to promote infant health during pregnancy and postpartum, and they felt this guidance could be effectively delivered through SMS. This suggests that SMS has the potential to bridge gaps in lack of knowledge and misconceptions around HIV care but also a larger scope of MCH practices.

Discussion

Our qualitative analysis explores the lived experience of HIV-infected pregnant and postpartum women, and reveals specifically how SMS may help support pregnant or post-partum living with HIV. Women in our study thought SMS could be used to augment their other efforts to address challenges of living with HIV. Woman indicated that SMS would help them feel supported, encouraged, and help bridge the gap to engagement in HIV care and improved MCH outcomes.

Our data suggest that women’s perceived potential benefits from SMS include; improved knowledge, feeling cared for/supported, improved self-efficacy and confidence, and improved

patient-provider relationships. Women indicated they would gain confidence and attain social support if they received encouraging messages from providers, which could help them overcome feelings of isolation and internalized stigma. Our data also suggests that using SMS as a support system may result in status acceptance which may promote status disclosure. Women mentioned they were more likely to engage in HIV care and adhere to medication if they could accept and disclose their status. Disclosure was commonly mentioned as a strategy to engage in care, hence women wanted encouraging messages to support the disclosure process. This therefore suggests that the use of SMS may serve as a catalyst to engage in conversation with partners and family, and eventually improve HIV and MCH health outcomes.

We found that women's HIV status does not fully define their experience as a pregnant or postpartum woman, and that while HIV related messages (covert or overt) were desired by the majority of women in our study, women also had a strong desire for more MCH messages that were unrelated to their HIV status. Messages that extended beyond HIV specific content, were both acceptable and desirable to women in the focus groups (with a few exceptions of wording). These MCH messages included diverse content from family planning, to ANC visits, to exclusive breastfeeding. The overwhelming desire and acceptability of SMS suggests SMS may be a viable intervention to improve maternal engagement in HIV and MCH care. While SMS alone, cannot overcome all the HIV-related challenges women face, it may be a powerful tool to mitigate some challenges, and help HIV-infected pregnant or post-partum feel supported and cared for.

Our study had several strengths. The qualitative study design allowed for depth of understanding on perceptions of SMS and preferences for SMS content that could be tailored and specific to HIV-infected pregnant and postpartum women. We purposively sampled both pregnant and postpartum women with a range of ART or PMTCT experiences and status disclosure, which allows for a breadth of perspectives. Using qualitative methods to assess SMS in the context of PMTCT provides new insight because this context is scarce throughout the literature.

However, our study was also subject to some limitations. Study findings may not be generalizable to other settings or women with different socioeconomic characteristics. In addition, our study is subject to social desirability bias since FGD participants may feel uncomfortable with discussions in a group setting; however, all participants were counseled on discussing sensitive topics prior to providing consent, which may limit potential for bias. A limitation to the use of SMS, would be inadvertent status disclosure. Careful consideration of women's preferences and language in SMS, is needed to avoid status disclosure.

Previous qualitative research indicates that participants have strong desirability and acceptability of HIV-related SMS content to improve ART adherence. Our study highlights this finding, and further suggests that SMS can be uniquely tailored towards HIV-infected pregnant and postpartum women, to help them improve engagement in HIV and MCH health outcomes. Prior to our analysis, we did not expect women to identify SMS as a strategy to improve provider-patient relationships, or to serve as a catalyst to engaging in conversation with their partners. We additionally did not expect women to desire content beyond the focus of PMTCT, including

simple encouraging messages. This study uniquely depicts women's preferences for SMS content, and suggests that SMS may improve health outcomes beyond the context of PMTCT.

This study can inform future SMS interventions by providing recommendations to message content. Based on feedback provided by the FGDs, recommendations for finalizing message content would be to incorporate encouraging content that make women feel supported by their providers, as this was frequently desired among participants. Additionally, it is best to keep phrases covert, rather than explicit HIV related language, or to tailor content to the recipient's disclosure status. Vague phrases such as "remember to take your medication" or "take time for your health" were acceptable among women. These phrases minimize the risk of status disclosure, while still serving as a reminder to take medication or attend clinic. With careful consideration of SMS content development and delivery, SMS can be used to support HIV infected pregnant and post-partum women remain in care, stay on treatment, and care for themselves and their children.

APPENDICES

A. Codebook

1.0 Challenges of Living with HIV

1.1 Disclosure

- 1.1.1. HIV Status
- 1.1.2. Medication (ARV) use

1.2 Lack of Support

- 1.2.1. Partner
- 1.2.2. Family (non-partner)
- 1.2.3. Emotional Support
- 1.2.4. Other support

1.3 Stigma

- 1.3.1. Community learning HIV Status
- 1.3.2. Family Shame
- 1.3.3. Negative HCW interactions

1.4 Breastfeeding

1.5 ART Adherence

- 1.5.1. Forgetfulness
- 1.5.2. Side effects
- 1.5.3. Structural barriers
- 1.5.4. Religious barriers
- 1.5.5. Awareness
- 1.5.6. Misconceptions
- 1.5.7. Child no longer at risk

1.6 Status acceptance

2.0 Resources/Strategies for ART Adherence

2.1 Personal Relationships

- 2.1.1. Partner
- 2.1.2. Children
- 2.1.3. Friends/community/family
- 2.1.4. HCWs

2.2 Faith

2.3 Knowledge

2.4 Devices

- 2.4.1. Radio
- 2.4.2. Phone (alarm)
- 2.4.3. Clinic Card

2.5 Other

2.6 Status disclosure

3.0 SMS Use

3.1 Benefits

- 3.1.1 Remove geographic barriers
- 3.1.2. Strengthen provider trust
- 3.1.3. Provide reminders
- 3.1.4. Improve test result turnaround
- 3.1.5. Provide information
- 3.1.6. Improves Provider Communication
- 3.1.7. Catalyzes conversation with partner/family

3.2 Challenges

- 3.2.1. No credit
- 3.2.2. No battery (phone)
- 3.2.3. Low/no literacy
- 3.2.4. Phone sharing- disclosure risk
- 3.2.5. Phone sharing- other

3.3 Competency

3.4 Male partner willingness

- 3.4.1. Self-receive message
- 3.4.2. Female partner receives

3.5 Provider perceptions

- 3.5.1. Improves workflow
- 3.5.2. Increases workload

4.0 SMS Preferences

4.1 SMS vs Calling

- 4.1.1. Prefer SMS
- 4.1.2. Prefer Calling

4.2 SMS Frequency

4.3 Unidirectional vs. Bidirectional

- 4.3.1. Prefer Unidirectional
- 4.3.2. Prefer Bidirectional

4.4 HIV Specific Messaging

- 4.4.1. Depends on the specifics of the recipients' situation
- 4.4.2. Prefers overt message
- 4.4.3. Prefers covert message

4.5 Including Partners

- 4.5.1. Approval
- 4.5.2. Disapproval

4.6 Personalization

5.0 SMS Content

5.1 Reminders

- 5.1.1. Medication Reminder- take meds
- 5.1.2. Exclusive Breastfeeding
- 5.1.3. HIV clinic/refill dates
- 5.1.4. ANC visits
- 5.1.5. General Health

5.2 Encouragement

- 5.2.1. Living positively with HIV
- 5.2.2. Status acceptance
- 5.2.3. Build motivation to engage in HIV care

5.3 Educational

- 5.3.1. Common Opportunistic Infections
- 5.3.2. PMTCT Precautions
- 5.3.3. ART Side effects
- 5.3.4. Progress & CD4 count
- 5.3.5. Infant Health
- 5.3.6. Hospital Delivery
- 5.3.7. General HIV/health
- 5.3.8. Medication during pregnancy
- 5.3.9. Maternal nutrition
- 5.3.10. ART/adherence benefits

5.4 Message Clarity

- 5.4.1. Clearly understood
- 5.4.2. Not understood
- 5.4.3. Message clarification

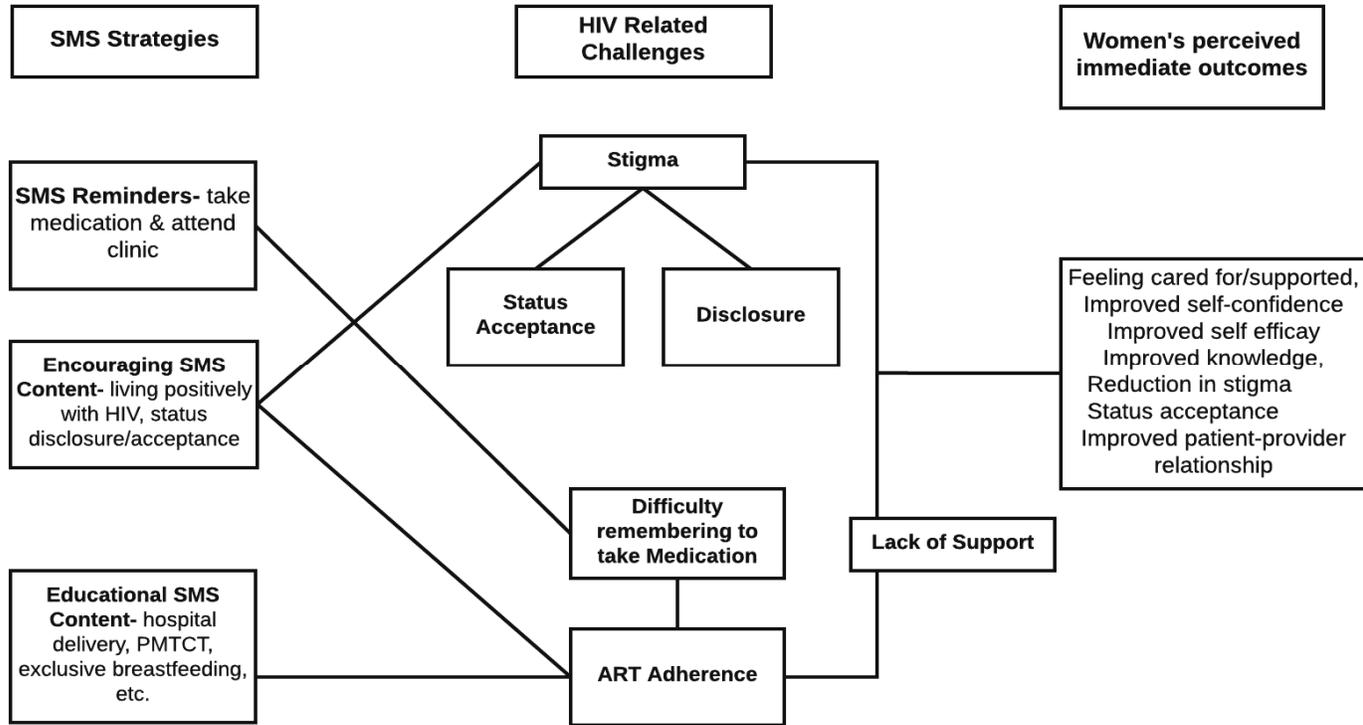
5.5 Message Acceptability

- 5.5.1. Acceptable
- 5.5.2. Unacceptable

6.0 SMS Message Number

Messages 1-30

B. Conceptual Diagram



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