Cover page

Title:
The Engaging Microenterprise for Resource Generation and Health Empowerment (EMERGE) Project: Feasibility of Assessing Economic and Sexual Risk Behaviors Using Text Messages in Homeless Young Adults

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Study Protocol

Title:
Feasibility of assessing economic and sexual risk behaviors using text message surveys in African-American young adults experiencing homelessness and unemployment: a single-group study

Aim:
This study examined the feasibility of assessing sexual and economic behaviors using text message surveys in African-American young adults who were out-of-school and experiencing homelessness and unemployment. Specifically, this manuscript describes the process, challenges, and solutions with regard to text message survey responsiveness and utility. Implications for using text message surveys in future HIV behavioral intervention trials are also discussed.

Methods:
Design
A single-group cohort study was used to examine the feasibility of assessing economic and sexual risk behaviors using weekly text message surveys. Participants were invited to respond to a text message survey sent to their cell phone every Monday at 9:00 AM for 5 weeks.

Setting
The study was conducted in Baltimore, MD. The majority (82%) of HIV diagnoses in Baltimore are among African-Americans, with young adults, aged 20 to 29, representing the highest proportion. Young adults in the city make up an increasing proportion of the homeless and unemployed. Youth experiencing homelessness are 6 to 12 times more likely to become infected with HIV than housed youth, with prevalence rates as high as 12%. HIV prevalence among African-Americans in Baltimore is 3.1%, over ten times the national HIV prevalence in the U.S. (0.3%) and exceeding the UNAIDS definition of a generalized epidemic (HIV prevalence > 1%).

Recruitment & Enrollment
Potential participants were recruited on-site from two community-based organizations (CBO) providing emergency and supportive residential services to young adults in Baltimore, MD. A recruitment flyer was posted in the main building of both CBOs. Designated CBO staff introduced potential participants to the study team on scheduled visit days. Study eligibility was determined using a paper-based screening questionnaire that was administered by a trained research assistant. Individuals were eligible to participate if, at the time of enrollment, they were: African American, aged 18 to 24, living in Baltimore, experiencing homelessness within the last 12 months, unemployed or underemployed ($\leq$ 10 hours per week), out-of-school, reporting one or more episodes of unprotected sex in the last 12 months, and having a cell phone that could send and receive text messages. Eligible participants were then introduced to the study and administered informed consent.

As part of the enrollment process, we invited participants to register their cell phone to the text message survey application. Participants sent a text message with the word “join” to the study phone number in order to register. Each person then received a brief orientation regarding the survey’s content, timing, and payment incentive ($20 in cash). In the presence of a trained research assistant, the participant also completed on his/her cell phone a mock, but identical version of the 14-question text message survey. This was done in order to confirm readability of the text message questions and their prompts and to clarify any points of confusion. Participants were also advised on how to opt out of the survey by sending a text with the word “leave” at any time. As a final orientation step, participants were advised on how to increase privacy during the study period, such as activating cell phone passwords, deleting all text message surveys, responding only to the study’s phone number, and answering in a quiet and private space.

Text Survey Design

We used *TextIt.in* to create, send, and receive text messages from participants. TextIt.in is an online service for building text messaging applications using a visual and interactive flow. The text message survey was powered by *Twillio*, a cloud communications platform, using a study-sponsored phone number. We then developed an online logic tree to order how survey questions would be texted to the participants. Figure 1 shows an excerpt of the branch logic used in the question tree. To facilitate responsiveness and data quality, the text messaging application included automated reminders and quality check prompts. Participants had 24 hours to complete each weekly text message survey. One automated text message reminder was sent to participants who did not initiate responding to the survey or to those who started but did not complete the survey within the first 24 hours. Reminder text messages included the name of the study, the payment incentive, and a reminder to respond to the survey within the next 24 hours. In addition, participants who responded with ineligible words or numbers outside of pre-set ranges received a text message query asking them to re-enter a valid response. All completed surveys generated one automatic text message that thanked the participant for his/her time.

Measures

Data were collected in August and September 2017. Participants received the same 14 questions as text messages each week regardless of their responses to the week's prior text message survey. Table 1 lists each question used in the survey. All questions were in English and referred to the last 7 days, equivalent to the prior week. Eligible responses were: yes/no or number of units (i.e., dollars, episodes, people). There were 7 economic questions relating to: involvement in any type of paid work; the amount of cash earned from a job; the amount of cash earned from one's own business; the amount of cash deposited into a savings account; the occurrence of loss of housing; the occurrence of requesting for cash to meet living expenses; and the amount of cash spent on any HIV preventive services or products. An additional 7 sexual behavioral questions inquired about the: number of sex partners; engagement in sex while high or drunk; frequency of condomless sex; utilization of other non-condom HIV preventive methods; frequency of sex exchange; discussion of HIV testing with sex partners; and receipt of HIV testing.

Our primary feasibility measures were: number of participants who responded to the survey in a given week; number of questions to which a participant responded in a given week; and number of hours from sending a survey to participants to receiving their response in a given week. We calculated the number, mean, and proportion of participants who responded to each question in each of the weekly surveys over the 5-week study period. A participant was categorized as responding to the question if s/he provided a valid response such as "yes/no", a numerical response, a free-form text, or a "skip" response in order to proceed to the next question. A participant was categorized as responding to the survey if s/he provided a valid response to at least one question of the 14-question survey. Non-responders were defined as enrolled participants who did not return a text message response to any of the text message surveys over the course of the study period. As part of the study's process evaluation, one discussion group with 5 responders was used to obtain feedback. Non-responders were also invited. The study team additionally documented in memo notes the implementation lessons learned.

Statistical Analysis Plan

To analyze the results of the text message survey, we first created a database in Excel that included: a cell phone number for each participant, a participant unique study ID, demographic data relating to participant age, gender, education level, years living in Baltimore, number of hours worked per week, number of children living in and out of the household, the date and time of study enrollment, the date and time of all outgoing and/or incoming messages, and the numerical, textual, or free-from text message response to each of the 14 text message questions each week. Secondly, we calculated the study's primary feasibility measures as listed above. As a third step, we calculated

the frequencies of sexual and economic behaviors per the specific responses for each weekly question. Lastly, lessons learned from the study's process evaluation were synthesized over five implementation domains: acceptability, enrollment and registration, responsiveness, data quality, and data access.