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A Human Immunodeficiency Virus Posttest Video to Increase Condom Use Among Adolescent Emergency Department Patients

Yvette Calderon, M.D., M.S.^{a,b,*}, Ethan Cowan, M.D., M.S.^{a,b}, Cheng-Shiun Leu, Ph.D.^c, Christopher Brusalis^a, John Y. Rhee^a, Jillian Nickerson^a, Jason Leider, M.D., Ph.D.^{d,e}, and Laurie J. Bauman, Ph.D.^f

^aDepartment of Emergency Medicine, Jacobi Medical Center, Bronx, New York

^bDepartment of Emergency Medicine, Albert Einstein College of Medicine, Bronx, New York

^cResearch Foundation for Mental Hygiene, Inc, Columbia University, New York, New York

^dDepartment of Internal Medicine, Jacobi Medical Center, Bronx, New York

^eDepartment of Internal Medicine, Albert Einstein College of Medicine, Bronx, New York

^fDepartment of Pediatrics, Albert Einstein College of Medicine, Bronx, New York

Abstract

Purpose—To compare the effectiveness of a theory-based HIV educational video tool with in-person HIV counseling in promoting safer sex behaviors among adolescent patients of an urban Emergency Department (ED).

Methods—This was a randomized controlled trial taking place in the Emergency Department of Jacobi Medical Center in the Bronx, New York. A total of 203 stable, sexually active patients aged 15–21 years completed pre-intervention and postintervention measures. Participants were randomized to the intervention video series (102 participants), a theory-based, youth-friendly human immunodeficiency virus (HIV) educational video, or an in-person HIV counseling session with a trained HIV counselor (101 participants). Participants completed pre-intervention and postintervention measures on the primary outcomes: condom intention, outcome expectancy, and self-efficacy.

Results—Participants in the video group improved condom use intention (adjusted differential mean improvement [ADMI] = .98 units; confidence interval [CI], .20–1.77; Holm adjusted $p = .028$), condom self-efficacy outcome (ADMI = .26 units; CI, .04–.48; Holm adjusted $p = .019$), and condom outcome expectancy scores (ADMI = .15 units; CI, .07–.23; Holm adjusted $p < .001$) significantly more than those in the counselor group, adjusting for stage of change. The intervention helped participants progress to the next level of readiness or maintain their positive behavior, and did not differ by age, gender, or race.

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*Address correspondence to: Yvette Calderon, M.D., M.S., Jacobi Medical Center, 1400 Pelham Parkway South, Building 6 Room 1B27, Bronx, NY 10461. ycal333@yahoo.com (Y. Calderon).

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“Project Control: Evaluation of a brief HIV counseling video to improve teenagers’ risk reduction behavior.” Presented at the sixth IAS Conference on HIV Pathogenesis, Treatment and Prevention (IAS 2011) in Rome, Italy, July 17–20, 2011. Poster presentation. Presented at 2011 National HIV Prevention Conference in Atlanta, Georgia, August 14–17, 2011. Poster presentation.

Conclusions—A theory-based, youth-friendly video can be a valid means to provide posttest HIV education and prevention messages within an urban emergency department. The theory-based prevention messages can improve teenagers' condom intentions, condom self-efficacy, and condom outcome expectancies immediately after the intervention.

Keywords

Adolescent; HIV; Condom; Video; Prevention

The 2010 National Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome Strategy for the United States has called for intensified prevention efforts in communities where HIV is most heavily concentrated [1]. The Centers for Disease Control and Prevention (CDC) continue to advocate that clinical settings such as emergency departments (EDs) offer venues to reach at-risk populations within these communities for rapid HIV testing [2]. Evidence suggests that testing alone will not reduce risk behavior and can even increase risk behaviors among HIV-negative patients by distorting individuals' perceptions of risk [3,4]. Brief behavioral interventions have been shown to help increase rates of condom use [5,6] as well as reduce risky sexual behaviors among adolescents [7–11]. Yet, routine prevention counseling is often viewed as time-consuming and burdensome in busy clinical settings [12]. The use of video-based HIV prevention models minimizes strain on hospital resources and is particularly appealing to adolescents, a population disproportionately affected by HIV [13,14]. We have demonstrated previously that a concise and informative HIV *pretest* counseling video shown to adolescent patients in an urban ED significantly improved HIV knowledge and participation rates in voluntary HIV testing compared with standard care (in-person counseling) [15]. This study reports the results of a randomized trial of an HIV *posttest* counseling video series, shown while ED patients wait for the results of their rapid HIV tests, designed to reduce adolescents' sexual risk behavior.

We based all content developed and used in this intervention on two theories: the Stages of Change [16] (SOC) and the Theory of Reasoned Action [17]. The SOC model is based on the belief that individuals are at different stages of a continuum when making decisions to change behaviors: precontemplation, contemplation, preparation for action, action, and maintenance [16]. We used SOC to tailor the intervention to the participant's initial stage so that the participant would be more open to the risk-reduction messages. Stages of Change has previously been tailored and used for HIV education and behavioral interventions [18,19]. According to the Theory of Reasoned Action, the most important determinant of a person's behavior is intention [17]. The Theory of Reasoned Action created the basis of using condom intention, condom outcome expectancy, and condom self-efficacy as the primary outcome measures for this intervention. We used these behavioral theories to design a teen-friendly behavioral intervention that efficiently addresses the multiple factors that contribute to the spread of HIV among adolescents.

Methods

Study design

We conducted a two-armed, randomized, controlled trial among eligible patient volunteers seen in the adult and pediatric EDs of Jacobi Medical Center. All participants viewed an HIV pretest video. We then randomized participants into a control group that received standard in-person HIV prevention counseling or an intervention group that viewed a series of posttest videos determined by participants' SOC. All participants completed pre-intervention and postintervention measures on condom intention, condom outcome expectancy, and condom self-efficacy. Human immunodeficiency virus testing was optional

for both arms. The research protocol received approval from the Albert Einstein College of Medicine Institutional Review Board.

We determined sample size *a priori* based on a .42 standardized effect, which was believed to be the minimal clinically meaningful effect size. Group sample sizes of 92 achieved 80% power to detect such effect with an α value of .05 using a two-sample Student t-test. Assuming a dropout rate of 10%, a total of 202 participants were needed. We calculated sample size requirements using PASS 2004 (NCSS, Kaysville, UT).

Selection of participants

We selected participants from the adult (aged 18–21 years) and pediatric (aged 15–17 years) EDs and the urgent care centers of Jacobi Medical Center, a level 1 trauma and tertiary care center located in Bronx, New York. Recruitment took place between 9 A.M. and 9 P.M., Monday through Friday, from November 2009 to June 2010. Inclusion criteria required that patients be sexually active, aged 15–21 years, and proficient in English. Patients were excluded if they were medically unstable, in obvious pain, unable to understand the consent process, did not speak English, were known to be HIV-positive, or had been tested within the past 6 months. Patients who refused to participate completed a short, anonymous refusal form that obtained their demographic information and reason for refusal.

Study procedures

Trained research assistants approached all patients who were between the ages of 15 and 21 years, in the waiting areas and treatment rooms of both the adult and pediatric EDs. Research assistants followed a script that described the study and obtained patients' informed consent. The institutional review board granted a waiver of parental consent to protect teens from having information about their risk behaviors disclosed to parents. If parents and/or guardians were present, the youth was brought to a private room for enrollment. Adolescents who agreed to participate completed a confidential, computer-based questionnaire to determine eligibility. Eligible patients provided either a young adult's assent form (15–17 years) or written informed consent (18–21 years). Patients were provided with a copy of the consent form, which included an explanation of the intervention and contact information for the primary investigator.

At baseline, all enrolled participants completed a demographics questionnaire; a risk assessment survey; measures on condom intention, condom outcome expectancy, and condom self-efficacy; as well as a series of questions to determine participants' SOC for condom use (Figure 1). All participants then viewed a validated HIV pretest educational video and were offered an optional HIV test [15]. Regardless of participants' decision whether to be tested, all participants were then randomized to one of two groups. Because we offered HIV testing to all participants before randomization, testing should not have affected differences between control and video groups. The control group received in-person counseling from HIV counselors trained to provide age-appropriate, culturally sensitive education and counseling. All control participants were given information on how to interpret HIV test results, partner notification, and condom use. The experimental video group watched the post-HIV test video series. We conducted randomization using a computer-generated block randomization scheme obtained from <http://www.randomization.com>. The randomization scheme was kept in an opaque envelope that was not opened until patients signed informed consent, to minimize bias.

For participants who accepted HIV testing, in-person counseling or the video series was presented, depending on whether they were in the control or video group, respectively, while they waited for test results. Participants who declined HIV testing received in-person

counseling or watched the video series immediately, depending on whether they were in the control or video group, respectively. All participants then completed post-intervention measures condom intention, condom outcome expectancy, and condom self-efficacy and a satisfaction questionnaire. After completing postintervention measures, participants in the intervention group who accepted HIV testing also received standard in-person posttest counseling when they received test results. According to the protocol, patients who tested as positive would be informed of the results by a provider and walked to the HIV clinic in the hospital by the research assistant.

Theory-based video intervention

The video intervention is a series of theory-based, HIV post-test prevention videos based on qualitative research we conducted previously with urban adolescents in the Bronx [20]. Research shows that interventions well-grounded in theories of behavioral change are more effective than those that are not, particularly in sex education and pregnancy prevention [21,22].

We used the Theory of Reasoned Action [17] to select intervention content that would affect important mediators of behavior (condom use intention, condom outcome expectancy, and condom self-efficacy). According to the theory, the most important determinant of a person's behavior is intention, which is a combination of attitude toward performing the behavior and subjective norms [17].

We used the SOC to develop the delivery of the video intervention as well as questionnaire content. It proposes a nonlinear continuum of behavior change, with five component stages: precontemplation, contemplation, preparation for action, action, and maintenance [16]. The theory recommends offering different messages to individuals at different stages of change, aiming to move individuals along the continuum stage by stage toward "action," and helping individuals maintain successful shifts from risk behavior. We used SOC to target message content and style to the participant's stage of change, as determined through pre-intervention measures [16]. The SOC measure required participants to answer four questions on condom use, with a 5-item scale corresponding to the five stages of change described by Prochaska et al. [16]. These questions allowed us to determine which of the five stages (precontemplation, contemplation, preparation for action, action, and maintenance) the participant was in. We recorded patients' SOC only at baseline.

We used qualitative data from semistructured individual interviews with 100 Bronx adolescents to guide media decisions in making the videos, including language, scenarios, and actor characteristics, to ensure comprehensible, youth-friendly videos that would be credible to teens and young adults. The video was shown in a post-HIV test session to adolescents aged 15–21 years. The intervention consisted of a series of three video vignettes, each lasting between 2 and 3 minutes. The vignettes were based on the themes that the Bronx youths described in the qualitative data they wanted to see in an HIV intervention video. The first video depicted an adolescent couple discussing whether to use condoms, and modeled for participants how to advocate for using condoms with one's partner. All of the participants watched the same first video (Figure 1). The second video was tailored toward the participant's SOC. Those in the "pre-contemplation" and "contemplation" stages viewed a video on the negative consequences of risky behaviors. The video depicted a pair of teens ending their relationship after discovering that they both had contracted HIV. Participants in the stages of "preparation," "action," or "maintenance" viewed a video that reinforced the positive consequences of consistent condom use. In this video, three adolescents discussed the importance of condom use and advised their friend to tell her partner to use a condom (Figure 1). The third video in the sequence was shown to both video and control groups, demonstrating how to use a male condom, a female condom, and a dental dam. The content

of the videos also incorporated specific information required by New York State law in posttest counseling sessions [21]. Videos were appropriate for an eighth-grade level, as determined by Microsoft Word's (Redmond, WA) Flesch-Kincaid grade-level instrument. Results were given in-person by the counselor at the end of all three videos.

Outcome variables

The primary outcomes were the three mediating variables of risk reduction behavior: intention to use condom scores, condom use self-efficacy score, and condom outcome expectancies; we measured all three variables on a 1–5 Likert scale. Measures from Rotheram-Borus et al. [22] and Brown-Peterside et al. [23] were used to determine condom intention scores. We based the scores on a series of five questions that measured whether the participants planned on using condoms when having sex. We used measures developed by Dilorio et al. [24] for condom self-efficacy and condom outcome expectancy. The condom self-efficacy scores measured participants' perceptions of whether they would be able to prevent certain risky behaviors; for example, on a scale from 1 to 5, they answered whether "I can always keep a supply of condoms at home." Condom outcome expectancy scores measured participants' perceptions of the consequences of using condoms; for example, on a scale from 1 to 5, they answered whether "my partner would get mad if I said we had to use a condom." In addition, a 10-question, true–false HIV testing knowledge measure adapted from Carey et al. [25] focused on understanding HIV test results, partner notification, and correct usage of condoms, which we summed to determine HIV knowledge scores. Secondary outcomes included several dichotomous variables indicating whether a participant had shown beneficial effect (from pre-intervention to post-intervention) on primary outcomes as well as condom intentions for oral sex, vaginal sex, anal sex, or intentions to carry condoms.

Statistical analysis

Descriptive statistics of baseline characteristics were generated separately for counseling and video treatment groups. To compare the difference between the two study groups on the baseline characteristics, we used a t-test for continuous variables and chi-square test for categorical variables.

The primary analyses compared the effect of the video intervention with in-person counseling on three primary outcomes: intention to use condom, condom use self-efficacy, and condom outcome expectancies using the generalized linear model with identity link function. To account for the within-subject correlation owing to multiple assessments on the same participant, we employed the generalized estimating equation method with independent working correlation to estimate the regression coefficients and standard errors. The independent variables included in each regression model were the video intervention indicator (*versus* in-person counseling), post-intervention time indicator (*versus* pre-intervention), and the interaction of time and intervention indicator. We included the SOC variable in the model because it showed a difference at baseline between groups. We used the regression coefficient corresponding to the interaction term to test the intervention effect; it represents the differential mean improvement between groups (i.e., video intervention and in-person counseling). We applied The Holm step-down procedure to adjust for multiple comparisons. We report the regression coefficients as well as their corresponding 95% confidence intervals (95% CIs) and Holm adjusted *p* values for each of the above analyses.

In secondary analyses, we compared the effect of the video intervention to the in-person counseling group on dichotomous forms of primary outcomes as well as secondary outcomes: condom intentions for oral sex, vaginal sex, anal sex, and intention to carry

condoms. We also examined the associations between the intention to use condoms and knowledge, self-efficacy, demographic characteristics, sexual experience, and risk factors for HIV. In examining association, the intervention group assignment was also included in the regression model, because it might confound the strength of association. We used the logistic regression model for all the secondary analyses.

Results

Descriptive statistics

Of 243 patients approached, 215 (88.5%) were eligible for study entry (Figure 1). Of the 215 eligible patients, 203 agreed to participate in the study and were randomly assigned evenly to the two study arms (94.4%), with 102 participants in the video group and 101 participants in the control group. No HIV-positive patients were identified over the period of the intervention. There were no statistically significant differences in terms of age, gender, race, ethnicity, HIV risk factors, and acceptance of HIV testing between video and control groups at the 5% level, which reflects the robustness of the randomization (Table 1). However, there was a statistically significant difference between the video and counseling groups for SOC level (Table 1) at the 1% level, but that was controlled for in the analysis.

Descriptive statistics of baseline characteristics were generated separately for in-person counseling and video intervention groups. To compare the difference between study groups on the baseline characteristics, we used a t-test for continuous variables and chi-square test for categorical variables.

Main outcomes

Compared with the in-person counseling group, video group participants achieved significantly greater improvement in all three primary outcomes after adjusting for the stage of change and for multiple comparisons. The improvement for video group participants was .98 units more on their intentions to use a condom (adjusted differential mean improvement [ADMI] = .98; 95% CI, .20–1.77; Holm adjusted $p = .028$) (Table 2), .15 units more on condom outcome expectancies (ADMI = .15; 95% CI, .07–.23; Holm adjusted $p = .001$); and .26 units more on condom use self-efficacy (ADMI = .26; 95% CI, .04–.48; Holm adjusted $p = .019$) compared with the in-person counseling group.

Secondary outcomes

Comparison of the effect of intervention for video intervention with the in-person counseling on the dichotomous form of primary outcomes and secondary outcomes showed no difference between groups. The change over time of intention to use condoms was associated with condom use self-efficacy ($p < .001$), when adjusted for intervention group assignment. Nevertheless, the social demographic characteristics, sexual experience, and risk factors for HIV were not associated with change of condom use intention.

Discussion

Patient encounters in the ED are opportunities to engage at-risk youth in HIV testing as well as “teachable moments” to promote HIV prevention, contributing to improvements in adolescents’ intentions to use a condom, condom self-efficacy, and condom outcome expectancies. A theory-based video intervention was previously shown to promote condom use among black and Latina female adolescents visiting Planned Parenthood [26], whereas a theory-based sexually transmitted infection (STI) prevention video shown in the waiting room of an STI clinic significantly reduced STI infections over a 14-month period [27]. Yet, because many youths do not use HIV testing sites, an ED-based video intervention may be

particularly appealing to adolescents. The improvement of scores for our outcome measures was not associated with age, gender, race, or ethnicity, which suggests generalized effectiveness in Bronx youths. The use of messaging as an instrument to provide tailored messaging in a clinical setting may improve the efficiency and relevance of teen-targeted HIV prevention practices.

The study has some limitations. First, efficacy of the video intervention was shown only in Bronx youths, which limits external validity. However, this was minimized by constructing videos based on theories using questions that were previously validated. Randomization was successful; nevertheless, there was a statistically significant difference in SOC that could happen purely by chance. To account for such imbalance, we included the SOC variable in each of the three models in the primary analysis.

There is a particular need to increase HIV testing rates among adolescents. According to the 2010 report from the Centers for Disease Control and Prevention [28], the rate of HIV diagnoses per 100,000 per population among adolescents ages 15–19 and 20–24 years has risen during 2007–2010, from 9.8 to 10.7 and 28.2 to 36.9, respectively. Furthermore, according to the Kaiser Family Foundation [29], fewer than half of teens aged 15–17 years knew where to go to be tested for HIV. Urban populations, including adolescents, have traditionally had low access to primary care because of financial constraints [30]. In fact, in a study done on access to the ED, most participants chose to come to the ED because of its convenience and location and because they had no primary care provider [30]. Therefore, normalizing routine HIV testing in EDs allows for cost-effective, time-efficient, and targeted ways to reach adolescent populations for HIV prevention education. The literature shows that individually targeted educational interventions can reduce sexually risky behaviors in adolescents [31], and the Kaiser Foundation [29] showed that many teens want to know more about a range of topics related to HIV/acquired immune deficiency syndrome. Therefore, tailored prevention videos can be valuable to adolescents in both increasing HIV knowledge and promoting safe sexual behaviors.

Whereas public health policies have sought to optimize the efficiency of HIV prevention efforts by increasingly focusing on HIV-positive persons, the use of low-cost video messaging in clinical settings offers an opportunity for prevention programming while engaging all members of communities with high HIV prevalence. The current study used a computer-based program that can be easily made available in EDs. We have used a similar computer-based program for adults at Jacobi Medical Center, through interactive kiosks. This program has been expanded to different hospitals nationally and internationally [32]. The specific SOC-tailored video that a participant watches can be automated through screening questions that the participant answers on the kiosk. Further research should focus on preventing HIV-negative adolescents from becoming infected in high-risk areas.

A theory-based, youth-friendly video series can be a valid means to provide posttest HIV education and prevention messages to adolescents within an urban ED. The findings demonstrate that the video series can significantly improve intentions to use condoms, condom self-efficacy, and condom outcome expectancies among adolescents immediately after the intervention. Longitudinal studies are needed to determine the duration of the video intervention's impact on adolescent intentions to reduce HIV risk behavior.

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IMPLICATIONS AND CONTRIBUTION

This study showed that an educational human immunodeficiency virus posttest counseling video can be used to improve sexual risk behavior in adolescents in an emergency department. Participants in the video-based counseling group had significantly greater improvements in condom intention, self-efficacy, and outcome expectancy scores compared with those in the human immunodeficiency virus counselor group.

Figure 1.
Flowchart of the video-based risk reduction intervention.

Table 1

Population characteristics and HIV risk factors: baseline characteristics between video intervention and counselor control groups

	Video (n = 102)	Counselor (n = 101)	p Value
Age <18 years	20.6%	25.7%	.48
Female gender	60.8%	55.4%	.53
Race			.31
American Indian	1.0%	1.0%	
Asian	2.9%	1.0%	
Black	34.3%	42.6%	
White	8.8%	3.0%	
Other	52.9%	52.5%	
Hispanic	59.8%	57.4%	.84
Previous HIV test	65.7%	68.3%	.80
Vaginal sex in past year	97.1%	96.0%	.99
Anal sex in past year	26.5%	21.8%	.54
Oral sex in past year	72.5%	62.4%	.16
Mean number of male sex partners	1.41 ± 2.03	1.42 ± 1.85	.99
Mean number of female sex partners	2.16 ± 7.08	2.13 ± 3.79	.97
Stage of Change			.01
Precontemplator	22.5%	10.9%	
Contemplator	32.4%	26.7%	
Preparation	20.6%	23.8%	
Action	2.9%	6.9%	
Maintenance	21.6%	31.7%	
Consented to testing	84.3%	84.1%	.98

Table 2

Adolescent risk behavior outcome measures: means, differences, *p* values, and confidence intervals for three primary outcome variables

Condom use measure	Video: Adjusted mean improvement ^a	Counselor: Adjusted mean improvement ^a	Adjusted mean difference of improvement ^a (Video-Counselor)	Holm adjusted <i>p</i> value	95% CI
Condom use Intention score	.91	-.07	.98	.028	.20–1.77
Condom self-efficacy	.23	-.03	.26	.019	.04–.48
Condom outcome Expectancy	.17	.02	.15	<.001	.07–.23

^aMean improvement was adjusted for stage of change.