Journal of AIDS and HIV Research Vol. 2(3), pp. 032-047, March 2010
Available online http://www.academicjournals.org/JAHR
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Full Length Research Paper

Perception of HIV/AIDS and socio-cognitive determinants of safe sex practices among college students attending a historically black college and university in the United States of America

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Accepted 15 December, 2009

This study applies the information-motivation-behavioral skills (IMB) model to explore the perception of HIV/AIDS among students attending a historically black college and university (HBCU) and the socio-cognitive factors that influence safe sex practices among these students. A convenient sample of college students attending a HBCU in the South-eastern United States was surveyed. Exploratory factor analysis generated a seven-dimensional final solution structure from the 41-item survey instrument. Frequency distribution of the students' HIV prevention information, HIV prevention motivation and AIDS prevention behavioral skills latent constructs was estimated. Multiple regression analysis of predictive influence of the constructs on the college students' willingness to practice safe sex was performed. The study found that most of the students surveyed are knowledgeable about HIV/AIDS and HIV/AIDS transmission modes, understanding of the risk behavior associated with HIV/AIDS and HIV/AIDS prevention behavior, willing to associate with HIV infected persons, interested in participating in HIV/AIDS education. This finding is consistent with previous research on college students' socio-cognitive perception of HIV/AIDS. However, regression analysis showed that academic class, willingness to associate with HIV/AID infected person (stigmatization), interest in HIV/AIDS education, understanding of HIV/AIDS risk behaviors and knowledge of HIV/AIDS transmission modes are significant predictors of the HBCU students' willingness (or intention) to practice safe sex.

Key words: HIV/AIDS knowledge, HIV/AIDS prevention, HIV/AIDS education, safe sex behavior, HIV/AIDS perception, factor analysis, multiple regression analysis, historically black colleges and universities (HBCU).

INTRODUCTION

The growing incidence rate of HIV/AIDS among black Americans in the United States continues to be a major minority health disparity concern. Recent data released by the Center for Disease Control (CDC) show that an estimated 56,300 new HIV infections occurred in 2006 (CDC, 2008). Black Americans ranked second only to gays and bisexual men as the group most affected by HIV. In particular, black Americans, while comprising 13% of the U.S. population, accounted for 45% of the new HIV infections in 2006. Since the early 1990s, new infections among black Americans remain at a higher level than any other racial or ethnic group, although they have been roughly stable at an unacceptably high level with some fluctuation. A comparative analysis of new infection by race/ethnicity show that in 2006, the rate of new infection among non-Hispanic black Americans was 7 times the rate among whites (83.7% versus 11.5% new infections per 10,000 population) and accounted for the

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largest share of new infections (45% or 24,900). Longitudinal data show that the number of new infections among black Americans peaked in the late 1980s and have exceeded the number of infections in whites since that time (CDC, 2008).

With regards to persons living with AIDS in 2005, blacks accounted for 20,187 (50%) of the estimated 40,608 AIDS new cases diagnosed in the United States. The rate of AIDS diagnosis for black American adults and adolescents was 10 times the rate for whites and nearly 3 times the rate for Hispanics. Black Americans die sooner after first diagnosed than any other racial group in the U.S. Of the persons diagnosed with HIV/AIDS during 1997 - 2004, a smaller percentage of black Americans (66%) were alive after 9 years compared to American Indians (67%), Hispanics (74%), white (75%) and Asians and Pacific Islanders (81%) (CDC, 2007). These data suggest that black Americans are eminently more severely and disproportionately living and dying of AIDS than any other racial/ethnic group in the United States.

Young people under 30 (aged 13 - 29) are most infected with HIV than any other age group (34% or 19,200). This data confirms that in the United States, HIV is an epidemic not only primarily of young people, but the disease is disproportionately spreading among black Americans than any other racial/ethnic group. According to the CDC, HIV/AIDS is now considered the leading cause of death for individuals aged 15 to 24 years of age. The most affected persons within this age group are college students (CDC, 2004c). Research indicate that the incidence of risky sexual behaviors and HIV infection is prevalent among college students, much of which occurs under the influence of drugs and alcohol (CDC, 2004c; UNAIDS, 2004; Davis et al., 2005). For black college students, researchers at the University of North Carolina, Chapel Hill found a statistically significant increase in HIV infection among black male college students aged 18 - 24 years from 65 per 100,000 population in 1998 to 92 in 2002 (Hightow et al., 2005). Research has also shown that college students tend to engage in risk behaviors that make them more prone to spreading HIV/AIDS (Hightow et al., 2007; Mattson, 2002; Gayle et al., 1990). The outcome of this risky sexual behavior is an increase in spread in HIV infection among college students and the number of students living with HIV/AIDS on college campuses (Gayle et al., 1990; Leone et al., 2004). As a result, the spread of the HIV/AIDS among young persons in recent years has shifted dramatically from men who have sex with men (MSM) to spreading rapidly among young heterosexual population (CDC, 2004b).

Research show that the high incidence of HIV/AIDS in the black American population is primarily due to high rate of undetection or late detection of the disease and higher level of challenges associated with risk factors for HIV infection experienced by black Americans relative to other racial/ethnic groups (CDC, 2007, 2006; Anderson et al., 2005; Millett et al., 2005; Leigh et al., 1993; Sharpe et al., 2004; Fleming and Wasserheit, 1999; CDC, 2003; Hart et al., 2004; Diaz et al., 1994; Jordan, 2007). These challenges include: high risk sexual contact, high substance abuse which may lead to risky sexual contact, lack of awareness of HIV serostatus, higher rates of sexually transmitted (STD) diseases among black Americans, higher homophobia and tendency to conceal homosexual behavior among black men, black men's dislike of using condom during sex, disproportionate ratio of available black men to black women (1 black man to every 5 black women), pressure on black women to engage in risky sexual intercourse to maintain relationships and socioeconomic issues such as high poverty rate among black Americans associated with limited access to high-quality health care, housing and HIV prevention programs (CDC, 2004a; Duncan et al., 2002; Bazargan et al., 2000).

Strategies aimed at preventing HIV infection among young people has focused, for the most part, on men having sex with men (MSM) (Leone et al., 2004). Davis and colleagues (2007) argue that prevention messages tailored only to MSM or non-MSM individuals may not reflect the current state of sexual behaviors in the United States. Furthermore, research related to our present study on HIV/AIDS perception among college students has consistently shown that knowledge alone does not predict safe sex practices (Anastasia et al., 1999; Bates and Joubert, 1993; CDC, 2004c; Gupta and Weiss, 1993; Lewis et al., 1997; Opt and Loffredo, 2004). These findings suggest that existing efforts to formulate effective prevention measures to curtail the spread of this disease among adolescents should focus on obtaining theory-driven socio-cognitive determinants of HIV prevention intentions and safe sex practice among students on college campuses, especially Historically Black Colleges and Universities (HBCUs).

Recently, a number of researchers have made an effort to address this void (Davis et al., 2007; Opt et al., 2007; Mattson, 2002; Netting and Burnett, 2004; Opt and Loffredo, 2004; Fierro-Gonzalez and Brown, 2002; Lance, 2001; Demmer and Caroleo, 2001; Dilorio et al., 2000; Troth and Peterson, 2000; Van Den Eijnden et al., 1998). In general, these studies have focused on investigating college students' attitudes and beliefs about HIV/AIDS to identify barriers that influence the effectiveness of HIV messages aimed at this group, students' sexual practices and their willingness to be tested. The common finding emerging from these studies is that most college students are knowledgeable about HIV transmission routes and protection methods, but this knowledge rarely deters them from engaging in risky sexual practice. Moreover, the students tend to believe that they are of low risk for contracting the disease. To develop effective education and prevention strategies, a

Table 1. Quasi-experimental one-shot case study design.

Treatment	Post test
X	O_2

Where X is exposure of the student to societal risk activities associated with HIV/AIDS infection at a selected HBCU campus located in southeastern United States. O_2 is a measure of a HBCU college student's level of HIV prevention information, HIV prevention motivation and AIDS prevention behavioral skills, as well as the college student's level of willingness or intent to practice safe sex.

number of scholars have proposed that research should focus on college campuses (Mattos, 2002; Opt et al., 2007). Other scholars have suggested the need to extend this research effort to include comparative studies of college students in various institutional settings, such as private versus public colleges, religious versus secular, 2-year versus 4-year and commuter versus residential institutions (Lewis and Malow, 1997; Opt et al., 2007).

Despite the obvious role that these studies may have in theory-building and effective design, implementation and evaluation of HIV/AIDS intervention strategies, as well as the plethora of studies that have been conducted on the perception and incidence of HIV/AIDS among college students, very few studies to date have targeted college students attending HBCU. First, is a study by Duncan and colleagues (2002) indicating that the most salient barriers to safe sex practices were negative views of condoms, trust issues and spontaneity. Second, is a study by Bazargan et al. (2000) showing that elevated HIV knowledge, young age, non-monogamous relationship, positive experience and attitudes about condom use, greater behavior skills and male gender were significant predictors of condom use. An extension of research effort to college students attending HBCU is worthwhile for three reasons. First, it identifies factors that contribute to the spread of HIV/AIDS among college students on HBCU campuses. Second, it adds to research which apply acceptable contemporary theoretical models to determine the various socio-cognitive determinants of HIV prevention intentions and safe sex practice behaviors among students attending HBCUs. Third, it generates theoretically-driven empirical data which can be relied upon to design effective HIV/AIDS prevention education and outreach programs on HBCU campuses.

The goal of our study was to contribute to this limited existing line of HIV/AIDS research on college students attending HBCUs by applying the Information-Motivation-Behavioral Skills (IMB) model to identify socio-cognitive factors that contribute to safe sex practice intentions among HBCU students. According to the IMB model, HIV prevention behavior, such as safe sex practice, is a function of HIV prevention information, HIV prevention motivation and AIDS prevention behavioral skills (Fisher and Fisher, 1992; Fisher et al., 1994). In particular, the model states that HIV prevention information and motivation works through prevention behavioral skills to influence risk reduction behaviors, such as safe sex practice (Fisher and Fisher, 1992). In applying the IMB model, a systematic empirically-grounded data can be generated to guide HBCU college administrators in developing appropriate prevention strategies to curtail the spread of HIV infection among this most vulnerable group in the United States. Specifically, the objective of the study was threefold. First, to explore and identify the latent information, motivation and behavioral skills factors of HIV/AIDS among HBCU students. Second, to determine the students' level of information about HIV/AIDS and prevention, motivation to prevent HIV/AIDS infection and HIV/AIDS prevention behavioral skills. Third, to identify the information, motivation and behavioral skills factors that influence HBCU college students' willingness to practice safe sex.

METHODS

Research design

This study employed a one-shot case study design (Isaac and Michael, 1997). The design involved using a self-administered survey to obtain the perception of HBCU college students about the requisite information, motivation and behavioral skills required to practice safe sex. 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 students attending HBCUs. A schematic representation of the design is displayed in Table 1.

Information-motivation-behavioral skills (IMB) model

The conceptual framework used to identify the socio-cognitive determinants of safe sex practices among college students attending HBCUs was based on Fisher and Fisher (1992) information-motivation-behavioral skills (IMB) model of understanding and promoting behavior. The model considers information and motivation to be independence construct, but 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 about how to prevent

HIV infection, as well as information or knowledge about HIV/AIDS. Motivation is theorized to include both personal motivation (that is, personal attitudes towards performing safe sex practice), as well as social motivation (that is, perceived social support for engaging in safe sex practice). In a sense, the IMB model suggest that an individual's motivation to practice safe sex is determined not only by his or her own personal feelings about whether practicing safe sex is good, but also whether friends and other referents provide social support for safe sex practice. Finally, according the IMB model, behavioral skills refers to an individual's sense of self-efficacy necessary to practice safe sex. Thus, an individual would need to perceive that he or she possesses the behavioral skills necessary to practice safe sex.

Unlike other models used in the study of HIV/AIDS and its risk factors, the IMB model has been validated extensively as providing a more comprehensive model of the determinants of health behavior that are of theoretical and empirical importance than other models which in general have been lacking in conceptual breath, specification of constructs and relationships, parsimomy and direct implications for intervention (Carey et al., 1997; Fisher et al., 1996; Fisher and Fisher, 1992, 2000; Fisher and Fisher, 1993; Abraham and Sheehan, 1994; Fisher et al., 2003). 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 el al., 1989) and oral rehydration behavior in developing countries (Foote et al., 1985).

Applying the IMB model to the present study, we hypothesize that levels of information, motivation and behavioral skills are fundamental determinants of safe sex practice among college students attending HBCUs. In a sense, the extent that at-risk HBCU college students are well informed and motivated to practice safe sex and possess the skills required to effectively prevent HIV infection, they will more likely be willing to engage in safe sex practices. Conversely, to the extent that these college students are poorly informed, unmotivated to practice safe sex and lack the behavioral skills required to effectively prevent HIV infection, they will unlikely be willing to practice safe sex.

Survey instrument

The data source for this study was a 41-item self-administered survey designed to obtain the students' opinion about HIV/AIDS and its risk factors. The items were extracted and modified from various survey instruments which have been used in HIV/AIDS studies. The survey instruments included: the HIV Knowledge Questionnaire (Carey et al., 1997; Carey et al., 2002); the National Survey of Teen on HIV/AIDS (The Kaiser Family Foundation, 2000); The International AIDS Questionnaire (Davis et al., 1999), The National Survey of the Public's Attitudes Toward HIV/AIDS in the United States and the World (The Kaiser Family Foundation, 2002); the AIDS Epidemic At 20 Years, The View From America (The Kaiser Family Foundation, 2001) and other independent studies on HIV/AIDS. A total of 63 items were extracted from these various survey instruments or questionnaires. Each statement on the developed survey had 5-response categories ranging from strongly agree to strongly disagree.

Content validity was established by giving the survey instrument to ten HIV prevention experts to review and suggest items to be modified or eliminated that they considered irrelevant, redundant or peripheral to HIV/AIDS prevention. Nineteen items were identified by the experts as irrelevant, redundant or peripheral to HIV/AIDS prevention. These items were eliminated from the survey. Furthermore, prior to administering the survey, it was pilot-tested on a sample of 20 students for redundancy or unclear items. The student found three items to be redundant or unclear. These items were eliminated.

The final survey instrument consisted of two parts. The first part contained demographic information such as race/ethnicity, enrollment status, academic class status and age group. The second part contained a battery of the 41-items designed to measure the respondents' level of HIV prevention information, HIV prevention motivation, AIDS prevention behavioral skills and intent to practice safe sex.

Participant 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 black Americans, 10% Caucasian and 4% Hispanics, 1% Native Americans 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 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, or tabulated 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 min to complete.

A total of 300 students agreed to participate in the survey. The analysis presented here include 297 participants whose response to each of the items showed no pattern of missing values. A breakdown of the sample by race/ethnicity was as follows: blacks (79.4%), whites (9.8%), Hispanics (3.0%), Native Americans (1.0%) and other racial groups (6.8%). Most of the respondents (76.1%) were within the age range of 18 - 25 years old, followed by 26-34 years old (10.1%), then 35 - 44 years old (8.4%) and above 45 years old (4.4%). The sample distribution by enrollment status showed that majority of the participants (97.6%) were full-time students and only 2.4% were attending college as part-time students. A breakdown of the sample by academic class status indicated that most of the participants were seniors (37.6%), followed by Freshmen (20.0%), next Juniors (19.3%) and Sophomores (15.3%). In general, the demographic breakdown of the study participants was similar to that of the student population of the HBCU under investigation, thus indicating a fairly representative sample.

Once the survey was completed, the participants' responses were score on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree. The scores were reversed for negatively stated items. The responses were entered into a constructed SPSS Version 17.0 dataset for analysis.

DATA ANALYSIS

Due to the large number of items on the survey instrument used in this study, the first step in data analysis involved conducting an exploratory factor analysis to remove as much redundant information and non-informative variables as possible. This was accomplished by identifying bivariate relations with high correlation values, reviewing the theoretical foundation of how each item was worded and removing as many redundant items or variables as possible. With the remaining variables, a principal component factor analysis applying the varimax rotation was used to further reduce the remaining items' pool into a smaller number of interpretable factors. The number of factors was determined by joint consideration of Cattell (1966) scree plot and residuals criteria. The latent root (eigenvalue) criterion was considered to be fairly unreliable since in this study the number of variables was more than 30 and several communalities were less than .70 (Mertler and Vannatta, 2005, p. 260).

Thurstone's principle of simple structure using pattern coefficient of absolute value 0.3 as the lower bound of meaningfulness per factor and interpretability of the solution were used to determine the final solution (Lambert and Durant, 1975). Finally, internal consistency estimates (Cronbach's α) were calculated for the items representing each factor retained from the exploratory factor analysis procedure. Cronbach's Alpha of 0.60 was considered as the minimum acceptable level of internal consistency for using a factor (Price and Mueller, 1986; Hair et al., 2006). For factors with Cronbach's Alpha below this minimum threshold, the internal consistency of the factor was improved by identifying and removing items with low item-test correlation and item-rest correlation (Nunnally and Bernstein, 1994).

A composite summative scale were developed for each of the generated socio-cognitive factors based on the items representing the factor and scored on a 5-point scoring scheme. Computation of the frequency distribution of the respondents' scores on each of scales was performed. Finally, multiple regression analysis was performed to determine the predictive influence of each of the latent socio-cognitive measures of information, motivation and behavioral skills on the level of willingness or intent to practice safe sex among HBCU college student participants.

RESULTS

Exploratory Principal Factor Analysis

Exploratory principal factor analysis was conducted to determine what, if any, underlying structures exist for the responses (n = 300) to the 41-item survey. Prior to the factor analysis, the data was evaluated to screen for missing values, outliers and assess normality and linearity. A simple independent sample t-test found three cases exhibiting patterns of missing values. The cases were eliminated reducing the sample size from 300 cases to 297. Using Mahalanobis distance, no outlier was found. A scatterplot matrix revealed fairly normal distributions and linear relationship among the items. Principal component factor analysis was conducted utilizing a varimax rotation with Kaiser Normalization. The final solution comprised seven factors that accounted for a total of 51.7% of the variance in the items. Examination of the correlation matrix indicated evidence of inter-item dependence (χ^2 = 2947.21, $p < .01$), an acceptability Kaiser- Meyer-Olkin (KMO) sampling adequacy statistic (KMO = 0.763) and an anti-image matrix that demonstrated properties approximating the desired diagonal matrix, with only 117 (35%) non-redundant residuals with absolute values exceeding the desired threshold of 0.05. Visual inspection of Cattell (1966) Scree plot also suggested retention of a seven-factor solution for the survey responses (Table 2).

Factor 1, which explained 18% of the variance, had 7 items with a pattern coefficient (factor loading) of absolute value 0.3 or higher. This first factor was labeled "Willingness to Associate with HIV-infected Persons". The second factor, labeled "Interest in HIV Education", explained 9% of the variance and had 3 items with large pattern/structure effect size coefficients. Factor 3, labeled "Knowledge of HIV Transmission", explained 6% of the variance and had 6 items with large pattern/structure effect size coefficients. Factor 4, labeled "Understanding HIV/AIDS Risk Behavior" explained 5% of the variance and had 5 items with large pattern/structure effect size coefficients. Factor 5, labeled "Willingness to Practice Safe Sex", explained 5% of the variance and consisted of 7 items with large pattern/structure effect size coefficients. Factor 6, labeled "Knowledge of HIV/AIDS", explained 4.5% of the variance and had 2 items with large pattern/structure effect size coefficients. Factor 7, labeled "Understanding Misconception of Immunity from AIDS", explained 4% of the variance and had 2 items with large pattern/structure effect size coefficients.

Measures of final solutions

The measures of the seven final solutions derived from the factor analysis are displayed in Table 3. A detailed description of the scales is presented in Appendix A of the article.

Frequency distribution of HBCU college students' perception of HIV/AIDS

Table 4 presents the frequency distribution of HBCU college students' perception of HIV/AIDS and its risk factors. The Table shows that a large majority of the respondents (over 87%) were willing to associate with HIV/AIDS-infected persons, interested in HIV/AIDS education, knowledgeable of HIV/AIDS transmission, willingness to practice safe sex, understanding of HIV/AIDS risk behavior, knowledgeable of HIV/AIDS and understanding of misconception of immunity from HIV/AIDS.

Socio-cognitive predictors of HBCU students' willingness to practice safe sex

Multiple regression analysis was conducted to determine

Table 2. Total variance for seven component solution.

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative (%)	Total	% of variance	Cumulative (%)
1	5.715	17.861	17.861	5.715	17.861	17.861
2	2.972	9.287	27.147	2.972	9.287	27.147
3	1.809	5.654	32.801	1.809	5.654	32.801
4	1.675	5.233	38.034	1.675	5.233	38.034
5	1.617	5.053	43.087	1.617	5.053	43.087
6	1.444	4.512	47.599	1.444	4.512	47.599
7	1.325	4.141	51.740	1.325	4.141	51.740
8	1.156	3.612	55.352			
9	1.114	3.482	58.834			
10	1.078	3.370	62.204			
11	0.952	2.975	65.179			
12	0.907	2.834	68.014			
13	0.864	2.699	70.713			
14	0.828	2.587	73.300			
15	0.762	2.382	75.682			
16	0.727	2.272	77.955			
17	0.719	2.245	80.200			
18	0.683	2.135	82.335			
19	0.658	2.057	84.392			
20	0.586	1.831	86.223			
21	0.559	1.748	87.971			
22	0.527	1.648	89.619			
23	0.502	1.569	91.188			
24	0.461	1.439	92.628			
25	0.442	1.381	94.008			
26	0.401	1.254	95.262			
27	0.376	1.175	96.437			
28	0.361	1.129	97.567			
29	0.326	1.019	98.585			
30	0.245	0.765	99.351			
31	0.126	0.394	99.745			
32	0.082	0.255	100.000			

Extraction method: Principal component analysis.

the accuracy of the independent variables: race/ethnicity, age, enrollment status, level of academic class, level of willingness to associate with HIV/AIDS-infected persons, level of interest in HIV/AIDS education, level of

Table 3. Component loadings.

	Loading
Component 1: Willingness to associate with HIV/AIDS-infected person	
I would feel uncomfortable around someone with AIDS	0.643
I would feel uncomfortable living near an AIDS hospital or AIDS home	0.766
I would feel uncomfortable working with someone with AIDS	0.784
I would not feel comfortable eating in a restaurant where the cook has AIDS	0.642
I would not feel comfortable shaking hands with someone who has AIDS	0.712
It would be dangerous to permit a student with HIV to attend college	0.568
HIV is a punishment for immoral behavior	0.539
Component 2: Interest in HIV/AIDS education	
HIV education in middle school is a waste of time	0.908
HIV education in high school is a waste of time	0.907
HIV education in college is a waste of time	0.897
Component 3: Knowledge of HIV/AIDS transmission modes	
A person can get HIV from tears or saliva	0.694
A person can get HIV from donating blood	0.569
Sharing cooking utensil with a person who has AIDS is not safe	0.557
A person can be infected with the AIDS virus from someone's cough or sneeze on them	0.546
A person can be infected with the AIDS virus from mosquitoes	0.509
Component 4: Willingness to practice safe sex	
I dislike the idea of limiting sex to just one partner	0.673
I would dislike asking a sex partner to get the HIV antibody test	0.667
I intent to talk about HIV prevention with a mate only after sex	0.514
During sex, I would be insulted if my partner insisted we use condoms	0.497
A person can be infected with the AIDS virus by attending college with a student who has AIDS	0.409
Component 5: Understanding HIV/AIDS risk behavior	
I will use condoms when having sex if I am not sure if my partner has HIV	0.609
I would openly promote others to get tested for HIV	0.516
HIV/AIDS education is needed on the college campus	0.583
I intent not to use drug so I can avoid HIV	0.587
A pregnant woman can give the virus that cause AIDS to her unborn baby	
At the present there is no cure for AIDS	
If I was HIV positive, I would tell my mate	0.468
Component 6: Knowledge of HIV/AIDS	
A person can be infected with the AIDS virus from sharing needles for drug use	0.817
A person can be infected with the AIDS virus through sex with an infected person	0.811
Component 7: Understanding of misconception of immunity from AIDS	
There is a vaccine available that protects one from the AIDS virus	0.907
A person can be infected with HIV for 5 years without getting AIDS	0.891

understanding of HIV risk behaviors, level of knowledge of HIV/AIDS and level of knowledge of HIV/AIDS transmission modes. Data screening led to the elimination of three cases that were outliers. Evaluation of linearity showed no violation of the linearity assumption. Tests of the impact of multicollinearity revealed that the factor

Table 4. Frequency distribution of HBCU College students' perception of HIV/AIDS.

Variable	Rank category	Frequency
Willingness to associate	Very willing	29.5
	Willing	47.8
	Somewhat willing	22.4
	Not willing	0.4
	Not willing at all	0.0
Interest in HIV/AIDS education	Very interested	85.3
	Interested	11.0
	Somewhat interested	1.4
	Not interested	1.0
	Not interested at all	1.4
Knowledge of HIV/AIDS transmission	Very knowledgeable	20.5
	Knowledgeable	39.4
	Somewhat knowledgeable	32.9
	Not knowledgeable	6.5
	Not knowledgeable at all	0.7
Willingness to practice safe sex	Very willing	73.7
	Willing	22.5
	Somewhat willing	3.5
	Not willing	0.0
	Not willing at all	0.3
Understanding of HIV/AIDS risk behavior	Very understanding	95.8
	Understanding	3.8
	Somewhat understanding	0.3
	Not understanding	0.0
	Not understanding at all	0.0
Knowledge of HIV/AIDS	Very knowledgeable	45.6
	Knowledgeable	25.9
	Somewhat knowledgeable	16.0
	Not knowledgeable	7.1
	Not knowledgeable at all	5.4
Understanding of HIV/AIDS prevention	Very understanding	79.6
	Understanding	20.4
	Somewhat understanding	0.4
	Not understanding	0.0
	Not understanding at all	0.0

All values are given in percentages.

labeled "Understanding of Misconception of Immunity from AIDS" was highly collinear (VIF = 9.972; Tolerance = .100) and therefore was deleted from the regression model. Results of the regression analysis are presented in Table 1. The results indicate that the overall model of eleven variables was statistically reliable in predicting HBCU students' willingness to practice safe sex (R^2 = 0.285; F (9, 268) = 11.42; $p < 0.001$). On the average, the beta coefficients on four of the ten variables, that is, level of willingness to associate with HIV/AIDS (Beta = .266,

Table 5. Regression socio-cognitive factors on HBCU students' willingness to practice safe sex.

Model	B	Std. Error Beta	Beta	t	Sig.	Tolerance	VIF
Academic class	.329	.163	.108	2.014	.045	.957	1.045
Age	-.002	.002	-.052	-981	.327	.989	1.011
Race	.059	.176	.018	.336	.727	.988	1.012
Enrollment status	-1.425	1.215	-.060	.1.17	.242	.960	1.042
Willing to associate	.164	.038	.266	4.363	.001	.741	1.350
Interest in HIV education	.316	.102	.175	3.081	.002	.852	1.174
Understand HIV risk behavior	.230	.061	.209	3.782	.001	.905	1.104
Knowledge of HIV/AIDS	.002	.082	.001	.024	.981	.965	1.036
Knowledge of HIV transmission modes	.110	.050	.130	2.201	.029	.791	1.264

Dependent: Willingness to practice safe sex $R^2 = .285$. $F(9,268) = 11.42$, $N = 268$, $p < .001$.

t = 4.363, p < 0.001), level of interest in HIV/AIDS education (Beta = .175, t = 3.081, p < 0.002), level of understanding of HIV risk behavior (Beta = .209, t = 3.782, p < 0.001) and level of knowledge of HIV transmission modes (Beta = .130, t = 2.201, p < 0.029) are positive and significant, suggesting that these factors are predictive of HBCU students' willingness to practice safe sex. Also, academic class coefficient is positive and significant (Beta = .130, t = 2.201, p < 0.029), suggesting the possibility that upper class students are more willingness to practice safe sex than lower class students.

DISCUSSION AND CONCLUSION

In this study, we found that most of the college students who participated in the study were knowledgeable and understanding of HIV/AIDS and the risk behavior associated with the disease. The study also found the HBCU college students to be generally willing to associate with persons infected with HIV/AIDS, practice safe sex and participate in HIV/AIDS education. In effect, the findings of this study seem to support previous research which found that college students are generally understanding of and knowledgeable about, HIV/AIDS and its risk factors (Baldwin and Baldwin, 1988; Keeling, 1991; Anastasia et al., 1999; Bates and Joubert, 1993; CDC, 2004c; Gupta and Weiss, 1993; Lewis et al., 1997; Opt and Loffredo, 2004; Mattos, 2002; Netting and Burnett, 2004; Opt and Loffredo, 2004; Fierros-Gonzalez and Brown, 2002; Lance, 2001; Dilorio et al., 2000; Troth and Peterson, 2000; Van Den Eiginden et al., 1998; Demmer and Caroleo, 2001; Opt et al., 2007). With regards to the predictive influence of these factors on the students' willingness to practice safe sex, the regression analysis results suggest that controlling for age, enrollment status, knowledge of HIV/AIDS does not does not influence HBCU students' willingness to practice safe. This finding is consistent with previous research cited above. Rather, academic class, willingness to associate with HIV/AID infected person, interest in HIV/AIDS education, understanding of HIV/AIDS risk behaviors and knowledge of HIV/AIDS transmission modes are predominant in predicting the students' willingness (or intention) to practice safe sex.

The conclusion and application of the findings of this study can be made within the context of the Theory of Reasoned Action (TRA) which focuses on the psychological determinants of HIV/AIDS prevention behaviors (Fishbein and Ajzen, 1975). According to this theory, HIV/AIDS prevention behaviors are a function of behavior intentions which in themselves are a function of attitudes, subjective norms and perceived behavioral control concerning those behaviors. Studies on black American college students using this theoretical framework have produced mixed results. For example, studies by Jemmott and Jemmott (1991) and Bazargan and colleagues (2000) found that black American college students have not internalized safer sex messages compared to white college students. Using the same TRA as a framework, Davis and colleagues (2007) explored the racial differences of sexual behaviors and safe sex practices, HIV/AIDS awareness, condom use-self efficacy and attitude toward safer sex practices in a sample of sexually active college students in the United States. The researchers found that more black American college student respondents than their white counterparts reported they used condoms frequently and they intend to used condoms regularly in the future. No racial differences were found in intentions for future casual sex, condom use efficacy, or attitudes towards safe sex practices. However, although these findings suggest that African American college students in this sample appear to have internalized safer sex messages, the study found that both groups reported a lack of safe-sex practices, which essentially is the same as the conclusion arrived at in our study. Therefore, it stands to reason that since the findings of our study essentially dovetails with previous research, more research focusing on college students attending Historically Black Colleges and Universities is needed. First, a follow-up study should be conducted to

determine if the elevated level of knowledge and understanding HIV/AIDS among the college students attending the HBCU under investigation correlate negatively to the students' intention practice of safe sex among the students as found in previous studies. Second, as a contribution to theory development, the future studies should use the latent constructs developed in this study to test contemporary socio-cognitive theories, such as the theory of planned behavior and Information-Motivation-Behavioral Skill Model, using more advance statistical procedures such as structural equation modeling techniques.

Another finding of interest is that most of the respondents were willing to associate with persons infected with HIV/AIDS and interested in HIV/AIDS education. Previous studies have found that persons infected with HIV/AIDS, including college students, not only experience disability, pain and possibility of death, but also ostracism and condemnation (Simkins and Kushner, 1986; Ragon et al., 1995). Other research has also shown that college students are sympathetic towards HIV/AIDS victims, however the willingness to work with AIDS victims or to interact with fellow college students identified as having HIV/AIDS is weak (Bailey et al., 1989; Edwards and Hiday, 1987; Bingham and Crocket, 1996). This finding deviates from our finding, which invariably reduces the possibility of non-infected students' reluctance to practice safe sex. With regards to our finding that HIV/AIDS education has a positive influence on the HBCU students' willingness to practice safe sex, Ragon et al. (1995) found that simple traditional models of teaching were ineffective in changing attitudes of college students regarding HIV transmission and safe sex practices (Ragon et al., 1995). The researchers opined that for HIV/AIDS education to be meaningful, it should be expanded to become: (a) a part of a general health education course offered at the college/university level; (b) develop a specific for credit course on HIV/AIDS and (c) allow the student health service more opportunity to develop and implement AIDS education programs. The findings of our study and previous studies may well serve as a precursor in facilitating the design and establishment of HIV/AIDS education on a HBCU campus using existing resources and programs offered by the Center for Disease Control (CDC) to increase and strengthen HIV/AIDS prevention and intervention activities targeted to black Americans, including college students (CDC, 2008).

This study was not without limitations. In particular, the study relied on a one-shot case design. The type of research design has three major limitations. First, there is complete absence of control and only college students attending one university, which in this case is the selected HBCU in the UNC system, participated in the study, limiting the external validity of the study's findings. To be sure, the "quick and easy" nature of this approach, often used as a basis for change or innovation, is misleading (Isaac and Michael, 1997). Second, there is no provision for comparison, which is the basis of science, except implicitly, intuitively and impressionistically. Third, this approach to inquiry usually involves the "error of misplaced precision" in that a great deal of time is devoted to the collection of data about which the conclusion derived can only be impressionistic and imprecise. Moreover, self-report instruments often have the problem of respondent dishonesty. Furthermore, the student sample used in this study was not randomly selected. Hence, the findings may not be representative of the perception and behavior of college students attending the particular HBCU under investigation as a whole. These limitations suggest that interpretation or generalization of the findings of this study should be limited to college students attending the particular HBCU under investigation or colleges with similar population mix or composition.

However, these limitations notwithstanding, the study provides some preliminary insights into the perception and the socio-cognitive determinants of HIV/AIDS among college students attending a Historically Black college and University. As a contribution to theory-building, this study and the survey instrument constructed and used in the study should be tested in other settings, particularly HBCUs for consistency or inconsistency in findings. Also, future studies should focus on whether college students inquire about their partners' sexual history prior to engaging in sexual activity. Finally, an area not covered in this study which has featured prominently in recent scholarly discourse on HIV infection among adolescence, including college students, is the influence of exposure to crime and violence on safe sex practice. Given that college students attending HBCU for the most part come from neighborhoods with threatening living conditions such as crime and violence, future studies should compare safe sex behavior between HBCU college students from high crime and violence neighborhoods and their counterparts from low crime and violence neighborhoods to ascertain if these threatening living conditions may be one of the contributing factors to the spread of HIV aids among black American college students.

ACKNOWLEDGEMENTS

Support for this research was provided by grant P20 MD001089 from the National Institution of Health, NCMHD U.S and Department of Health and Human Services.

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Appendix A

Survey instrument

Perception of HIV/AIDS and Socio-cognitive determinants of HIV/AID among Students at a Historically Black college and University (HBCU).

Questionnaire

Notice to participants

Thank you for your participation. The questionnaire is administered to obtain primary data to help in the development of targeted HIV/AIDS education curriculum for undergraduate students attending Historically Black Colleges and Universities. Participation in this study is voluntary and you may choose at any time to withdraw from the study. You may also refuse to answer any questions and still remain in the study. The data presented in this study will be coded and will not contain the names of any individual nor their responses.

Part I- DEMOGRAPHIC INFORMATION

Please check the answer that best describes you:

Race: Black____White ____Hispanic _____Native-American _____Other _____

Age: 18-25_____ 26-34_____ 35-44_____
45-54_____55 and Above_____

_____Full-Time Student _____Part-time Student

_____Freshman _____Sophomore
_____Junior _____Senior _____Unsure

Part II – PERCEPTION OF HIV/AIDS

Instructions: Please read each statement carefully. Record your immediate reaction to the statement by circling your response. There is no right or wrong answer for each statement.

SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree

1. I understand the Health Belief Model as related to HIV/AIDS. SA A U D SD
2. AIDS can reduce the body's natural protection against disease. SA A U D SD
3. AIDS can damage the brain.
SA A U D SD
4. AIDS is caused by an infectious virus.
SA A U D SD
5. A person can be infected with the AIDS virus &not have the disease. SA A U D SD
6. A person can look and feel well who has the virus that causes AIDS. SA A U D SD
7. There is a vaccine available that protects one from the AIDS virus. SA A U D SD
8. At present there is no cure for AIDS.
SA A U D SD
9. A person can be infected with HIV for 5 years without getting AIDS. SA A U D SD
10. A person can be infected with the AIDS virus by using a public toilet. SA A U D SD
11. A person can be infected with the AIDS virus from sharing needles for
drug use.
SA A U D SD
12. A person can be infected with the AIDS virus from someone's cough
or sneeze on them.
SA A U D SD
13. A person can be infected with the AIDS virus by attending college with
a student who has AIDS.
SA A U D SD
14. A person can be infected with the AIDS virus from mosquitoes. SA A U D SD
15. A person can be infected with the AIDS virus through sex with an infected
person.
SA A U D SD
16. I would feel uncomfortable around someone with HIV.
SA A U D SD
17. I would not feel comfortable living near an AIDS hospital or AIDS home. SA A U D SD
18. I would not feel comfortable working with someone with AIDS. SA A U D SD
19. I would not feel comfortable eating in a restaurant where the cook has AIDS. SA A U D SD
20. I would not feel comfortable shaking hands with someone who has AIDS. SA A U D SD
21. It would be dangerous to permit a student with HIV to attend college. SA A U D SD
22. HIV education in middle school is a waste of time.
SA A U D SD
23. HIV education in high school is a waste of time.
SA A U D SD
24. HIV education in college is a waste of time.
SA A U D SD
25. During sex, I would be insulted if my partner insisted we use a condom. SA A U D SD
26. I dislike the idea of limiting sex to just one partner.

SA A U D SD
27. I would dislike asking a sex partner to get the HIV antibody test. SA A U D SD
28. I intend to talk about HIV prevention with a mate only after sex. SA A U D SD
30. I intend not to use drugs so I can avoid HIV.
SA A U D SD
31. I will use condoms when having sex if I'm not sure if my partner has HIV. SA A U D SD
32. HIV is a punishment for immoral behavior.
SA A U D SD
33. Sharing cooking utensils with a person who has AIDS is not safe. SA A U D SD
34. A pregnant woman can give the virus that cause AIDS to her unborn baby. SA A U D SD
35. A person can get HIV from tears or saliva?
SA A U D SD
36. A person can get HIV from donating blood?
SA A U D SD
37. A person can get HIV from body piercing?
SA A U D SD
38. I know enough about AIDS education to teach others? SA A U D SD
39. If I were HIV positive, I would tell my mate?
SA A U D SD
40. I would date a HIV positive person?
SA A U D SD
41. I would openly promote others to get tested for HIV?
SA A U D SD
42. HIV/AIDS education is needed on the college campus? SA A U D SD

APPENDIX B

DEISCRIPTION OF MEASURE OF FINAL SOLUTION (SCALES)

Willingness to associate with HIV-infected persons (WAHP) scale

The students' willingness to associate with HIV-infected persons was measured by the following seven statements: A person can be infected with the AIDS virus by using public toilet; I would feel uncomfortable around someone with AIDS; I would feel uncomfortable living near an AIDS hospital or AIDS home; I would feel uncomfortable working with someone with AIDS; I would not feel comfortable eating in a restaurant where the cook has AIDS; I would not feel comfortable shaking hands with someone who has AIDS and It would be dangerous to permit a student with HIV to attend college. The response scoring categories were 1= strongly agree; 2 agree; 3 = somewhat agree; 4 = disagree and 5 = strongly disagree. Summation of the scores of the seven items for each category produced a composite Willingness to associate with HIV-infected Persons (WAHP) scale with the following scoring scheme: 0 - 7= not willing to associate with HIV-infected persons at all; 7.01 - 14 = not willing to practice safe sex; 14.01 - 21 = somewhat willing to practice safe sex; 21.01 - 28 = willing to practice safe sex; 28.01 - 35 = very willing to practice safe sex. Each respondent's level of willingness to associate with HIV-infected persons was determined by his or her score on the WAHP composite scale. Cronbach's alpha reliability coefficient for this scale is 0.8010, suggesting a high internal consistency among the variables representing the scale.

Interest in HIV Education (IHE) scale

This scale consisted of participants' response to the following three statements: HIV/AIDS education in middle school is a waste of time; HIV/AIDS education in high school is a waste of time and HIV/AIDS education in college is a waste of time. The responses were scored as follows: 1=strongly agree; 2 = agreed; 3 = somewhat agree; 4 = agree and strongly agree = 5. The response scoring categories were 1= strongly agree; 2 agree; 3= somewhat agree; 4= disagree and 5=strongly disagree. Summation of the scores of the three items for each category produced a composite Interest in HIV Education (IHE) scale with the following scoring scheme: 0 - 3 = not interested in HIV education at all; 3.01 - 6 = not interest in HIV education; 6.01 - 9 = somewhat interested in HIV education; 9.01 - 12 = interested in HIV education; 12.01 - 15 = very interested in HIV education. Each respondent's level of interest in HIV education was determined by his or her score on the IHE composite scale. Cronbach's alpha reliability coefficient for this scale is 0.9580, suggesting a high internal consistency among the variables representing the scale.

Knowledge of HIV/AIDS transmission modes (KHATM) scale

This scale consisted of participants' response to the following five statements: A person can get HIV from tears or saliva; A person can get HIV from donating blood; Sharing cooking utensil with a person who has AIDS is not safe; A person can be infected with the AIDS virus from someone's cough or sneeze on them and A person can be infected with the AIDS virus from mosquitoes. The response scoring categories were 1= strongly agree; 2 agree; 3= somewhat agree; 4= disagree; and 5=strongly disagree. Summation of the scores of the five items for each category produced a composite Knowledge of HIV/AIDS Transmission Modes (KHATM) scale with the following scoring scheme: 0 - 5 = not knowledgeable of HIV/AIDS transmission modes at all;

5.01 - 10 = not knowledgeable of HIV/AIDS transmission modes; 10.01 - 15 = somewhat knowledgeable of HIV transmission modes; 15.01 - 20 = Knowledgeable of HIV transmission modes; 20.01 - 25 = very knowledgeable of HIV transmission modes. Each respondent's level of knowledge of HIV transmission modes was determined by his or her score on the KHATM composite scale. Cronbach's alpha reliability coefficient for this scale is 0.6388, suggesting a fairly satisfactory internal consistency among the variables representing the scale.

Willingness to practice safe sex (WPSS) scale

This scale consisted of participants' response to the following five statements: I dislike the idea of limiting sex to just one partner; I would dislike asking a sex partner to get the HIV antibody test; I intent to talk about HIV prevention with a mate only after sex; During sex, I would be insulted if my partner insisted we use condoms and A person can be infected with the AIDS virus by attending college with a student who has AIDS. The response scoring categories were 1 = strongly agree; 2 agree; 3 = somewhat agree; 4 = disagree and 5 = strongly disagree. Summation of the scores of the five items for each category produced a composite Willingness to Practice Safe Sex (WPSS) scale with the following scoring scheme: 0 - 5 = not willing to practice safe sex at all; 5.01 - 10 = not willing to practice safe sex; 10.01 - 15 = somewhat willing to practice safe sex; 15.01 - 20 = willing to practice safe sex; 20.01 - 25 = very willing to practice safe sex. Each respondent's level of willingness to practice safe sex was easily determined by his or her score on the WPSS composite scale. Cronbach's alpha reliability coefficient for this scale is 0.6319, suggesting a fairly satisfactory internal consistency among the variables representing the scale.

Understanding of HIV/AIDS risk behavior (UHARB) scale

This scale consisted of participants' response to the following seven statements: I will use condoms when having sex if I am not sure if my partner has HIV/AIDS; I would openly promote others to get tested for HIV; HIV/AIDS education is needed on the college campus; I intent not to use drug so I can avoid HIV; A pregnant woman can give the virus that cause AIDS to her unborn baby; At the present there is no cure for AIDS and If I was HIV positive, I would tell my mate. The response scoring was 1 = strongly agree; 2 agree; 3 = somewhat agree; 4 = disagree and 5 = strongly disagree. Summation of the scores of the seven items for each category produced a composite Understanding of HIV/AIDS Risk Behavior (UHARB) scale with the following scoring scheme: 0 - 7 = does not understand HIV/AIDS risk behavior at all; 7.01 - 14= does not understand HIV/AIDS risk behavior; 14.01 - 21 = somewhat understand HIV/AIDS risk behavior; 21.01 - 28 = understand HIV/AIDS risk behavior; 28.01 - 35 = very understanding of HIV risk behavior. Each respondent's level of understanding of HIV/AIDS risk behavior was determined by his or her score on the UHRB composite scale. Cronbach's alpha reliability coefficient for this scale is 0.5584, suggesting a fairly satisfactory internal consistency among the variables representing the scale.

Knowledge of HIV/AIDS (KHA) scale

This scale consisted of participants' response to the following two statements: A person can be infected with the AIDS virus from sharing needles for drug use and A person can be infected with the AIDS virus through sex with an infected person. The response scoring was 1 = strongly agree; 2 agree; 3 = somewhat agree; 4 = disagree; and 5 = strongly disagree. Summation of the scores of the two items for each response category produced a composite Knowledge of HIV/AIDS (KHA) scale with the following scoring scheme: 0 - 2 = not knowledgeable of HIV/AIDS at all; 2.01 - 4 = not knowledgeable of HIV/AIDS; 4.01 - 6 = somewhat knowledgeable of HIV/AIDS; 6.01 - 8 = Knowledgeable of HIV/AIDS; 8.01 - 10 = very knowledgeable of HIV/AIDS. Each respondent's level of knowledge of HIV/AIDS was determined by his or her score on the KHA composite scale. Cronbach's alpha reliability coefficient for this scale is 0.6955, suggesting a satisfactory internal consistency among the variables representing the scale.

Understanding of misconception of immunity from AIDS (UMIA) scale

This scale consisted of participants' response to the following two statements: There is a vaccine available that protects one from the AIDS virus and a person can be infected with HIV for 5 years without getting AIDS. The response scoring was 1 = strongly agree; 2 = agree; 3 = somewhat agree; 4 = disagree and 5 = strongly disagree. Summation of the scores of the two items for each response category produced a composite Understanding of misconception of Immunity from AIDS (UMIA) scale with the following scoring scheme: 0 - 2 = not understanding of misconception of immunity from AIDS at all; 2.01 - 4 = not understanding of misconception of immunity from AIDS; 4.01 - 6 = somewhat understanding of misconception of immunity from AIDS; 6.01 - 8 = understanding of misconception of immunity from AIDS; 8.01 - 10 = very understanding of misconception of immunity from AIDS. Each respondent's level of

understanding of misconception of immunity from AIDS was determined by his or her score on the KHA composite scale. Cronbach's alpha reliability coefficient for this scale is 0.6275, suggesting a satisfactory internal consistency among the variables representing the scale.