

Research Articles

The Effects of Motivation and Knowledge on HIV Prevention Behavior among Historically Black College Students: An Application of the Information-Motivation-Behavioral Skills Model

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ABSTRACT

This study applies the Information-Motivation-Behavioral Skills (IMB) model to assess the effects of prevention education, prevention personal motivation and prevention knowledge on HIV prevention behavioral skills among historically black college students. The IMB model states that prevention information and prevention motivation are strong predictors of prevention behavioral skills. In light of increased incidence of HIV and STD infection among historically black college and university (HBCU) students in the United States, the present research examines the utility of two key components – motivation and knowledge – of the IMB model to explain HIV prevention behavior among this population. Survey data of indicators of the three IMB latent constructs –prevention information, prevention motivation, and prevention behavioral skills – was collected from students attending an HBCU. Structural equation modeling (SEM) analysis was performed to estimate the overall model fit indices and the magnitude of effects of prevention motivation and prevention information or knowledge on the prevention behavioral skills of the students. The analysis found that prevention HIV education motivation and HIV prevention knowledge had no significant effect on prevention behavioral skills, while HIV personal prevention knowledge emerged as having a significant and large effect in explaining HIV prevention behavioral skills among the students. These findings not only deviate from findings of previous research in other populations, but also suggest that to be effective HIV prevention programs aimed at reducing HIV risk behavior among HBCU students may consider shifting their focus to prevention personal motivation programs.

Keywords: HIV prevention, HIV prevention behavioral skills, historically black colleges and universities, HBCU, IMB model, Information-Motivation-Behavioral Skills model, structural equation modeling, HIV prevention personal motivation, HIV prevention education motivation.

INTRODUCTION

Data from the Center for Disease Control (CDC) show that African Americans continue to be the most severely burdened with HIV infection than all racial groups in the United States (CDC, 2011). In 2009 for example, despite representing only 14% of the US population, African Americans accounted for 44% of all new HIV infections. Furthermore, compared with members of other races and ethnicities, African Americans account for a higher proportion of HIV infections at all stages of the disease—from new infections to deaths. Despite increased investments in HIV prevention programs on college campuses in the United States, high risk sexual behavior continues to occur among college students (Netting and Burnett, 2004; Jordan, 2007; Opt et al., 2007). Moreover, an examination of recent data indicate that while the trend in HIV infection seems to have stayed even or slightly reduced among college students, the trend among African American college students and African Americans aged 18-25 continues to rise (Hightow et al., 2005; CDC, 2011). Independent research indicate that the incidence and spread of HIV/AIDS and other sexually transmitted diseases among heterosexual college students attending Historically Black Colleges and Universities (HBCUs) in the United States continue to rise at an alarming rate, despite increased investment in HIV prevention programs aimed at reducing engagement in risky sexual behavior among students on college campuses (CDC, 2004a, 2004b, 2004c, 2006, 2008, 2008a; Lewis et al., 2000; Yee, 2004; Hightow et al., 2005; Leone et al., 2004). Qualitative studies suggest that the most salient barriers to HIV

prevention among black college students are negative views of condoms, trust issues, spontaneity, young age, non-monogamous relationships, and perhaps most important, lack of prevention behavioral skills (Duncan et al, 2002; Bazargan et al, 2000; Opt and Loffredo, 2004; Leone et al., 2004). Other researchers found that black college students are, for the most part, quite knowledgeable about HIV/AIDS, but this knowledge is not a predictor of safe sex among the college students (Mongkuo et al., 2010; Anastasi, Sawyer, & Pinciario, 1999; Bates & Joubert, 1993; CDC, 2004c; Gupta and Weiss, 1993; Lewis, Marlow, & Ireland, 1997; Opt and Loffredo, 2004).

HIV prevention programs are more likely to succeed when they are based on empirical evidence and theory (Choi & Coates, 1994; Kelly, 2002; Leviton, 1989). One theoretical model that has proven useful in explaining HIV preventive behavior and other health-promoting behaviors and providing a useful framework for developing HIV prevention programs is the Information-Motivation-Behavioral Skills (IMB) model (Fisher & Fisher, 1992, 2000; Misovich et al., 2003; Fisher and Harman, 2003). For developing promotion programs (Fisher and Fisher, 2000; Fisher and Harman, 2003). The framework is appropriate because it is considered to be parsimonious, its constructs are operationally defined, and it specifies the causal linkages between its theoretical determinants and their relation to prevention behavior (Kelly, 2002; Fisher & Fisher, 1994). In particular, the IMB model states that HIV prevention information and motivation works through prevention behavioral skills to influence risk reduction behaviors, such as safe sex practice (Fisher & Fisher, 1992). The model considers information and motivation to be independent constructs that may relate to the practice of behavioral skills relevant to risk behavior change. In effect, the model proposes that to practice safe sex, it is necessary for an individual to possess the information or knowledge about how to prevent HIV infection, and the motivation to prevent HIV infection.

Previous research on information pertaining to HIV prevention has shown information to be an inconsistent predictor of HIV preventive behavior (Anderson et al., 2006; Mongkuo et al., 2010). However, when assessed within the framework of the IMB model, information has been a consistent predictor of HIV preventive behavioral skills (Fisher et al., 1994; Fisher et al., 1999). Motivation is theorized to include both personal motivation (that is, personal attitudes towards performing preventive behavior), as well as social motivation (that is, perceived social support for engaging in safe sex practice). In a sense, the IMB model suggests that an individual's motivation to engage in preventive behavior is determined not only by his or her own personal feelings about whether preventive behavior is good, but also by whether friends and other referents provide social support for such preventive behavior. According to the IMB model, information and motivation influence risk prevention independently, and in large part, indirectly through behavioral skills needed to perform HIV preventive behavior (Fisher & Fisher, 2000; Avant et al., 2000). In principle, behavioral skills refer to an individual's sense of self-efficacy necessary to engage in preventive behavior. Thus, an individual would need to perceive that he or she possesses the behavioral skills necessary for health risk prevention.

Using the IMB model, HIV and health promotion researchers have consistently found a strong association between motivation and behavioral skills (Misovich et al., 2003; Fisher et al, 1994; Fisher et al., 1999). Other studies have shown that behavioral skills mediate the effects of motivation on preventive behavior and HIV prevention behavior (Fisher et al, 1999; Avant et al, 2000; Bryan et al., 2002). In summation, the IMB model suggests that knowledgeable and motivated individuals who enact the relevant behavioral skills are more likely to practice the recommended preventive behaviors, such as HIV prevention.

Over the years, researchers have drawn on various behavioral models to predict preventive behavior among college students with the goal of designing effective HIV/AIDS education and prevention programs. Unlike other models such as the theory of reasoned action (Ajzen & Fishbein, 1980) and theory of planned reason (Ajzen, 1985; Ajzen & Fishbein, 2005), used in the study of HIV/AIDS and its risk factors, the IMB model has been validated extensively as providing a more comprehensive model for identifying socio-cognitive predictors of health behavior outcomes (such as HIV prevention) that are of theoretical and empirical importance (Carey et al., 1997; Fisher et al., 1996; Fisher & Fisher, 1992, 2000; Fisher & Fisher, 1993; Fisher et al., 2003; Cargill et al., 2006). In addition, the IMB model has been applicable to behaviors outside the HIV domain including voting behavior (Glasford, 2008), breast self-examination behavior among women (Misovich et al., 2003), adolescence smoking behavior (Botvin et al., 1989) and oral rehydration behavior in developing countries (Foote et al., 1985). However, few studies have sought to test the applicability of prevailing theories of HIV risk behavior among students attending HBCUs.

The purpose of this study was to apply the IMB model to assess the influence of HIV prevention motivation and HIV prevention knowledge in explaining HIV preventive behavioral skills among students attending an HBCU. The goal of the study was to identify specific factors that contribute to improving HIV preventive behavior among students which can be used in designing effective HIV prevention program at HBCUs. Specifically, the study objective was to test the effects of HIV prevention education, HIV prevention personal motivation, and HIV prevention knowledge on HIV prevention behavioral skills among HBCU students. Applying the IMB model to the present study, we hypothesize that an HBCU college student's level of HIV prevention information or knowledge and HIV prevention motivation are fundamental determinants of their level of HIV prevention behavioral skills which, in turn, leads to HIV

prevention behavior among college students attending HBCUs. In a sense, to the extent that at-risk HBCU college students are well informed and motivated to practice HIV risk prevention and possess the skills required to effectively prevent HIV infection, they will likely be more willing to engage in HIV prevention behavior. Conversely, to the extent that these college students are poorly informed about HIV risk prevention, unmotivated to engage in HIV risk prevention, and lack the behavioral skills required to effectively prevent HIV infection, they will be less likely to engage in HIV prevention behavior.

METHODOLOGY

Research Design

This study employed a cross-sectional quasi-experimental one-shot case study design (Isaac and Michael, 1997). The design involved using a self-administered survey to obtain the perception of HBCU students about the requisite information and motivation required to enact HIV risk prevention behavioral skills and HIV preventive behavior. This design is generally considered to be most useful in exploring researchable problems or developing ideas for action research (Isaac and Michael, 1997). Also, this design is considered to be appropriate when exploring individuals' perception of relatively new or less understood phenomenon, such as factors influencing the spread of HIV/AIDS among HBCU students attending HBCUs. A schematic representation of the design is displayed in Figure 1.



Figure 1. Quasi-experimental One-shot Case Study Design.

X is an HBCU student's level of HIV prevention information or knowledge and prevention motivation (education and personal). O₂ is a student level of HIV prevention behavioral skills.

Participants and Procedure

The HBCU selected for this study has a population of 6,000 college students enrolled. A breakdown of the population by race/ethnicity shows that approximately 81% is African American, 10% Caucasian and 4% Hispanic, 1% Native American and 4% other racial/ethnic groups. Participants in the study included a purposive, convenience sample of students attending this particular HBCU. After receiving IRB approval, various professors were contacted and asked for permission to conduct the survey during a portion of their class time. Once the permission was granted, we met with the students during the class period and explained the purpose of the study to them. They were also informed that their participation was strictly voluntary and that they may either opt not to participate in the study and leave or not provide a response to any of statements. In addition, the students were informed that no incentive will be provided for their participation in the study. The students who agreed to participate in the survey were provided with a consent form for them to read, sign and date. The consent form explained to the students that their participation was voluntary and would not affect their grade and their identity will be kept strictly confidential, and their names would not appear in any report. We adhered to all American Psychological Association (APA) research guidelines. This method varied from the traditional study in which researchers surveyed students in class during a 1-week period in 2003 (Opt and Loffredo, 2004). The survey was anonymous in that no identifying information was connected to individuals, or included in, the data set. Participants completed the survey during class time and returned them before leaving the class. Non-participants were asked to remain quiet or were dismissed from the class early. The survey took less than 10 minutes to complete. A total of 297 students participated in the survey.

Measures

The HIV Prevention Measure (HPM) survey instrument developed and validated by researchers at Fayetteville State University in North Carolina was used to collect the data for this study (Mongkuo et al., 2012). The survey instrument includes items measuring the three components of the IMB model –HIV prevention information, motivation, and behavioral skills.

Information. HIV prevention knowledge was measured by four items scored on a 5-point Likert scale ranging from 1=strongly agree to 5=strongly disagree: (a) A person can get HIV from tears or saliva, (b) A person can be infected with the AIDS virus from someone's, (c) Sharing cooking utensil with a person who has AIDS is not safe,

(d) A person can get the AIDS virus by using a public toilet. The four items were used as indicators of the IMB's latent information variable (see Table 1), which loading significantly on all four measures ($p = .001$).

Motivation. Two types of HIV prevention motivation were assessed: education and personal. HIV prevention education motivation was measured by three items scored on a 5-point Likert scale ranging from 1=strongly agree to 5=strongly disagree: (a) HIV education in middle school is a waste of time, (b) HIV education in high school is a waste of time, (c) HIV education in college is a waste of time. The three items were used as indicators of the IMB's latent education motivation variable (see Table 1), which loaded significantly on all three measures ($p = .001$).

HIV prevention personal motivation was operationalized using three items: (a) During sex, I would be insulted if my partner insisted we use condoms, (b) I intent to talk about HIV prevention with a mate only after sex, (c) I dislike the idea of limiting sex to just one partner. The three items were used as indicators of the IMB's latent personal motivation variable (see Table 1), which loading significantly on all three measures ($p = .001$).

Behavioral skills. HIV prevention behavioral skills were measured by two items scored on a 5-point Likert scale ranging from 1 = Strongly disagree to 5 = Strongly agree: (a) I would openly promote others to get tested for HIV, and (b) If I was HIV positive, I would tell my mate. The two items were used as indicators of the IMB's latent behavioral skills variable (see Table 1), which loading significantly on the two measures ($p = .001$).

Table 1. Standardized estimate for HIV Prevention Measure item loadings

HIV Prevention Measurement scale items	Estimate
HIV Prevention Education Motivation	
HIV education in middle school is a waste of time	.76
HIV education in high school is a waste of time	.90
HIV education in college is a waste of time	.86
HIV Prevention Knowledge	
A person can get HIV from tears or saliva	.50
A person can be infected with the AIDS virus from someone's cough or sneeze on them	.80
Sharing cooking utensil with a person who has AIDS is not safe	.42
A person can get the AIDS virus by using a public toilet	.53
HIV Prevention Personal Motivation	
During sex, I would be insulted if my partner insisted we use condoms	.30
I intent to talk about HIV prevention with a mate only after sex	.30
I dislike the idea of limiting sex to just one partner	.52
HIV Prevention HIV Prevention Behavioral Skills	
I would openly promote others to get tested for HIV	.43
If I was HIV positive, I would tell my mate	.68

Statistical Analysis

Latent variable structural equation analysis was performed to assess the influence of IMB prevention motivation (education and personal) and information on prevention behavioral skills using AMOS 17.0 (Arbuckle, 2007). To make full use of the available data, full maximum information likelihood (FIML) estimation procedure was used. A number of indices were used to evaluate the goodness of fit of the four-factor orthogonal HPM structural IMB model. The model absolute fit was assessed using chi-square statistics, χ^2 , with low χ^2 considered good fit (Hair et al., 2006). Incremental fit was evaluated using the Root Mean Square Errors of Approximation (RMSEAs) with a value less than 0.06 indicating a relatively good fit, along with Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) with values of .95 or greater considered desirable (Hu & Bentler, 1999; Hair et al., 2006, Blunch, 2010; Brown, 2006). The magnitude of effect of prevention education motivation, prevention personal motivation, and prevention knowledge latent constructs on the prevention behavioral skills latent construct was determined by estimating the standardized regression coefficients (Beta coefficients (β) or factor loadings), with β 's below .05 too small to be considered meaningful influences on prevention behavioral skills, even when they are statistically significant; those between .10 to .25 were considered moderate influences on prevention behavioral skills; and those above .25 considered large effects on behavioral skills (Keith, 2006, p. 62).

RESULTS

Table 1 contains the standardized parameter coefficients with factor loadings of latent variables onto measured variables and the direct effects within the structural portion of the tested causal model. The fit of the IMB prevention model of this complexity was good ($\chi^2(48, N = 371) = 52.965, p < .01$; CFI = .99; TLI = .99; RMSEA = .017). The model explained 20% of the variance in prevention behavioral skills among the sample of HBCU students.

Table 2 displays the estimated β coefficients associated with each of the exogenous latent constructs in the structural equation causal model. Personal prevention motivation had a large and significant positive effect on prevention behavioral skills ($\beta = .29, t = 2.90, p < .01$), while prevention education motivation had a moderate and significant negative effect on prevention behavioral skills ($\beta = -.18; t = -1.99, p < .05$). Prevention knowledge had no meaningful effect on prevention behavioral skills ($\beta = -.10, t = -.95, p > .05$).

Table 2: Structural Equation Unstandardized and Standardized Regression Weights of Prevention Information, Prevention Education Motivation and Prevention Personal Motivation on Prevention Behavioral Skills among Historically Black College Students

Exogenous Construct	<i>b</i>	S.E.	β	<i>t</i>	<i>P</i>
Prevention Education Motivation	-.20	1.0	-.18	-1.99	.046
Prevention Knowledge/Information	-.06	.06	-.10	-.949	.344
Prevention Personal Motivation	.29	.10	.40	2.90	.004

Endogenous Construct: Prevention Behavioral Skills

DISCUSSION

This study was aimed at using the Information Motivation Behavioral Skill (IMB) model to assess the influence of prevention education motivation, prevention personal motivation, and prevention knowledge on prevention behavioral skills among students attending Historically Black Colleges and Universities (HBCUs). The study found that of the three exogenous latent constructs, prevention personal motivation behaved as expected in that it had a strong positive influence of prevention behavioral skills among the students. This finding is consistent with the finding of previous research (Misovich et al., 2003; Fisher et al, 1994; Fisher et al., 1999; Fisher et al, 1999; Avant et al, 2000; Bryan et al., 2002). Meanwhile, prevention education motivation had a weak negative effect on the students' HIV prevention behavioral skills. This finding deviates from previous the findings of the effect of motivation on behavioral skills. The finding of no effect of prevention knowledge on behavioral skills is consistent with previous research ((Anderson et al., 2006; Mongkuo et al., 2010), but inconsistent with research using the IMB model (Fisher et al., 1994; Fisher et al., 1999). Taken together, the findings of this study suggest that of the three exogenous latent construct of the IMB model, only personal prevention motivation may be effective in enhancing the HIV prevention behavioral skills among students attending HBCUs. Hence, the focus of HIV prevention programs in HBCUs may have to be on promoting personal motivation rather than the existing emphasis on prevention education motivation and prevention knowledge. Finally, the CDC reports that given that previous research have shown that exposure to violent living conditions have a strong determinant of an individual level of personal motivation, which in turn may influence his or her ability to engage in risky sexual behavior, future studies using the IMB model should expand the exogenous variables in the model to include exposure violent living condition.

While the findings of this study provide useful insights into the influence of motivation and information on HIV preventive behavior among students attending the selected HBCU in this study, the external validity of the findings is questionable. Hence, the use of our findings to design and implement HIV prevention programs on other HBCU campuses should be made with caution. We, therefore, recommend that future studies should be conducted at other HBCUs to determine the consistency of findings.

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