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Development and Preliminary Pilot Testing of a Peer Support Text Messaging Intervention for HIV-Infected Black Men Who Have Sex with Men

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Abstract

Background—Black men who have sex with men (MSM) are disproportionately infected with HIV, and are less well retained along the HIV continuum of care. We report on the feasibility of a peer support text messaging intervention designed to increase retention in HIV care and HIV medication adherence among HIV-infected Black MSM.

Methods—Based on formative research, a cellphone app was developed to support a peer-based text messaging intervention. The app allowed the researchers to view text messages sent between mentors and mentees, but did not allow them to view other text messages sent by these phones. Three HIV-infected Black MSM were recruited to serve as volunteer peer mentors. They were trained in motivational techniques, peer support skills, and skills for improving appointment attendance and medication adherence. Mentees ($N = 8$) received the intervention for one month. Mentees completed a post-intervention survey and interview.

Results—The peer mentor text messaging intervention was feasible. Mentors delivered support in a nonjudgmental, motivational way. However, technical and other implementation problems arose. Some mentees desired more frequent contact with mentors, and mentors reported that other commitments made it difficult at times to be fully engaged. Both mentors and mentees desired more personalized contact (i.e., phone calls).

Conclusions—A text messaging peer mentor intervention was feasible. Additional research with a larger sample is needed to determine optimal ways to improve mentors' engagement in the intervention, as well as to determine intervention acceptability and efficacy. In future studies, peer support phone calls could be incorporated.

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Keywords

men who have sex with men; retention in care; ART adherence; continuum of care; mobile technology-based interventions

Introduction

HIV remains a significant public health problem in the United States, with 1.2 million Americans living with HIV infection in 2013.[1] The majority of individuals infected with HIV are men who have sex with men (MSM); MSM account for approximately two thirds of new infections each year, with the most new diagnoses occuring among Black MSM.[2]

For HIV-infected individuals, achieving viral suppression is associated with improved health and longevity, as well as reduced risk of transmitting HIV.[3–8] To achieve viral suppression, individuals must be tested for HIV, linked to care, retained in care, prescribed antiretroviral therapy (ART), and adherent to ART. Due to dropout at each point on this continuum of care, only 55% of people infected with HIV in the U. S. are virally suppressed;[1] however, the percentage of HIV-infected individuals who are virally suppressed increases to 79% among those retained in medical care and who are taking ART.[9] Thus, improving retention in care, as well as medication adherence, are critically important to improve health among HIV-infected individuals.

There are racial disparities in retention in care and medication adherence; 38% of Black MSM are estimated to be consistently retained in care, compared to 49% of Whites and 50% of Hispanics.[10] Furthermore, some studies (although not all) have found racial disparities in ART adherence.[11] These racial disparities in retention and adherence may help to explain racial disparities in viral suppression and HIV-related morbidity and mortality: it is estimated that 41% of Black individuals are virally suppressed,[9] HIV-related deaths are highest among Blacks,[12] and survival time after diagnosis is lower on average for Blacks than for other racial/ethnic groups.[13] Among MSM specifically, rates of viral suppression are lower for Black MSM compared to White MSM.[14]

There are numerous barriers to delivering interventions to Black MSM who are infected with HIV, including stigma surrounding same sex sexual behaviors and HIV diagnosis,[15–17] difficulty attending appointments due to lack of transportation, poor health, and other life challenges,[18] and the cost of delivering interventions with enough frequency to keep men engaged and adherent during the long periods of time between medical appointments. Mobile technology-based interventions overcome many of these barriers; mobile technology obviates the need to travel to attend intervention sessions, and allows for anonymously-delivered interventions that may be provided frequently and at low cost.

Few studies have investigated the use of mobile technologies to improve retention in HIV care among individuals living in the US. One exception is the work of Smillie and colleagues (2014), who conducted a qualitative study of a mobile phone text messaging intervention in which participants were sent weekly texts asking how they were; responses classified as requiring follow-up triggered a text or phone call from clinic staff. This study

demonstrated that the intervention was valued primarily as a means of accessing social support.[19] Several additional mobile technology-based interventions addressing retention in HIV care are currently under development,[20] including those that utilize text messages. For example, Christopolous and colleagues report on a protocol design for a study comparing the utility of text message appointment reminders and text message appointment reminders combined with thrice-weekly standardized motivational and informational text messages.[21]

Several studies have used mobile technology to improve HIV medication adherence. The majority of these studies have used simple text message reminders to take medication. A recent meta-analysis found that text message reminders increased adherence to antiretroviral medications for HIV-infected individuals. However, these reminders were more effective when they were bidirectional (i.e., participants could text or call back, either in response to automated reminders or to a text from clinic staff) and when they included personalized message content,[22] suggesting that interventions that go beyond simple automated reminders to include more personalized content may be more efficacious. Other mobile apps that address adherence to medication are currently in development, including those that utilize game mechanics (i.e., actual games, as well as earning “points” for each in-app activity completed which in turn grants access to more game content) and social networking features to enhance social support and sustain behavior change.[23] Data regarding the efficacy of such interventions, however, are not yet available.

Peer mentor interventions, which have long been used for HIV prevention,[24] are now being employed to improve retention in care and medication adherence among individuals infected with HIV. In a qualitative study of an HIV peer mentor intervention, mentees reported that support from HIV-infected peer mentors helped them reduce anxiety and depression and motivated treatment adherence;[25] however, quantitative intervention results have been mixed.[26,27] To date, the majority of peer mentor interventions aimed at improving the continuum of care have employed a traditional, face-to-face approach, and have not capitalized on the potential benefits of mobile technology for delivering sustained, low cost, anonymous interventions.

Findings from formative work, previously published by our team, demonstrated that HIV-infected Black MSM had access to cellphones and used cellphones frequently, including for texting. In qualitative interviews, these men reported that they preferred interventions that provided individually-tailored support, and that allowed for anonymous participation.[28] Based on this prior work, as well as the desire to monitor the content and frequency of communication between mentors and participants, and the desire to develop an inexpensive, scalable intervention, we developed a text messaging peer mentor intervention to increase retention in care and medication adherence among HIV-infected MSM. The purpose of the current small pilot study was to test the technology we developed, to assess the feasibility of using this method of intervention delivery, and to garner suggestions for improving the intervention.

Methods

Participants

Three HIV-infected Black MSM were recruited to serve as volunteer peer mentors. HIV-infected Black MSM were chosen as mentors so that they would be able to relate to and build rapport with intervention participants. We sought recommendations from clinics and community-based organizations serving HIV-infected individuals; we asked them to reach out to men who would be nonjudgmental, sensitive to participant needs, and who were natural helpers. Mentors were volunteers, rather than paid research staff, because of the extensive and burdensome research ethics training the mentors would have needed to complete to be paid research staff; much of this training was not applicable to their role as peer mentors. In addition, the use of volunteer mentors resulted in a lower cost, scalable intervention that could be implemented in a variety of settings (e.g., community-based organizations, clinics).

Eight HIV-infected Black MSM who were experiencing difficulty remaining in care or difficulty adhering to their medication were recruited as mentees. Participants had to be an HIV-infected Black MSM who had attended at least one HIV-related medical appointment (HIV-infected men who had never linked to care were not the targets of this intervention, because we thought men who never linked to care might need a more intensive intervention). Participants also had to fulfill one of the following criteria: a) missed at least one HIV medical appointment without calling their provider in the past two years; b) gone longer than seven months without seeing an HIV medical care provider in the past two years; or c) took ART less than 95% of the time during the past 6 months (assessed via self-report).

App development

Working with a software engineer, we developed an application (app) for Android devices that allowed us to capture text messages sent between mentors and mentees and securely transmit them to a database via a Python JSON webservice. Text messages sent to or received from phone numbers other than those involved in the study were ignored (i.e., not uploaded to the database and not accessible to the research team), to ensure privacy for participants, as well as to ensure the privacy of people who were not involved in and had not consented to the research.

The secure SQL database, housed on a University server, included: (a) date text was sent; (b) time text was sent; (c) phone number of text sender; (d) phone number of text recipient; and (e) content of text message. The information in the database allowed us to determine who sent the text and who received the text; how long it took mentors to respond to texts; how frequently conversations were mentor-initiated vs. mentee initiated; whether mentors were adhering to the research protocol in terms of timing and content of text messages; and the issues that mentees wanted to discuss.

A web front-end provided a secure interface for research staff to generate reports of the frequency and content of text messages. The website also offered other administrative functions, such as remotely disabling the app on a phone. Research staff could view the entire database, or could limit what they viewed to a specific date range or phone number.

The app was installed on both mentor and mentees phones, resulting in text messages being recorded twice by the system; this redundancy ensured that if an app was disabled or deleted on one of the phones, the messages would still be uploaded to the database because the app was installed on the other phone. Redundant messages were checked for by the system, and only one copy of each message was posted in the web interface accessed by the research team.

The app was designed to start automatically when the phone was turned on; participants did not need to log in to the app to use it. This decision was made because we were concerned that men would either forget or would find it burdensome to have to start up the app each time they restarted their phone. The app ran in the background and did not interfere with other applications running on the phone, allowing men to use their phones as they typically would were they not participating in a study. As the mentors and mentees had conversations via text messaging, these conversations were logged in the database for later retrieval.

Cellphones were purchased for mentors and mentees, to ensure a consistent platform on which to install the app. We encouraged participants to return at the end of study participation so we could remove the app from their phone, but we also built a feature into the app that allowed us to remotely disable the upload of text messages from that phone, in case participants failed to show up for app removal. From our earlier, formative work we knew that participants faced many life challenges that interfered with showing up to appointments; being able to remotely disable the app was an important feature to ensure that we did not collect data from participants past their end date of enrollment.

We took numerous steps to protect participant confidentiality and privacy when considering how to develop and manage the app. First, cellphones were purchased in the University's name, and cellphone service for each phone number remained in the University's name for the duration of study participation; in this way, cellphone numbers were not linked to the participants, and thus were not HIPAA identifiers. We chose to use Android phones because Android phones allow for the disabling of text notifications (i.e., the content of text messages does not show on the screen when the phone is not in use). Secure protocols were used to encrypt the data when transmitted from the patient's phone to the webservice. When we met with participants, we helped them set up a password on the cellphone, to ensure other individuals could not access their phone if lost or stolen. Finally, phones could be remotely disabled (i.e., rendered entirely inaccessible and unusable in the future) if lost or stolen.

Mentor training

A two-hour, in-person mentor training was co-led by the PI and by a therapist with extensive experience with sexual health and HIV-related issues. Consistent with the theoretical framework guiding the intervention (i.e., the Information-Motivation-Behavioral Skills model), peer mentors were trained in information related to HIV care (e.g., course of typical HIV care, why retention is important, why medication adherence is important), in skills related to HIV care (e.g., organization/planning skills for keeping appointments and adhering to medication, coping skills, skills for obtaining social support); we wanted mentors to be able to provide informational support to mentees regarding HIV, as well as to

help them develop skills for remaining in care and adhering to medication. In addition, mentors were trained in techniques for responding to participants in a motivational way (e.g., being nonjudgmental and empathetic, using open ended questions, rolling with resistance); the guidance we gave men was largely consistent with principles of motivational interviewing.[29] Although we intended for conversation content to be determined by the expressed needs of participants, mentors were given a list of potential conversation starter questions (e.g., "How did your appointment go?"; "When is your next appointment? How have you planned for that?"; "What is the hardest part of all of this for you?"), in case they needed assistance initiating conversations with mentees. They were also given a list of potential questions designed to motivate participants to stay healthy (e.g., "Who means the most to you? Are they are on your support team?"; What is one thing you can focus on trying to do to stay healthy this week?") Throughout the training, mentors were asked to role play different responses that were consistent with the techniques they learned during the training.

In addition, mentors received training in boundaries, to protect the well-being and confidentiality of mentees (e.g., not using last names, not arranging to meet in person, referring to a medical provider if someone had a medical question or problem) and ethical issues (e.g., confidentiality, respect for persons). Peer mentors were trained to tell participants to contact their medical provider with any medical or health related questions, and to call 911 or visit the emergency department in the case of a medical emergency. Finally, peer mentors were asked to sign a code of conduct governing their relationship with counseling recipients, and were provided with handouts summarizing the material covered in the training.

Peer mentors were asked to respond within 12 hours when a mentee sent a text, and were asked to reach out to mentees if they had not heard from them in 3 days (e.g., "Hey, how's it going? Just wanted to see how you are doing."). This time period was chosen in an effort to balance the need for regular communication with respect for participants' time; in this way, participants could take the lead in regards to frequency of communication. The content and frequency of text messages was reviewed at least twice per week by study staff trained in the intervention, and feedback was provided to mentors when needed. Mentors were also encouraged to contact the study team at any time if they needed guidance in responding to mentees.

Study procedures

Mentees were recruited from June – August 2016**.** Active recruitment of mentees was conducted at a University-affiliated infectious diseases clinic. Research nurses informed physicians when a potentially eligible patient was in the clinic; the physician then asked patients if they were interested in meeting with a study nurse to learn more about a potential study opportunity. If patients were interested, the study nurse provided a brief overview of the study, and gave patients a flyer explaining the study. The study nurse asked for permission to give the patient's contact information to the study team; if the patient declined, the nurse encouraged the patient to contact the study team by phone if interested in participating.

In addition, we posted recruitment materials at the infectious diseases clinic, as well as at community agencies serving HIV-infected individuals, so interested individuals could contact us directly. Participants were also recruited through word of mouth.

A research staff member spoke by phone with interested individuals, providing an overview of the study, obtaining verbal consent for screening, and screening to confirm eligibility. Out of 22 MSM screened, 8 were eligible and agreed to participate in the study. Approximately half of the men who were ineligible were ineligible because they only had sex with women, while the rest were well-retained in care and adherent to their medication.

Men who were interested and eligible were scheduled for an appointment to meet with research staff at a community-based center affiliated with the local University. After providing written, informed consent, men completed a brief survey assessing demographic information. Research staff provided men with cell phones, which contained the pre-installed text messaging app. To help ensure privacy, research staff helped men set passwords on their phones. Research staff assisted men in sending an initial introductory text to their mentor; men were asked to use either no name or only their first name in their text messages, for additional confidentiality protection. Finally, research staff provided men with written and verbal instructions on how to use their phones and useful features of the phones.

Mentees were enrolled in the text messaging intervention for one month; this timeframe was selected because we anticipated this timeframe would be long enough to assess feasibility, troubleshoot problems, and garner suggestions for improvement; we anticipate that a longer intervention would be needed to improve retention and adherence, but that was not the purpose of this small pilot. During the month of enrollment research staff sent a weekly satisfaction question to mentees via text message (i.e., “How satisfied are you with the peer counseling intervention? Text 1 for very dissatisfied, 2 for mildly dissatisfied, 3 for mostly satisfied, and 4 for very satisfied”). During this time, research staff also monitored the content of the text messages sent by the mentors for quality assurance, and provided feedback to the peer mentors.

At the end of one month, mentees completed a final satisfaction survey, and participated in a brief interview regarding their participation in the study and suggestions for improvement. The survey asked participants whether they liked receiving messages from the peer mentor (1 = disliked the messages to 3 = liked the messages), whether the text messages were helpful (1 = not helpful to 3 = very helpful), whether they would recommend the intervention to a friend (1 = definitely no to 4 = definitely yes), and how satisfied they were with the intervention (1 = very dissatisfied to 4 = very satisfied). Mentors also participated in a brief interview regarding their participation, and provided suggestions for intervention improvement. Both mentors and mentees were reimbursed $10 for completing the final survey and brief interview.

At the end of study participation, mentees and mentors were allowed to keep their study phones; the study stopped paying for cellphone service at this point. If participants returned to meet in person with study staff, the app was removed from their phones; if participants

did not return to meet in person with study staff, the upload of text messages from that phone was disabled remotely.

All procedures were approved by the IRB of the participating institution.

Results

Participants

Mentees were, on average 40 years old (SD = 14.71 [2 missing]). All participants self-identified as Black/African American (n = 8). Most were unemployed (n = 5; 83% [2 missing]) and eligible for the Supplemental Nutrition Assistance Program (n = 5; 83% [2 missing]). Median household income was $800/month. Two men (33%) completed high school, and 4 (67%) completed at least some college (2 missing). All participants had health insurance, including Medicaid (n = 6; 100% [2 missing]), and the AIDS Drug Assistance Program (n = 1; 17% [2 missing]).

Mentors were on average 46 years old (SD = 17.0). All mentors self-identified as Black/African-American. Two (67%) were employed full time, and one (33%) was unemployed. One (33%) completed high school, while the other two (67%) completed at least some college.

Intervention delivery

During the course of intervention delivery, 2 men reported problems with their phones freezing and with the cursor jumping around while texting. We replaced those phones, and the issues were resolved. One participant reported that his cellphone was stolen; we replaced his cellphone as well. One participant reported that several apps that were downloaded on his cellphone were erased, including the text messaging app.

Research staff who took part in the mentor training reviewed the text messaging database at least twice per week. Many of the participants' text messages centered around issues related to ART and HIV medical care, including struggles with obtaining/maintaining insurance coverage, medication interactions, and the desire for different kinds of medication. Some individuals also spoke of their daily lives and of issues not related to the HIV diagnosis (e.g., leisure plans). The content of mentors' text messages followed intervention protocol. Most of the messages involved asking open-ended questions and providing informational and emotional support in a nonjudgmental way. Mentors kept appropriate boundaries and contacted research staff when mentees were struggling with issues that were beyond the scope of a peer mentoring intervention.

Two of the mentors did not consistently adhere to the guideline of connecting with mentees at least every 3 days. When more than 3 days had passed without contact between mentors and mentees, research staff reached out to mentors to remind them of this guideline, and to troubleshoot if mentors were having difficulty adhering to the guideline. Mentors generally reported that other life circumstances (e.g., work) made it difficult at times for them to be more consistent in reaching out to mentees.

Mentee satisfaction

Average weekly satisfaction scores were 3.0 (SD = 1.15) for week one; 2.7 (SD = 1.1) for week two; 3.0 (SD = 1.1) for week three; and 3.1 (SD = 0.7) for week four, indicating moderate satisfaction with the intervention.

On the final satisfaction survey at the end of intervention participation, completed by $n = 7$ participants, men reported that they liked receiving messages from their peer mentor ($M = 2.7$, SD = 0.8 on 3 point scale), that the messages were somewhat helpful ($M = 2.1$, SD = 0.7 on 3 point scale), and that they would recommend the intervention to a friend ($M = 3.0$, SD = 1.4 on 4 point scale). Overall, men reported that they were satisfied with the intervention ($M = 3.0$, SD = 1.2 on 4 point scale). Although most participants were satisfied or very satisfied with the intervention ($n = 5$), two participants reported that they were dissatisfied or very dissatisfied with the intervention.

Mentee suggestions and recommendations

When asked how the intervention could be improved, two men said that they wanted more frequent texting with their mentor; these were the two mentees who reported being dissatisfied with the intervention. Inspection of the text messaging database revealed that mentor/mentee contact for these participants was less frequent than once every 3 days we asked the mentors to maintain. Other participants noted that the frequency of texting was satisfactory.

When asked for suggestions regarding how mobile technology could be used differently in the intervention, most men reported that they would have preferred a mix of text messaging and phone calls. Two men expanded upon this, saying that texts seemed impersonal and that it was difficult to get a sense of the mentor's personality via text.

Mentor suggestions and recommendations

When asked how the intervention could be improved, all three mentors noted some degree of difficulty in getting participants to open up. No mentors expressed difficulty in maintaining boundaries with participants; for example, when one participant asked his mentor for a picture of himself, the mentor gently declined to provide him with one. Another mentor alerted research staff when told of mental health issues that significantly interfered with the participant's well-being, in accordance with study protocol. Two of the three mentors, however, suggested that it might be helpful to relax the boundaries by allowing for an introductory phone call or meeting that would allow for rapport-building. Furthermore, two mentors suggested that the intervention was too brief to allow for the formation of relationships between mentors and mentees, and recommended a more extended intervention (e.g., 3 months).

When asked for suggestions regarding how mobile technology could be used differently, two had no suggestions, while one mentor suggested then use of social media as an additional way to keep in contact with mentees.

Discussion

We developed a novel smartphone app that records and uploads to a secure database text messages sent and received from specified phone numbers. We assessed the feasibility of using this app in a peer mentor text messaging intervention with a small group of HIV-infected Black MSM, and garnered suggestions and feedback from mentors and mentees. There were difficulties with implementation (i.e., problems with phones freezing, stolen phone, app deleted). Both mentors and mentees generally reported a desire for contact that was more personal than text messages (e.g., phone calls).

Peer mentor interventions, in general, have several advantages over professionally-delivered interventions. Mentors and mentees can be matched on important characteristics, which may help to build initial rapport. Mentees may think that peer mentors could understand their challenges and circumstances better than a professional might be able to. Peer mentor interventions can be easily adapted to be targeted to a new population by recruiting mentors from that target population. Messages can be tailored to each individual participant.

We hypothesized three primary advantages of using text messaging to deliver a peer mentor intervention to HIV-infected individuals, relative to typical in person or telephone-delivered peer mentor interventions. First, the text messaging intervention allowed for completely anonymous delivery; in our formative work, HIV-infected Black MSM reported that anonymous intervention delivery was desirable.[28] With text messaging, there was no risk of recognition from an in-person meeting or risk of voice recognition over the phone, and men did not need to reveal even a first name if they desired complete anonymity. However, despite our formative work indicating the importance of anonymity in interventions for HIV-infected men, most of the men reported that they would have preferred a combination of texts and phone calls. Similarly, two of the mentors reported to the study team that it was difficult to develop rapport without having an initial phone call or meeting. It may be that, although anonymity is initially desired, once men are comfortable with their mentor they may desire more personal contact. Consistent with motivational principles, future interventions could let men choose the level of contact they have with mentors.

A second advantage of text messaging is that it allows for frequent, inexpensive contacts over the long periods between scheduled medical appointments; thus, text messaging may be a feasible and easily scalable method of intervention delivery that could be implemented in a variety of organizations (e.g., community-based organizations, health departments, clinics), either as an add-on to existing peer support services or as a stand-alone program. Use of participants' own phones might increase the potential for scalability, although additional testing would be needed to ensure the app would work on other Android phones, and could be adapted for other types of phones (i.e., iphones). We hoped that text messaging would also allow for in-the-moment intervention delivery (e.g., when a mentee is struggling to go to a medical appointment, or has not taken his medication for a day or two). We found that some mentors maintained frequent contact over the month of intervention delivery, but other mentors needed reminders to contact their mentee; even with research staff oversight, some mentors had infrequent contact with mentees, leading to dissatisfaction with the intervention. Some mentors at times were quite engaged with mentees, but at other times

were less engaged; mentors reported at these times that other commitments, especially work commitments, interfered with their ability to communicate more frequently with their mentees. These mentors were highly recommended and carefully selected, were engaged in community HIV prevention efforts, had prior mentoring experience, were well trained, and had clear expectations for frequency of contact with mentees. It is possible that because the mentors we selected were all active in their communities, they did not have time to take on other commitments. There was also a delay between mentor training and launch of the pilot trial, due to unexpected technological issues. It is possible that mentors' life circumstances (e.g., work demands) changed in the interval between when they agreed to participate and when they were asked to deliver the intervention.

A third advantage of the current method of intervention delivery was the ability to monitor the frequency and quality of texts. In traditional in-person or telephone-based peer mentor interventions, it may be difficult to monitor the quality of intervention delivery. Although we were initially concerned that mentors might have difficulty implementing the intervention using a motivational style (e.g., open ended questions, nonjudgmental responding), the text messaging database revealed that the mentees excelled at this style. Rather, as noted above, the primary challenge was that, in some cases, contact from mentors was not frequent enough. The text messaging format and cellphone app that uploaded text messages to a secure database allowed us to continually review the text messages, and to provide feedback to the mentors based on what we saw in the database. Despite this feedback to mentors, and prompts to reach out to their mentees, in some cases the text messaging frequency was still low.

Challenges in using peers for delivery of HIV-related supportive services is not without precedent. For example, a recent national demonstration project employed paraprofessional outreach workers, who were frequently peers, to improve linkage and retention among HIV-infected young MSM of color. In this project, termination of outreach workers due to misconduct and poor boundaries was high.[30] In the current study, there were no problems with mentor misconduct or poor boundaries, perhaps due to the careful selection and training of mentors. We established many boundaries, primarily to ensure the well-being and confidentiality of participants; however, these boundaries may not be necessary nor realistic outside of the context of a research study. Both mentors and mentees expressed the desire to relax the boundaries, particularly around the requirement to limit interactions to texting only, which made it difficult to build rapport.

Mentors were very skilled at using a motivational style in their interactions with participants, an interaction style that takes skill and time to master; all of our mentors reported prior previous training in motivational counseling strategies. The main difficulty we encountered was a lack of time to devote to the intervention. Although this was a significant challenge that impacted mentee's satisfaction with the intervention, we think it is one that can be overcome with thoughtful changes to the structure of the program.

Lessons Learned

Our ability to draw definitive conclusions was limited by our small sample size; however, participants and mentors provided important intervention feedback, and we learned several

lessons that should be considered for future interventions. Engaged and involved mentors are key to effective intervention delivery of a text messaging-based peer mentor intervention. Mentors in the current intervention pilot had numerous commitments, which at times interfered with their frequency of contacting their mentee. To improve engagement of the mentors, it may be necessary to pay them for their time, rather than relying on volunteers. Regular meetings with research staff and with other mentors, during which text messages are reviewed and feedback is provided, may help to improve connection with the project and the team, and increase accountability for regular contact with mentees. It may be necessary to have both peer mentors as well as professional counselors involved in the intervention; mentors and professionals would be able to provide different types of support, and professionals could be available on a more regular and consistent basis.

Both mentors and mentees reported that they desired interactions that were more personal than text messaging, despite our earlier findings that men desired anonymity in intervention participation. A peer support text messaging intervention may serve as an initial foot in the door; that is, men who might refuse other types of interventions because of confidentiality concerns might initially agree to participate in a text messaging intervention because it is anonymous; however, as men become comfortable with the study team and with their mentor, they may desire more personal contact, such as telephone calls. Alternatively, an initial meeting or telephone call might be used to build rapport, which could then be followed by the text messaging intervention; this approach would allow mentors and mentees to get to know each other and build rapport, while maintaining the scalability of the current intervention. Finally, most of the participants in this study were older men; younger men may have felt more comfortable communicating solely via text message. Future research should assess age differences in participant satisfaction.

In conclusion, a peer mentor text messaging intervention was feasible to deliver to HIV-infected Black MSM, but there were challenges implementation and intervention fidelity. Additional research with more participants is needed to determine satisfaction and efficacy of this peer text messaging intervention to improve retention in care and medication adherence for this population.

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References

1. Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas, 2014. HIV Surveillance Supplemental Report 2016–2016. 21(4)
2. Centers for Disease Control and Prevention. Diagnoses of HIV infection in the United States and dependent areas, 2014. HIV Surveillance Report. 2015; 26
3. Buchacz K, Baker RK, Moorman AC, et al. Rates of hospitalizations and associated diagnoses in a large multisite cohort of HIV patients in the United States, 1994–2005. AIDS. 2008; 22:1345–1354. [PubMed: 18580614]
4. Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med. 2011; 365:493–505. [PubMed: 21767103]

5. Del Romero J, Castilla J, Hernando V, et al. Combined antiretroviral treatment and heterosexual transmission of HIV-1: Cross sectional and prospective cohort study. BMJ. 2010; 340:c2205. [PubMed: 20472675]
6. Donnell D, Baeten JM, Kiarie J, et al. Heterosexual HIV-1 transmission after initiation of antiretroviral therapy: A prospective cohort analysis. Lancet. 2010; 375:2092–2098. [PubMed: 20537376]
7. Palella FJ Jr, Delaney KM, Moorman AC, et al. Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. N Engl J Med. 1998; 338:853–860. [PubMed: 9516219]
8. Quinn TC, Wawer MJ, Sewankambo N, et al. Viral load and heterosexual transmission of human immunodeficiency virus type 1. N Engl J Med. 2000; 342:921–929. [PubMed: 10738050]
9. Centers for Disease Control and Prevention. National HIV Prevention Progress Report, 2015. 2015. http://www.cdc.gov/hiv/pdf/policies/progressreports/cdc-hiv-nationalprogressreport.pdf. Accessed 10/07/16
10. Dasgupta S. Disparities in Consistent Retention in HIV Care—11 States and the District of Columbia, 2011–2013. MMWR. Morbidity and mortality weekly report. 2016; 65
11. Maulsby C, Millett G, Lindsey K, et al. HIV among black men who have sex with men (MSM) in the United States: a review of the literature. AIDS Behav. 2014; 18(1):10–25. [PubMed: 23620241]
12. Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data – United States and 6 dependent areas – 2013. 2015
13. Centers for Disease Control and Prevention. Diagnoses of HIV Infection in the United States and Dependent Areas, 2013. 2015
14. Rosenberg ES, Millett GA, Sullivan PS, et al. Understanding the HIV disparities between black and white men who have sex with men in the USA using the HIV care continuum: a modeling study. Lancet HIV. 2014; 1(3):e112–e118. [PubMed: 25530987]
15. Mahajan AP, Sayles JN, Patel VA, et al. Stigma in the HIV/AIDS epidemic: A review of the literature and recommendations for the way forward. AIDS. 2008; 22:S67–S79.
16. Henkel KE, Brown K, Kalichman SC. AIDS-related stigma in individuals with other stigmatized identities in the USA: A review of layered stigmas. Soc Personal Psychol Compass. 2008; 2:1586–1599.
17. Arnold EA, Rebchook GM, Kegeles SM. 'Triply cursed': racism, homophobia and HIV-related stigma are barriers to regular HIV testing, treatment adherence and disclosure among young Black gay men. Cult Health Sex. 2014; 16:710–722. [PubMed: 24784224]
18. Higa DH, Marks G, Crepaz N, et al. Interventions to improve retention in HIV primary care: a systematic review of U.S. studies. Curr HIV/AIDS Rep. 2012; 9(4):313–325. [PubMed: 22996171]
19. Smillie K, Van Borek N, Abaki J, et al. A qualitative study investigating the use of a mobile phone short message service designed to improve HIV adherence and retention in care in Canada (WelTel BC1). J Assoc Nurses AIDS Care. 2014; 25:614–625. [PubMed: 24768442]
20. Muessig KE, Nekkanti M, Bauermeister J, et al. A systematic review of recent smartphone, Internet and Web 2.0 interventions to address the HIV continuum of care. Curr HIV/AIDS Rep. 2015; 12:173–190. [PubMed: 25626718]
21. Christopoulos KA, Riley ED, Tulsky J, et al. A text messaging intervention to improve retention in care and virologic suppression in a U.S. urban safety-net HIV clinic: study protocol for the Connect4Care (C4C) randomized controlled trial. BMC Infect Dis. 2014; 14:718. [PubMed: 25551175]
22. Finitsis DJ, Pellowski JA, Johnson BT. Text Message Intervention Designs to Promote Adherence to Antiretroviral Therapy (ART): A Meta-Analysis of Randomized Controlled Trials. PLoS ONE. 2014; 9(2):e88166. [PubMed: 24505411]
23. LeGrand S, Muessig KE, McNulty T, et al. Epic Allies: Development of a gaming app to improve antiretroviral therapy adherence among young HIV-positive men who have sex with men. JMIR Serious Games. 2016; 4(1)

24. Simoni JM, Nelson KM, Franks JC, et al. Are peer interventions for HIV efficacious? A systematic review. AIDS Behav. 2011; 15:1589–1595. [PubMed: 21598034]

25. Hallum-Montes R, Morgan S, Rovito HM, et al. Linking peers, patients, and providers: A qualitative study of a peer integration program for hard-to-reach patients living with HIV/AIDS. AIDS Care. 2013; 25:968–972. [PubMed: 23311339]

26. Purcell DW, Latka MH, Metsch LR, et al. Results from a randomized controlled trial of a peer-mentoring intervention to reduce HIV transmission and increase access to care and adherence to HIV medications among HIV-seropositive injection drug users. J Acquir Immune Defic Syndr. 2007; 46:S35–47. [PubMed: 18089983]

27. Cully JA, Mignogna J, Stanley MA, et al. Development and pilot testing of a standardized training program for a patient-mentoring intervention to increase adherence to outpatient HIV care. AIDS Patient Care STDs. 2012; 26:165–172. [PubMed: 22248331]

28. Senn TE, Braksmajer A, Coury-Doniger P, et al. Mobile technology use and desired technology-based intervention characteristics among HIV+ Black men who have sex with men. AIDS Care. 2016 In press.

29. Miller, WR., Rollnick, S. Motivational interviewing: Helping people change. 3rd. New York, New York: Guilford Press; 2013.

30. Hidalgo J, Coombs E, Cobbs WO, et al. Roles and challenges of outreach workers in HIV clinical and support programs serving young racial/ethnic minority men who have sex with men. AIDS Patient Care STDs. 2011; 25:S15–22. [PubMed: 21711144]