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Opportunities for technology-based HIV prevention programming among high school students in Cape Town, South Africa

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Abstract

One in three new cases of HIV in South Africa is among adolescents. Given that adolescents are particularly affected, scalable and cost-effective prevention programs are urgently needed. This study aims to identify opportunities to integrate technology into youth HIV prevention efforts. In 2012, 1,107 8^{th} – 11^{th} graders completed a paper-and-pencil survey. Respondents were enrolled in one of three public high schools in Langa. Because it is the closest black township to Cape Town, Langa has the highest density of people in the region. Eighty-nine percent of respondents have used text messaging (SMS) and 86% have gone online. If an HIV prevention program was offered online, 66% of youth would be somewhat or extremely likely to access it; slightly fewer (55%) felt the same about SMS-based programming. In comparison, 85% said they would be somewhat or extremely likely to access a school-based HIV prevention program. Interest in Internet-(60%) and SMS-based (54%) HIV prevention programming was similar for youth who had a self-appraised risk for HIV compared to youth who appraised their risk to be lower, as it was for youth who were tired of hearing messages about HIV prevention.

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Technology use is common – even among high school students who live in lower income communities. At the same time, these data reveal that it is not uncommon for youth to be tired of hearing messages about HIV prevention, and many of the typical topics key to HIV prevention have low interest levels among youth. HIV prevention researchers need to be mindful of the extent of existing programming that youth are exposed to. Technology-based programming may be especially amenable to meeting these requirements because of its novelty especially in developing countries, and because interactive functionality can be easily integrated into the program design. Given the preference for school- and Internet-based programming, it seems that a hybrid approach is likely feasible and acceptable.

Keywords

HIV prevention; adolescents; technology; needs assessment

INTRODUCTION

Despite intensive HIV prevention research (Hargreaves et al., 2007; Rehle et al., 2007) and the development of effective prevention programming (Harrison, Newell, Imrie, & Hoddinott, 2010; Jewkes et al., 2008; Pettifor et al., 2004), adolescent HIV preventive behavior change remains elusive (Hartell, 2005; Shisana et al., 2009; Van der Linde & Human Sciences Research Council, 2013). Of great concern, HIV risk behaviors appear to be increasing among South Africans (Van der Linde & Human Sciences Research Council, 2013).

To promote behavior change, HIV prevention programs need to be efficacious but also easily implemented. Data suggest explosive technology growth in South Africa (Central Intelligence Agency, 2013; Smith, 2013). Technology-based interventions lack many of the structural challenges noted in traditional interventions and are less costly to scale up (Cole-Lewis & Kershaw, 2010; Free et al., 2013; Noar, Black, & Pierce, 2009; Perry et al., 2012; Ybarra & Eaton, 2005). Nonetheless, technology is under-utilized to promote HIV preventive behavior in developing countries. To determine whether technology is an appropriate delivery mechanism for adolescent-focused HIV preventive programming in South Africa, a better understanding of both how young people use technology and also their interest in engaging with HIV preventive information through technology, is critical.

Methods

The research protocol was reviewed and approved by the University of the Western Cape and the Chesapeake Institutional Review Board. Data were collected between April-August 2012. All participants provided written informed consent.

Location and Participants

Respondents attended one of three partner schools in Langa, a low income community with the highest density of people in the region because it is the closest black township to Cape

Town. All students in Grade 8 to Grade 11 who were 16 years of age (the legal age of consent in South Africa) or older were invited to voluntarily participate in the study.

Procedures

Surveys were completed via paper and pencil in the absence of the teachers and school administrators. To assure anonymity, names were not collected on the survey instrument.

Respondents took an average of one hour to complete the survey. The survey was written in English, which is the official language of South Africa and the language of instruction in the high schools. There are multiple living languages in South Africa, however (Intersol Inc, 2010). The survey was first piloted among youth in the target age range to ensure readability and acceptability of sensitive questions.

Measures

Acceptability of information delivery by mode—All youth were asked: "If there was a health education program about HIV/AIDS prevention for teenagers, how likely would you go to it if it was …. a) at school, b) at a religious organization, c) over e-mail, d) over text (SMS) messages, and e) on the Internet".

Interest in HIV prevention programming—Topics were chosen to reflect key components of HIV prevention programs, as well as those that were posited to be salient to youth based upon our previous work with sub-Saharan adolescents (Ybarra, Biringi, Prescott, & Bull, 2012). Youth were asked to rate how much they agreed or disagreed with the statement: "I am tired of hearing about how to prevent HIV / AIDS and other STDs (sexually transmitted diseases)." They also were presented with a list of eight different topics related to HIV/AIDS and were asked whether they would be interested in receiving information about them. Topics included HIV-specific information (e.g., how to use a condom), family planning (e.g., birth control), and relationships (e.g., how to start a relationship).

HIV risk attitudes and behaviors—Youth were asked to appraise their personal risk of getting HIV; and how strongly they agreed or disagreed with the following statement: "I am tired of hearing about how to prevent HIV/AIDS and other STDs (sexually transmitted diseases)."

Vaginal sex was queried: "Have you **ever** had vaginal sex? We mean when a penis goes into a vagina." Anal sex was queried: "Have you **ever** had anal sex? We mean when a penis goes into an anus."

Data cleaning

All surveys were double entered by project staff to ensure accuracy. Missing data were imputed using the "impute" command in Stata, which estimates missing values using best set regression (StataCorp, 2009). Each respondent was required to have valid, non-missing data for at least 70% of the variables included in the analyses. Based on this criterion, 92 respondents were removed and 1,015 were retained.

Results

Of the total 1,460 students who were enrolled in the three partner schools, 1,279 students (88%) were present on the day of the survey. 1,107 of the 1,191 eligible students completed the survey (Response rate = 93%). Demographic and technology use characteristics are shown in Table 1.

Interest in HIV prevention programming

As shown in Table 2, one in three youth (38%) somewhat or strongly agreed that they were tired of hearing about how to prevent HIV/AIDS and other STDs. Few expressed interest in learning: how to "refuse sex" (43%), how to use a condom (42%), and about birth control (32%). Even topics posited to be of interest to adolescents (e.g., how to develop a relationship) were endorsed by less than half of youth. Males tended to be more fatigued and less interested than females about HIV prevention programming.

Acceptability of information delivery by mode

Of the five access points queried, youth were most likely to indicate that they would be somewhat or very likely to access an HIV prevention program if it were delivered at school (85%, Table 3).

Reaching youth at greater risk for HIV

Sixty percent of youth who appraised their likelihood of getting HIV as above average chance said they were somewhat or very likely to access an HIV prevention program if it were online and 54% if it were via SMS. Similar rates of interest in Internet (60%) and SMS (53%) programming were noted among youth who agreed they were tired of HIV prevention messaging, and for youth who reported ever having vaginal or anal sex (67% and 55%, respectively). As shown in Table 4, among otherwise similar youth, those who were tired of hearing about HIV prevention were about 50% less likely to access a program if it were offered at school or online, with a similar trend noted for email. Youth who had had vaginal sex were 34% less likely to access it if it were offered online.

Discussion

Technology use is common among adolescents attending our three partner schools in the lower income community, Langa, South Africa. Yet, these data reveal that it is not uncommon for youth to be tired of hearing messages about HIV prevention, and many of the typical key HIV prevention topics key have low interest levels among youth. HIV prevention researchers need to be mindful of the extent of existing programming that youth are exposed to. Technology-based programming may be especially amenable to meeting these requirements because of its novelty especially in developing countries, and because interactive functionality can be easily integrated into the program design.

According to youth in this study, the likelihood of accessing an HIV prevention program was greatest if the program were offered at school. Perhaps this is because currently available programming is predominantly delivered in schools, so this is the most familiar

option for youth. This does not mean that youth were opposed to technology-based programs, however: Two in three youth said they were at least somewhat likely to access an Internet-based program, and slightly more than one in two youth would access an SMS-based program. Given the preference for school- and Internet-based programming (among the technology-related access points), a hybrid approach may be feasible and acceptable. For example, perhaps an Internet program could be offered as an after-school activity on school grounds. By utilizing the Internet as the program delivery mechanism, one safeguards program fidelity by ensuring all youth have access to the same, accurate sexual health information, while simultaneously allowing youth greater privacy to complete the program when and where they are comfortable. It also takes the onus off the teacher to deliver what can be uncomfortable or embarrassing information to their students, as well as the burden of finding classroom time to teach the material.

Limitations

The generalizability of these data to greater South Africa, and youth who do not speak English fluently or are not enrolled in high school is unknown. Furthermore, it is possible that some youth did not answer honestly. Additionally, technology use was lower among the 92 respondents excluded from the analyses. Differences in findings may have been noted if these youth or those who were absent on the day of the survey had been included in the analytical sample.

Conclusions

In South Africa, like many countries, people who live in low income households are at higher risk for HIV (Government of the Republic of South Africa, 2011). The access to and interest in technology as a delivery mechanism for HIV prevention programming among low income students in the current study suggest this may be an under-utilized opportunity to reach this vulnerable population. Importantly, too, youth with characteristics that may further increase their risk for HIV (e.g., vaginal sex) are generally as likely to be interested in technology-based programming as their peers. The current data support a greater exploration of applications of technology in delivering HIV preventive behavior in South Africa.

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Table 1

Youth characteristics (n=1,015)

Youth characteristics	% (n)
Demographic characteristics	
Female	63.7% (647)
Age (Range: 16–24; M:SD)	17.5 (1.2)
Grade	
Grade 8	0.2% (2)
Grade 9	0.1% (1)
Grade 10	52.0% (528)
Grade 11	47.7% (484)
Race	
African	97.7% (992)
Colored *	0.6% (6)
Indian	0.1% (1)
White	0.1% (1)
Other	1.5% (15)
Father's education	
No formal education	2.4% (24)
Primary school	6.5% (66)
Secondary school	36.6% (371)
Tertiary institution / University graduate	25.8% (262)
I am not sure	28.8% (292)
Income	
Lower than the average family	29.0% (294)
Similar to the average family	60.8% (617)
Higher than the average family	10.3% (104)
Mother's education	
No formal education	2.6% (26)
Primary school	5.2% (53)
Secondary school	39.8% (404)
Tertiary institution / University graduate	31.1% (316)
I am not sure	21.3% (216)
Importance of religion on respondent's life	
Not at all important	3.0% (30)
Somewhat unimportant	1.4% (14)
Somewhat important	11.8% (120)
Very important	83.8% (851)
Technology use	
Ever used the Internet	85.8% (871)
Ever used SMS (text messaging)	
Do not have a phone	9.9% (100)

Youth characteristics	% (n)
Have a phone, do not SMS	1.5% (15)
SMS	88.7% (900)
Self-appraised chance of getting HIV is above average / very strong	12.7 (129)

* Colored refers to youth who are mixed race (White and African)

Table 2

Interest in specific HIV prevention programming-related topics (n=1,015)

Appraisal of HIV prevention programming	All (n=1,015)	Males (n=368)	Females (n=647)	p-value
Somewhat / very tired of hearing about how to prevent HIV	37.5% (381)	42.1% (155)	34.9% (226)	0.02
Interested in learning about…				
How to end a relationship	43.8% (445)	36.7% (135)	47.9% (310)	0.001
How to avoid sex if you don't want to have sex	43.4% (440)	28.8% (106)	51.6% (334)	<0.001
How to use a condom	42.2% (428)	43.5% (160)	41.4% (268)	0.52
How drugs and alcohol affect your decision making	39.1% (397)	50.3% (185)	32.8% (212)	<0.001
Birth control / family planning	31.5% (320)	27.5% (101)	33.9% (219)	0.04
How to refuse sex from a sugar daddy / mommy	22.7% (230)	22.3% (82)	22.9% (148)	0.83
Where to get an HIV test	21.9% (222)	23.9% (88)	20.7% (134)	0.24
How to develop and maintain a romantic relationship	16.7% (169)	22.0% (81)	13.6% (88)	0.001

p-value based upon a chi-square testing the relative difference in endorsement for males versus females

Table 3

Likelihood of accessing an HIV prevention program based upon different access points (n=1,015)

Likelihood of accessing an HIV prevention program if it were available through….	School	Religious Organization	Email	SMS (text messaging)	Internet
Not at all likely	10.1% (102)	17.8% (181)	33.1% (336)	27.5% (279)	20.9% (212)
Somewhat unlikely	4.7% (48)	12.3% (125)	24.6% (250)	17.4% (177)	13.0% (132)
Somewhat likely	38.3% (389)	46.1% (468)	22.2% (225)	30.6% (311)	31.4% (319)
Extremely likely	46.9% (476)	23.7% (241)	20.1% (204)	24.4% (248)	34.7% (352)

Table 4

Relative odds of being somewhat or very likely to access an HIV prevention program[a]

HIV risk attitudes and behaviors	School (n=1015)	Religious organization (n=1015)	Email (n=1015)	SMS (text messaging; n=1015))	Internet (n=1015)
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Above average chance of getting HIV	0.97 (0.54, 1.73)	1.00 (0.60, 1.66)	0.82 (0.55, 1.23)	0.86 (0.57, 1.32)	1.26 (0.78, 2.04)
Tired of hearing about HIV prevention	**0.47 (0.31, 0.72)**	0.79 (0.56, 1.11)	*0.78 (0.59, 1.03)*	0.79 (0.59, 1.06)	**0.57 (0.42, 0.80)**
Ever had vaginal or anal sex	0.82 (0.51, 1.33)	0.82 (0.56, 1.20)	0.89 (0.66, 1.22)	0.95 (0.69, 1.32)	**0.66 (0.45, 0.95)**

[a]Five different multivariate logistic regression models were estimated, one for each access point (e.g., school). Each model estimates the relative odds of being somewhat or very likely to access an HIV prevention program through the access point in question, given the indicator of HIV risk behavior or attitudes in question. Odds ratios are adjusted for the other two HIV risk attitudes and behaviors, as well as demographic characteristics (i.e., biological sex, age, grade, race, paternal and maternal education, income, i.e., religiosity), technology use (i.e., Internet, SMS), self-reported honesty, and the number of variables imputed. Bold text denotes statistical significance ($p<0.05$). Italicized text denotes borderline statistical significance ($p<0.10$).