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Development and Pretesting Multimedia HIV-Prevention Text Messages for Mobile Cell Phone Delivery

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Keywords

African American youth; HIV prevention; mobile cell phones; multimedia; text messaging

HIV infection is a serious health problem among African American adolescents. In 2006, 15% of all new HIV infections occurred among adolescents and young adults ages 13 to 24 years (Centers for Disease Control and Prevention [CDC], 2008). Although African American adolescents represented only 17% of the adolescent population in the 34 states with confidential HIV reporting, they accounted for 72% of the adolescent HIV and/or AIDS cases (CDC, 2009a). The increasing number of new infections points to the need to expand access to effective HIV-prevention programs (CDC, 2008, 2009b).

HIV-prevention programs to date have primarily been small-group programs that provide individuals with the knowledge and skills to practice safer sex (CDC, 2009a). A major limitation to these efforts is their inability to reach large groups of youth (13–18 years of age), particularly ethnic and racial minority youth, with risk-reduction information (Rotheram-Borus, 2000). Therefore, researchers have been unable to identify modes in which HIV risk-reduction information can be delivered in a cost-effective format to large numbers of youth. This report shares results from the pretesting phase of an innovative approach to the use of mobile cell phone (MCP) multimedia text messaging boosters of HIV-prevention information, with 12 African American youth 13 to 18 years old.

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MCPs are convenient, inexpensive, confidential, and accessible to youth at all times (Lenhart, 2009; Mobile Marketing Forum, 2007; Utting, 2004). In the United States, 71% of teens ages 13 to 17 years own a cell phone, and girls and boys are equally likely to own them (Lenhart, 2009). Text messaging, a feature of MCP technology, has been referred to as the note-passing of the new century, with teens using this feature for immediate contact with friends (Cornelius & St. Lawrence, 2009; Lenhart, 2009).

Teens also use MCPs to communicate about dating and relationships, presenting opportunities to use MCPs to provide educational messages about safer sex behaviors (Patrick, Griswold, Raab, & Intille, 2008). For example, one study found that 42% of text messages sent by high school students to a school nurse involved issues related to sexuality (Utting, 2004).

Little research, however, has looked at the effectiveness of using MCP technology to change health behaviors. In a review of the literature, Ybarra and Bull (2007) identified two published MCP interventions that were successful in changing health behavior. Another review of the literature found 12 text messaging interventions with documented evidence of effectiveness in changing behaviors (Cole-Lewis & Kershaw, 2010). The text messaging interventions were for asthma management (Ostojic et al., 2005), medication adherence (Coccosila, Archer, Haynes, & Yuan, 2009), weight loss (Haapala, Barengo, Biggs, Surakka & Manninen, 2009), diabetes management (Cho, Lee, Lim, Kwon, & Yoon, 2009), physical activity (Newton, Wiltshire, & Elley, 2009), and smoking cessation (Rodgers et al., 2005). Also, Nguyen, Dill, Wolpin, Steele, and Benditt (2009) piloted a cell phone-based exercise persistence intervention for post-rehabilitation with patients with chronic obstructive pulmonary disease.

The San Francisco Health Department SexInfo program was the first in the country to direct safer sex messages to young people using MCP technology (Levine, McCright, Dobkin, Woodruff, & Klausner, 2008). In the first 25 weeks of service, there were more than 4,500 inquiries about sexual risk. Another safer sex cell phone messaging program, Hookup, allowed teens to send text messages for sexual health promotion tips (California Family Health Council, 2009). In Washington, DC, a media awareness campaign, Text Message, featured high school students using MCPs to inform each other about a friend who had acquired HIV (Donovan, 2005). However, these health promotion media awareness programs did not use an evidence-based curriculum.

Incorporation of an evidence-based curriculum into the system may increase the effectiveness of MCP technology as a platform for prevention. The Becoming a Responsible Teen (BART) curriculum is an evidence-based curriculum with proven effectiveness in increasing HIV knowledge and safer sex practices among African American youth in diverse settings (St. Lawrence, Crosby, Brasfield, & O'Bannon, 2002). Given its effectiveness with African American youth, this is a good starting point for examining the impact of MCP delivery of HIV risk-reduction information. Thus, this study developed content and pretested text messages, pictures, and videos used to enhance an HIV-prevention curriculum for MCP delivery. Pretesting was part of a larger study that examined the feasibility and acceptability of using this approach to enhance the delivery of an HIV-prevention curriculum to African American youth.

Methods

Study Design

This exploratory research was designed with two goals. These were to (a) develop MCP multimedia text messaging boosters guided by content in the BART curriculum, and (b)

assess the feasibility and acceptability of delivering the booster messages to African American youth.

Sample

A convenience sample of 12 African American teens ages 13 to 18 years were recruited to the Teen Advisory Committee for this study. The study was approved by the institutional review boards at the authors' universities. We recruited teens who had previous knowledge of text messaging, were willing to work with the research team, and were considered popular (well known) by their peers. Inclusion criteria for the Teen Advisory Committee were based on the original study of the BART curriculum, which was developed and tested by St. Lawrence et al. (1995) using popular teens, except that teens ages 13 to 18 years rather than those ages 14 to 18 years were recruited. The decision to allow 13-year-old participants into the study was based on the first author's experience with this age group and the fact that the probability of younger teens owning an MCP had increased 100% (Selian & Srivastava, 2004). Teens were recruited by personal contact and flyers posted in community-based organizations. Our recruitment and retention coordinator made contact with staff at four community-based organizations and asked them to identify teens who met inclusion criteria for this study.

Procedure

The ADAPT-ITT model (Wingood & DiClemente, 2008) was used to guide the process of adapting the BART curriculum for MCP multimedia text messaging delivery. The process included a plan for adaptation in parallel with a plan for implementation. The eight-phase model guided the process of adaptation by systematically allowing the research team to record each step involved in the development of the text messaging boosters. Our goal for this adaptation was to tailor the BART material for text messaging boosters. The plan outlined the (a) process of adaptation, (b) key information from each BART session for text messaging delivery, (c) materials for developing the messages, (d) activities that would be appropriate and relevant for MCP multimedia text messaging delivery, and (e) development of a facilitator's checklist for text message responses to teens. The Teen Advisory Committee met frequently (for a minimum of four times a month) over a 6-month period to provide input on content development and delivery of the MCP multimedia text messaging boosters.

Content Development

Because the positive effects of BART were found to begin to degrade after 12 months (J. St. Lawrence, personal communication, September, 16, 2007), MCP multimedia text messages were developed to produce a booster effect to the BART content and reinforce the initial intervention (Wu et al., 2003), so as to achieve sustained effects. The research team identified information from the eight BART curriculum sessions that could be developed for MCP multimedia text messaging delivery, and teens were given the information to convert to text messaging language. After core information was identified, the Teen Advisory Committee was tasked with converting the messages from Standard English to text messaging language. Content evaluation to determine the appropriateness of the messages involved achieving unanimous agreement on the intent of each message. Each week, teens were given text messages to review for clarity. If a text message was unclear, abbreviations were edited for clarification. Next, the process involved development of pictures and videos. We hired a videographer who developed pictures that depicted modes of HIV transmission with compositing and videos of role-play scenarios with labeling and subtitles. Each text message, picture, and video required teens to text a response to a question indicating their understanding of the content (see Table 1). If teens responded correctly, they would receive a reply giving them praise such as "Correct, U R Awesome." If teens responded incorrectly,

they would be informed that the answer was incorrect and were given the right answer. The videographer also developed an infomercial about the project, which was posted on YouTube, My Space, Facebook, and the project Web site (<http://www.uncc.bart.edu>).

Consistent with the ADAPT-ITT model, a pretest marketing method known as theater testing was used. Theater testing has been commonly used to test products such as videos, print advertisements, and public service announcements. A theater test resembles what participants may experience and is used to gauge participants' reactions to a test product. One advantage to this method is the opportunity to elicit immediate reactions to messages and concepts in a relatively short period so that an accurate assessment can be obtained. In the current study, teens were invited to a central location for a demonstration of the MCP multimedia text messaging content. Because there was no mechanism to monitor whether messages had been read or deleted before being read, teens were asked to provide feedback on this and to give reactions to the content. Teens provided recommendations on the content and suggested that the research team allow them to text the facilitator if they had questions. These recommendations were integrated into further content development.

Pretest Phase

Next, we prepared to deliver the MCP multimedia text messages, pictures, and videos. We identified an Internet-hosted short messaging service (SMS) that enabled us to transmit messages, no more than 140 to 160 characters in length, in addition to links to pictures and videos, to teens' cell phones using a personal computer Internet service. To control for the delivery process, we provided teens with project cell phones and covered the costs for text messaging and Web access.

A facilitator trained in using the MCP technology sent, received, and responded to the teens' text messages. The text messages, pictures, and videos were sent with a question to which the teens had to respond. The pictures and videos were sent with a link to a URL address that, when highlighted, made the messages automatically download and play on the MCP.

In April 2009, a pretest evaluated the content and delivery process. Daily messages were sent for 3 weeks to the Teen Advisory Committee to identify problems with the MCP multimedia delivery format (receiving, reading, and responding), and to elicit participants' recommendations for changes in language, content, and methods. Based on previous experience designing interventions related to sexual behavior (Jemmott, Jemmott, & Fong, 1992), we anticipated that 3 weeks would be sufficient to make final revisions to the MCP multimedia text messaging development and delivery protocol. After 3 weeks, the Teen Advisory Committee and text messaging facilitator were asked for feedback on how the intervention could be improved and whether it was acceptable (not intrusive, acceptable delivery dose); they were also asked about problems in receiving, reading, and responding to the messages. The teens debriefed with the facilitator about their experiences with the process. We assessed feasibility by setting a benchmark of 80% as the response rate.

Data were collected on the frequency of responses to text messages, pictures, and videos; research team's attempts to reach participants who fell below an 80% response rate; teens' recommendations for changes; and the number of teens who found the MCP messaging process intrusive. Debriefing data were collected and analyzed using a prescribed sequential six-step process (Krueger, 1998).

First, data from the 90-minute debriefing session were summarized on a white board and the teens were allowed to make corrections as needed. Next, a research team member entered the data into a Word document. Third, to ensure completeness, the first author and text messaging facilitator independently reviewed the data for accuracy. The fourth step involved

organizing data according to the questions and responses given across the group. Research team members then reviewed the data and arrived at similar conclusions, adding credibility to the process. Finally, data from the debriefing session were shared with participants, and the frequencies of MCP text messaging responses were entered into the Statistical Package for the Social Sciences version 16.

Results

The sample for the pretest consisted of eight female and four male participants, with a mean age of 16 years ($SD \pm 0.8$). All were in high school, except for two teens who were in middle school.

Perceived Feasibility and Acceptability of the MCP Multimedia Text Messages

The average 3-week MCP multimedia text message response rate was 80% (see Table 2). Teens reported that they enjoyed seeing themselves in the role-play videos. Two said, “We did a great job.” Another teen said, “I did not know that my brother could act.” Also, the real-life situations were appealing to the group. One teen said, “The videos looked like real teen life situations.” Another said, “I thought that I was watching a television program about teens and safer sex messages.” Teens’ responses to the question *What did you like about the text messages?* varied. All said that they liked the random format (text message, picture, or video) and said the questions represented reality. One teen said, “I was happy that I knew the answers to the questions.” Three teens indicated that this was a “good project” and they were proud to be part of the process.

When asked what they disliked about the delivery process, one teen said, “Some of the abbreviations weren’t useful or necessary.” Another said, “I disliked the command button on the MCP.” The teens indicated that their knowledge of HIV risk-reduction behaviors increased because they received feedback when their answers were wrong. Although they reported increases in knowledge, some areas of inaccuracy and confusion were noted. One teen said, “I did not know the answer to the question, ‘Can mosquitoes transmit HIV?’ I went to my father and he did not know either.” The delivery dose (one message per day) was acceptable to all the teens; however, one said he wanted the messages to be longer. When asked about timing of the messages, the teens agreed that receiving messages once a day after school “worked for them.”

When asked how the process of receiving the MCP text messaging boosters made them feel, the responses varied. Two teens said, “I felt connected with the research team.” One said, “I felt like a businessman with responsibility to the project.” Another said, “I learned a lot about HIV, information that was not taught in school or by my parents.” The teens texted questions to the facilitator to clarify why they got an answer wrong or to ask a question about the next time they were scheduled to meet. The teens suggested that we keep the text messaging language clear and simple because “not everyone knows” various MCP text abbreviations.

Barriers to Implementation

Errors with message delivery and equipment problems, including failure of the Internet hosted SMS to send the message at the specified time, and MCP problems, such as inability to access the Web and inability to receive text messages, were identified and corrected. Teens were able to contact the text message facilitator or project office immediately with any problems. All enjoyed the facilitator’s responses to their text messages and questions. On three occasions, a research team member contacted teens who had fallen below the 80% benchmark response rate. Reasons why teens had not responded to messages included lost/

stolen cell phone, hospitalization, and misinformation about how to respond to the text messages.

Discussion

This study pretested the use of a new technological platform that is ubiquitously in the hands of teens for the delivery of HIV risk-reduction information. Content development involved designing safer sex text messages that were appealing to and understood by teens. The results indicated that teens were interested in receiving information about safer sex behaviors in their natural settings and with technology, using familiar language. The pretest identified problems with the MCP delivery process that the research team was able to correct. Technical challenges were identified and corrected with the SMS communications company, and the research team also identified a backup SMS system.

Although the benchmark group response rate of 80% was achieved, there were some impediments (e.g., a lost cell phone and misunderstanding about how to respond to the messages). The team developed oral and written instructions to give to teens on how to retrieve messages, open pictures, and gain access to video links. Additionally, a list of common text message abbreviations was developed to avoid confusion in interpreting messages. If a teen reported a lost/ stolen or damaged cell phone, a replacement project phone was provided.

Use of Web browsers and text messaging can be costly (Cornelius & St. Lawrence, 2009; Whittaker et al., 2008), and funds needed to be budgeted for this process. In an earlier study, Whittaker et al. (2008) found that costs of downloading video clips with prepaid phones was a major barrier to adoption of their smoking cessation intervention. However, the SexInfo project in San Francisco allowed individuals to text random questions to project staff, eliminating costs for downloading videos, which required text message responses in this study.

The potential of using MCPs to reach large numbers of youth with health promotion information has several advantages. MCPs are in widespread use and do not require great technological expertise to operate. The majority have multimedia features, similar to those used in our intervention, and MCP interventions can be adapted for use in resource-poor countries with 100% cell phone penetration and high rates of HIV infection. Finally and most importantly, the ability to receive, respond to, and review messages on demand and in a confidential manner was of maximum benefit to youth.

Our findings need to be generalized cautiously, given the small and convenient sample from one geographic area. However, with its focus on a new platform for delivering HIV safer sex messages, the study results were promising and provide insight into adapting HIV information for MCP delivery. Our findings indicate that this approach could be acceptable and not intrusive to teens, and thus supportive of a new HIV risk-reduction delivery platform.

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Table 1**Sample Multimedia MCP HIV-Prevention Text Messaging Boosters**

Session	Objective	Examples of Text Messaging Boosters
1	HIV knowledge	U can get HIV with unprotected sex
2	Making sexual decisions and understanding values	Alcohol leads 2 unsafe sex
3	Developing and using condom skills	Latex protects U from HIV
4	Learning assertiveness skills	Use an “I” message 2 day
5	Practicing assertive communication	What type of communication is this? http://bart.uncc.edu/role06.html (video)
6	Personalizing the risks	http://bart.uncc.edu/olivia.html . If some1 does this will they get HIV? (picture)
7	Spreading the word	Protect ur self against HIV
8	Taking BART with you	Love and protect ur self use condoms

NOTE: MCP = mobile cell phone; BART = Becoming a Responsible Teen.

Table 2

Participant Response Rate to MCP Multimedia Text Messaging Booster Messages

Participant ID	Number of Messages Responded to (<i>n</i> = 17)	Response Rate	Staff Attempt to Reach Teen Who Fell Below 80% Response Rate
1	16	94%	
2	16	94%	
3	16	94%	
4	16	94%	
5	16	94%	
6	16	94%	
7	6	41%	Yes
8	4	24%	Yes
9	16	94%	
10	11	65%	Yes
11	16	94%	
12	14	82%	
Total group response rate		80%	

NOTE: MCP = mobile cell phone.