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Adolescents' perceptions of a mobile cell phone text messaging-enhanced intervention and development of a mobile cell phone-based HIV prevention intervention

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Abstract

Purpose—This study examined African American adolescents' perceptions of a mobile cell phone (MCP)-enhanced intervention and development of an MCP-based HIV prevention intervention.

Design and Methods—One focus group was conducted with 11 adolescents who participated in the Becoming a Responsible Teen Text Messaging project.

Results—Adolescents said they benefited from the MCP-enhanced approach and were receptive to the idea of developing an MCP-based intervention.

Practice Implications—Nurses can use the findings of this report as a starting point in examining the development of MCP-based sexuality education with parents and adolescents.

Search terms

Adolescents; mobile cell phone; text messaging

Human immunodeficiency virus (HIV) is a critical health concern for African American adolescents and young adults. Current estimates suggest that rates of infection are worse than previously expected, with half of HIV-infected individuals, 13–29 years of age, self-identifying as African American (Centers for Disease Control and Prevention [CDC], 2010a). African American adolescents are at greater risk for infection in part because they are more likely than adolescents of other ethnic groups to be sexually active, to have multiple sexual partners, and to have gotten someone pregnant (CDC, 2008, 2010c). Given these high risk behaviors, reaching adolescents with safer sex information is crucial (CDC,

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2010b). Yet, despite efforts to reach those at risk, many adolescents do not know their HIV status (CDC, 2010a) or understand modes of HIV transmission (Cornelius, Cato, St. Lawrence, Boyer, & Lightfoot, 2011). Therefore, new interventions and better methods of disseminating effective interventions are urgently needed (CDC, 2010c).

Mobile cell phones (MCPs) may be an effective way to reach adolescents as these phone users are more likely to be African American, younger, less educated, and belong to a low socioeconomic group (Lenhart, 2010). The amount of time that African American adolescents spend on media and multitasking with MCPs averages 13 hr a day (Kaiser Family Foundation Study, 2010). These adolescents now spend more time using the media features on their MCPs than talking on them (Kaiser Family Foundation Study, 2010). One study found that African American adolescents used their MCPs more than adolescents from other racial groups for texting and social interaction (Lenhart, 2010).

Lim, Hocking, Hellard, and Aitken (2008) identified several programs that used MCP technology to provide sexual health services via text messages. Services in Australia, Singapore, India, China, Finland, and the United States sent general safer sex messages to masses of people using MCPs (Lim et al., 2008). This approach has proven to be a cost-effective way of reaching large groups of people with safer sex information. However, while success has been reported with general sexual health messages, few MCP sexual health studies have targeted adolescents (Currie et al., 2010; de Tolly & Alexander, 2009; Dhar, Leggat, & Bonas, 2006; Gold, Lim, Hellard, Hocking, & Keogh, 2010; Lim et al., 2011; Puccio et al., 2006; Samal et al., 2009), and even fewer have targeted African American adolescents (Cornelius et al., 2011; Cornelius & St. Lawrence, 2009; Juzang, Fortune, Black, Wright, & Bull, 2011; Levine, McCright, Dobkin, Woodruff, & Klausner, 2008; Wright, Fortune, Juzang, & Bull, 2011).

In one of the few studies, Juzang and colleagues (2011) explored the feasibility of delivering HIV prevention text messages to African American men, 16–20 years of age. Three text messages per week were delivered for 12 weeks to the intervention group, while the control group received text messages about nutrition. Participants in the intervention group showed significantly greater awareness of HIV knowledge and sexual health.

Levine and colleagues (2008) conducted a sexual health program in partnership with the San Francisco Department of Public Health. The program has been successful in providing safer sex messages using MCP technology to the general public. African American adolescents were more likely than adolescents of other ethnic groups to report awareness of the program, live in the targeted neighborhoods, and own an MCP (Levine et al., 2008).

In another study, Cornelius and St. Lawrence (2009) examined the receptivity of African American adolescents, 13–18 years of age, to an HIV-prevention intervention enhanced by text messaging boosters. Adolescents were receptive to the idea of receiving text messaging boosters about safer sex information but wanted to receive no more than three messages per day during the hours of 4–6 p.m. Eastern Standard Time.

Cornelius and colleagues (2011) then conducted a study to develop and pretest multimedia text message boosters with a sample of 12 African American adolescents to enhance the Becoming a Responsible Teen (BART) intervention. Adolescents received one multimedia text message daily for 3 weeks and provided feedback as to what they liked and disliked about the text messages and delivery process. A majority of the adolescents felt connected to the research team by having a project MCP, but they recommended keeping the text messaging language simple (Cornelius et al., 2011). Thus, MCP technology clearly has the potential for reaching African American adolescents with HIV prevention information. However, before we can adapt an HIV prevention intervention for MCP-based delivery to

masses of adolescents, we must understand adolescents' perceptions of MCP text messaging-enhanced and MCP-based HIV prevention interventions.

METHODS

Design

The study reported here was part of a larger study (Cornelius, 2008) that examined the feasibility of enhancing an adolescent HIV prevention intervention using text messaging delivery. Adolescents attended seven weekly BART face-to-face sessions, then they received daily multimedia text messages (pictures, videos, and text messages) for 3 months (see Table 1). Each teen in the project received a Blackberry® smartphone for consistency with the text messaging delivery process. Multimedia text messages included URL links to pictures that showed modes of HIV transmission, videos with adolescents role-playing different communication techniques (passive, assertive, aggressive), ways to apply a condom, and ways to negotiate safer sex practices with peers and significant others (Cornelius et al., 2011). Adolescents' perceptions of the MCP text messaging-enhanced intervention and the development of an MCP-based HIV prevention intervention delivered solely via MCP technology without face-to-face sessions were examined in an exit focus group interview. The study was approved by the first author's university institutional review board. This article reports the exit focus group findings.

The focus group was held in a private room at a university in the southeast region of the United States. A purposive sample of 11 adolescents (30% of those in the larger study) was recruited for the focus groups. Inclusion criteria were attendance at seven weekly face-to-face sessions, responses to at least 80% of the daily multimedia text messages, and returned for the 3-month follow-up. The sampling plan allowed for equal numbers of boys and girls, and captured different educational levels. Before the focus group session, the participants were informed of the purpose of tape recorders on the table in front of the classroom, and guidelines for the session were discussed. Participants were asked to speak one at a time as the moderator wrote key ideas on a white-board in front of the classroom and were asked to be respectful of others if they disagreed with an opinion. Two main questions with subsequent follow-up questions guided the discussions about the safer sex MCP text messaging experience (see Table 2). The audiotaped session lasted 50 min, and participants were compensated $50 for their time.

Data analysis

Data were collected and analyzed following the focus group method of Krueger and Casey (2000). The moderator provided participants with a brief summary of the main ideas that had been expressed so that they could make changes or additions to the summarization. After the focus group session, the moderator debriefed with the first author. The focus group data were then transcribed verbatim, without any names on the transcript, and supplemented with field notes from the debriefing session. To ensure content accuracy and completeness, two research team members reviewed the transcribed data against the tape-recording of the session. The transcript was read multiple times by the first author and a research team member for consensus. Findings were structured around the focus group questions.

RESULTS

The sample comprised six female and five male participants with a mean age of 15.4 years ($SD \pm 1.7$ years). The majority attended high school (grades 9–12), one attended middle school (grades 6–8), and one was in the first year of college. Seven adolescents owned a

personal cell phone, and two had forwarded project MCP multimedia text messages to their peers (see Table 3).

Perceptions of MCP text messaging-enhanced intervention

The moderator started the session by asking participants, “How did the multimedia MCP text messaging process (receiving and responding to the messages) make you feel?” Participants’ responses reflected a sense of duty and obligation to discuss the project with their peers and friends. They felt that they were doing something important because of the high rates of HIV infection. One female teen said, “I actually spoke with people about what I was doing and learning with the project and forwarded messages to my friends.” One male said, “This project gave me an enlightened sense of HIV and AIDS, and how much it can be spread to others.”

Participants mentioned the ways their friends noticed the project cell phone, the Blackberry, and asked them about it. One teen said, “A lot of people asked me what I was doing with a Blackberry, so I told them it was for this study, and even they were surprised at some of the questions asked.” Two participants who forwarded text messages to their peers used the opportunities to engage in learning experiences in their social network. One said, “I looked forward to discussing the answers to the messages with my friends.” Another added, “Two of my friends engaged in conversations about the messages. I also took three of my friends to have an HIV test and one of them found out that she was pregnant.”

Responses to a question about what they liked best about the project varied. One teen said, “I liked the facilitators’ responses when you have the correct answers, they were like, ‘yeah, You go girl’ stuff like that.” Another said, “I liked that I learned from the text messages about how HIV is transmitted. Every person can learn something new about HIV that they did not know before.”

Adolescents also shared what they liked least about the MCP text messaging-enhanced intervention. One participant said, “I did not like the repeated text message questions.” Another said, “I did not like waking up early and coming in for the face-to-face sessions.” Another agreed, “I didn’t like waking up early on Saturdays either.”

The participants commented that the videos were realistic, and this was important if people expected them to learn and respond to messages. The videos provided information on how to react in similar situations, and thus they personalized the situations to their own lives. One said, “I liked the big sister/little sister video on safer sex information because I have a little sister and I can look forward to teaching her about safer sex when she gets older.” Another participant said, “I liked the assertiveness communication video where the girl stood her ground when her boyfriend wanted her to have sex without a condom. She used assertive communication.” Another added, “I don’t remember the name of the video, but it was the one on risky sexual behavior where a group of teenagers … were at a party and there were lights and music playing in the background. I liked it because it was realistic because of the setting and all the stuff such as the bottle in a brown paper bag and the brown colored cigarette to make you think that it was alcohol and drugs.”

Adolescents said they learned most from the introductory YouTube video and one of the intervention videos entitled “Simply Fresh.” One teen said, “These videos show you that things aren’t as they appear with people. Like, they didn’t even know that their friend was having sex with men, and that he had AIDS.” Another said, “I agree, these videos show you that people are cruel and will knowingly infect you with the virus that causes AIDS.”

Perceptions of developing an MCP-based intervention

The moderator also asked participants what they thought about the idea of sending HIV prevention information solely to their cell phones as an alternative to an MCP text message-enhanced intervention with face-to-face sessions and once-a-day multimedia text messaging boosters like the one they had received. All but one participant ($n = 10$) were in favor of an MCP-based cell phone intervention. One male said, “I think it’s a good idea because I always have my phone on me, and it would be easier to answer the message instead of having to come in for the face-to-face sessions.” A female said, “I think it’s good because if people can’t make it to the class, or like they just can’t make it that day, they could get the text message and answer it. However, it is important that if we have a question, we can text the facilitator and get an immediate response.” Another teen said, “I think not having to wake up early and just have it on your phone and not having to drive somewhere is really a convenience. We have cell phones in our hands, so why not use them.”

Another teen disagreed, however, saying,

> I actually disagree with that because we need that interaction [face-to-face] and to get what other people feel about certain examples that the facilitators give us. We need to have a wide variety of ideas based on what other people think. And if we don’t have that we’ll just be thinking, okay, worldwide AIDS, blah, blah, blah. And it won’t be like a fun thing where you can interact with other people.

Another teen said, “I think the ‘BEST’ advantage of a MCP-based project is that you do not have to wake up early and you will have the information on your cell phone and not have to drive somewhere. Like anything … else it’s a convenience thing.”

Participants gave various reasons why they would participate in an MCP-based intervention. One said, “I would participate in an MCP-based HIV prevention program; however, I think that we should be able to reach a facilitator like we did in this project. Because some people can’t ask their mom or dad questions like they would a facilitator.” Another teen said, “I would participate but make sure that people do not have problems with the delivery process; I had to switch my phone because of technical problems.”

The participants listed several advantages to an MCP-based approach; for example, they would not have to make up missed sessions and would not spend time traveling to the project site if the information were delivered directly to their MCPs. Only three mentioned disadvantages to an MCP-based intervention. One said, “I would miss interacting with people, like in the sessions [face-to-face].” Another added, “I would rather come to the classroom.” The third teen said, “I think that it might be a bad idea because it won’t be effective as with people doing it. I may say I ain’t got to do it so it won’t be as effective as one-on-one with the facilitators.”

When asked how an MCP-based intervention could be enhanced to ensure that adolescents benefit from the experience, one adolescent said, “Randomize the delivery process. Send text message, picture, video one day and then picture, video, and text message the next day.” Another said, “Keep the participants informed, send videos, and do hands-on things, like we did.” Another recommended making the intervention similar to a television program or commercial program.

Participants varied in how many minutes per day they would view multimedia text messages sent to their MCPs. A majority ($n = 6$) thought that at least 12–26 min per day (average 15.6–19.5 min per day) would be sufficient to view, respond, and practice skills with the MCPs. Participants also thought that messages should be sent once daily. One teen said, “For me I would forget my phone at home sometimes. So if I forgot to answer a question, I

would only miss one, but if ya'll sent two, I would have missed two questions." Another added, "I think one is good because then if you're around friends you can just talk about one topic, and not get off topic and go around it."

When asked the best hours for sending MCP-based messages, one participant said, "Um somewhere around 4:00 p.m., due to the fact that I get out of school at 3:35 p.m." Another said, "It's like I get out of school at 2:30 p.m., so I guess you could say like 3:00 p.m. because I do not want it ringing in class."

Participants unanimously agreed that with the MCP-based approach, they should be able to text their facilitator questions. They viewed the facilitator as a person who knew the answers to questions that their peers and parents might not know. When asked to elaborate, one teen said, "I remember I had a problem with one of the text messaging questions, it didn't make sense. So I had to get—I had to like elaborate with my facilitator to make more sense of it. So, if we are able to text our facilitators, we can understand the question a little bit more, or [if] we have questions outside of HIV, like we want to know more about say an STD or something, we can always ask our facilitator about it." Another added, "I agree that a teen should be able to text their facilitator because some people can't ask their mom or their parents the questions they want to ask them, but you could ask a facilitator."

The moderator then asked participants what would make the MCP-based intervention delivery process go smoother. One participant suggested making role-play skits interactive: "Maybe you could send a role play script question and have the teen text the response to the facilitator, keep a dialogue going." Another participant recommended delivering the messages in a random format. The adolescents recognized the value of having a Teen Advisory Committee for input into the design, testing, and implementation of the project. One teen said, "Use a Teen Advisory Committee to recruit and market the project by making presentations at schools." Another suggestion was to market the MCP-based intervention to young adults, those in college. The participants also suggested that we provide some way in which they could interact with each other in face-to-face sessions.

Finally, the participants were asked if they would participate in an MCP-based HIV prevention program with their parents. They gave several reasons for doing so. One said, "I want to see how much my mother knows about HIV." Another said that he would participate so that he could observe his mother's reactions to some of the information. Another teen indicated that she would participate because her mother was biased toward certain high risk individuals and had inaccurate information about HIV transmission. She said,

> I would participate because my mother is very stereotypical, uh, I don't know if I said that right, I don't care. But, yes, so she—she is, you know like, she doesn't understand where HIV, well she knows where it comes from, but her main objective is homos. So, I would like for her to get these messages, so that she knows that everybody can get HIV.

DISCUSSION

Participants in this study were receptive to the MCP text messaging-enhanced intervention and identified what they liked best and least about the intervention. They also said they would participate in an MCP-based intervention and would consider participating in one with their parents. They noted both the advantages and disadvantages of an MCP-based intervention and provided suggestions on how the research team could develop an MCP-based intervention for this age group.

Few studies have evaluated the frequency with which text messages should be delivered. The participants in this study said that the once-a-day MCP text messaging dosage of choice was “appropriate and perfect.” In other research, once-a-day or once-a-week messages have been successful in increasing knowledge and promoting healthy behaviors in adolescent patients (Cornelius et al., 2011; Cornelius & St. Lawrence, 2009; Franklin, Waller, Pagliari, & Greene, 2006; Newton, Wiltshire, & Elley, 2009). One-time text messages have been found to be effective for patient–provider communication (Levine et al., 2008), notification of test results (Dhar et al., 2006; Menon-Johansson, McNaught, Mandalia, & Sullivan, 2006), and medication adherence (Puccio et al., 2006). Gold and colleagues (2010) sent text messages fortnightly to participants 16–29 years of age. A majority of the participants, however, recalled receiving the messages monthly and felt that the timing was appropriate. Few, however, remembered messages being sent more frequently. Juzang and colleagues (2011) sent three messages per week to the participants in their study. As with this study, participants preferred that the messages be delivered after school.

Participants identified ease of use, anonymity, confidentiality, and support on demand, regardless of location, as advantages to MCP text messaging-enhanced and MCP-based interventions. As in previous research, the participants felt that the ability to reach facilitators with additional questions provided them a connection to project staff and assurance that someone was available to answer their questions about sexual health (Cornelius et al., 2011; Levine et al., 2008).With this age group, the use of facilitators is clearly important.

The potential of MCP technology to influence behavior change has been documented (Cole-Lewis & Kershaw, 2010). The messages increased participants’ HIV awareness and knowledge, and this is encouraging. As with previous research (Gold et al., 2010), two participants in this study shared the text messages with their peers, and one encouraged her friends to get tested for HIV. Consistent with other research, when participants received information about getting tested for sexually transmitted infections, it decreased their fear of testing (Gold et al., 2010, 2011).

Other research has also shown the receptivity of adolescents to the delivery of safer sex messages using MCP technology (Cornelius et al., 2011; Cornelius & St. Lawrence, 2009). In this study, adolescents were receptive to the MCP-based platform, as evident by one teen’s statement that “My cell phone is always with me.” Participants recommended a random format of delivering messages and did not like repetition of messages. As in other research, adolescents favored variety in the text messaging delivery process (Gold et al., 2010, 2011).

Previous research has shown that improving parent–child sexual communications can delay initiation of sexual activity, and parents need assistance with sexual communications with adolescents (Cornelius, 2009; Dilorio, McCarty, & Denzmore, 2006). At this time, only face-to-face and computerized parent–child sexuality interventions exist. However, the MCP holds promise as a new communication device. In our study, adolescents were receptive to the idea of participating in a parent–child MCP-based intervention and thought that an MCP-based parent–child educational intervention might be effective for health promotion.

Our study is one of a few that have targeted African American youth, used the multimedia features of MCP technology, provided participants feedback with their responses (correct or incorrect), and enhanced an evidence-based intervention for MCP delivery. This feature has been used with computer technology but not with MCP technology. The majority of cell phones today can accept and deliver multimedia text messages (including pictures and

videos). Researchers need to further examine the potential of using MCPs to improve sexual health.

A few limitations of our study should be noted. First, the research was exploratory, and therefore generalization of the focus group findings was not a goal. Rather, the aim was to document the opinions of the target group regarding the feasibility and acceptability of MCP-enhanced and MCP-based interventions. More specifically, the focus group was designed to allow adolescents to express their ideas and say what they liked and disliked about both approaches. Second, our study included a small purposive sample of adolescents who participated in an MCP text messaging-enhanced project; their responses might differ from those who had not participated in a text messaging project. Nevertheless, this sample represented a good source for increasing our understanding of the use of MCP technology to deliver safer sex messages to African American adolescents. The experiences of the adolescents who participated in this MCP-enhanced text messaging project highlight the importance of considering the use of MCPs to meet the sexual communication needs of this age group. Adolescents may benefit from an MCP approach that provides safer sex information to them directly.

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How might this information affect nursing practice?

The findings from this study can be used as a starting point for an examination of MCP-based sexuality education. One other study found that almost half of the MCP messages sent to a school nurse were related to issues of sexuality (Utting, 2004). Pediatric nurses can also explore opportunities to educate adolescents and parents on sexuality issues. Adolescents in our study were receptive to the idea of a parent–teen MCP intervention.

Similar to the facilitators in this study, nurses can use MCPs to dialogue with adolescents about risky sexual behaviors. With interactive dialogue, nurses can communicate with adolescents in a language that they are familiar with and with technology that is always in their hands. MCP technology has been recognized as a health promotion tool for behavior change (Cole-Lewis & Kershaw, 2010), and it has significant relevance for reducing risky sexual behaviors.

Table 1

Examples of Multimedia Text Messages

Type of message	Example multimedia text message
True or false	T or F: HIV+ mothers can infect their babies thru breastfeeding. TXT UR ANSWER!
Fact or myth	FACT or MYTH. U WILL get HIV if you do this. Click on this link: http://bart.uncc.edu/images/wt/worknext.jpg TXT UR Answer by hitting reply.
Short answer	HIV is exchanged thru 4 body fluids. Txt 2 of the body fluids.
Picture	Click on this link: http://bart.uncc.edu/images/wt/needle.jpg Is this behavior HIGH, SOME, OR NO RISK 4 HIV? TXT UR ANSWER.
Video	Click on this link http://bart.uncc.edu/tyneshia.html TXT UR Answer by hitting reply.

Table 2

Focus Group Interview Questions

Main questions	Follow-up questions
MCP-enhanced intervention	
How did the multimedia MCP text messaging process make you feel?	• What did you like best about the project? • What did you like least about the project? • Which video did you like the most? • Which video did you learn the most from?
MCP-based intervention	
We are thinking about sending information from the BART intervention solely to your cell phone so that you will not have to come in for the sessions each week. What do you think about this idea?	• Would you participate in a program in which safer sex messages would be sent solely to your cell phone? • What would be an advantage of delivering multimedia MCP safer sex messages this way? • What would be a disadvantage? • How can we make it so that adolescents learn from this process? • How many times a day should we send the messages? • What time of day should they be sent? • Do you think adolescents should be allowed to text their facilitators if they have questions? • What should we use more of, pictures, videos, text message responses? • Any suggestions to make this process go smoother? • Would you attend a parent–teen MCP-based HIV prevention intervention?

MCP, mobile cell phone; BART, Becoming a Responsible Teen; HIV, human immunodeficiency virus.

Table 3

Sample Demographic Characteristics

ID	Gender	Age	Education level	Sent MCP-messages to friends	Owned a personal cell phone	Suggested minutes for MCP-based intervention
1	Female	13	8th grade	No	Yes	12–15
2	Male	18	12th grade	No	Yes	16–20
3	Female	17	11th grade	No	Yes	No response
4	Female	17	11th grade	Yes	Yes	21–26
5	Female	15	10th grade	Yes	Yes	12–15
6	Female	16	10th grade	No	No	21–26
7	Male	18	College freshman (first year in college)	No	Yes	12–15
8	Male	16	11th grade	No	No	No response
9	Male	17	11th grade	No	No	No response
10	Female	16	11th grade	No	No	No response
11	Male	15	10th grade	No	Yes	No response

MCP, mobile cell phone.

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