

# CORRELATES OF HIV RISK-TAKING BEHAVIORS AMONG AFRICAN-AMERICAN COLLEGE STUDENTS: THE EFFECT OF HIV KNOWLEDGE, MOTIVATION, AND BEHAVIORAL SKILLS

Mohsen Bazargan, PhD, Ella M. Kelly, PhD, Judith A. Stein, PhD, Baqar A. Husaini, PhD,  
and Shahrzad H. Bazargan, PhD

Los Angeles, California

---

This study identifies theoretically based predictors of condom use in a sample of 253 sexually active African-American college students recruited from two historically African-American colleges. The Information-Motivation-Behavioral (IMB) skills model of AIDS-preventive behavior was employed to delineate the roles of HIV/AIDS knowledge, experiences with and attitudes toward condom use, peer influences, perceived vulnerability, monogamy, and behavioral skills. A predictive structural equation model revealed significant predictors of more condom use including: male gender, more sexual HIV knowledge, positive experiences and attitudes about condom use, nonmonogamy, and greater behavioral skills. Results imply that attention to behavioral skills for negotiating safer sex and training in the proper use of condoms are key elements in reducing high risk behaviors. Increasing the specific knowledge level of college students regarding the subtleties of sexual transmission of HIV is important and should be addressed. Heightening students' awareness of the limited protection of serial monogamy, and the need to address gender-specific training regarding required behavior change to reduce transmission of HIV should be an additional goal of college health professionals. (*J Natl Med Assoc.* 2000;92:391-404.)

---

**Key words:** HIV ♦ African Americans  
♦ college students

A review of a decade of literature on HIV/AIDS risk in heterosexual college students indicates that college students are engaging in high rates of behavior that place them at risk of human immunodeficiency virus (HIV) infection.<sup>1-3</sup> The college campus provides students with a sense of new independence, self-determination, and strong peer pressure to experiment with a variety of sexual behav-

ior.<sup>4</sup> College students are likely to have multiple sexual partners and their use of condoms tends to be sporadic.<sup>5</sup> In addition, as Ragon and his colleagues<sup>4</sup> have suggested,

“... college students have a belief in personal immortality—behaviors which later in life may lead to disease and disability are viewed with skepticism. Also, the lack of immediate signs and symptoms of HIV infection, due to its latency period, can cause many college students to mistakenly believe that they are immune to HIV.”

The increasing shift in the HIV/AIDS-infected population in the United States from the white, male gay community increasingly to women and populations of color, require that attention be focused on college students representative of these

---

© 2000. From the Charles R. Drew University of Medicine & Science, and the University of California at Los Angeles (UCLA), Los Angeles, CA, and Tennessee State University. Request for reprints should be addressed to Dr. Mohsen Bazargan, Charles R. Drew University of Medicine & Science, 1621 East 120th St., Los Angeles, CA 90059.

groups. In general, and for communities of color, in particular, these young people represent a valuable prospective leadership pool. For them to place themselves at risk, to some extent, places their respective communities' futures at risk.

College students representing communities of color, however, generally manifest the problems of individuals in transition. This means that they must struggle with the "duality" of their developing identity.<sup>6</sup> Components of this duality are the culturally prescribed modes of behavior and belief systems as well as the new knowledge, attitudes, and beliefs that are developed as their identities are refined. With one foot in their communities and another in the world of academia, behavior change can become conflicted. This appears to be true, especially for African-American college students. The Centers for Disease Control and Prevention (CDC) reported in 1995 that, although only 12.6% of the U.S. population is estimated to be African American, this group comprises 40% of AIDS-related deaths in this country.<sup>7</sup> In 1995, the AIDS-related death rate for African-American young adults was 6.4 times higher than that of their white counterparts.<sup>7</sup>

HIV/AIDS is now the leading cause of death for African-American men between the ages of 25 and 44 years and the second leading cause of death for African-American women of the same age. Given the incubation period for HIV from a few months to more than 10 years, it is reasonable to assume that increasing numbers of African-American young adults, many of college age and those anticipating college entry, may also be at higher risk than their majority group counterparts. Currently, African-American women have an HIV/AIDS rate of 63 per 100,000 and are 20 times more likely to acquire the disease than white women. African-American women represent 55% (31,181) of AIDS cases reported among adult and adolescent women,<sup>8</sup> suggesting that African-American college students are disproportionately at risk of HIV infection.

Preliminary results of an assessment of HIV infection among college students performed by the CDC in collaboration with the American College Health Association estimated a crude overall seroprevalence of 2%.<sup>9</sup> However, a recent study of 408 African-American southern college students indicated that 3.18% had HIV/AIDS.<sup>10</sup> African-American college students currently are at increased risk of being HIV-infected as compared with their majority-group peers; however, currently, they do not

manifest risk at the level that exists within their larger racial-ethnic community.

How might this increased risk be explained when compared with their white college-age peers? African-American college students may be at risk of HIV/AIDS, because, like other members of their community, they have developed a different set of attitudes about the genesis and operation of HIV/AIDS based on their unique history in the United States. It has been noted by a variety of researchers that there is sufficient evidence to suggest that the medical establishment<sup>11-13</sup> has often neglected African Americans. Recent research has linked the persistence of the HIV/AIDS epidemic, especially in the African-American community, as a logical outcome of the this neglect that has resulted in continuing black-white health disparities.<sup>14-21</sup> The current HIV/AIDS epidemic can be seen within the scope of that unique history, as it has contributed to a social environment in which those within this community "at greatest risk for HIV/AIDS infection are also the most disadvantaged members of our society."<sup>22</sup> One recent outcome of this situation is that even U.S. public health officials now acknowledge that some African Americans' belief in AIDS as a form of genocide is a legitimate attitudinal barrier rooted in the history of the Tuskegee Syphilis Study.<sup>12</sup>

## BACKGROUND

### HIV Knowledge, Sexual Activity, and Condom Use

Previous studies have reported that between 80% and 92% of college students possess correct HIV/AIDS knowledge and think use of condoms is a good preventive method.<sup>23-26</sup> However, this fairly high level of correct knowledge about HIV and its mode of transmission has yet to be linked to an increased reduction in risky behaviors. As an example, only a small proportion of sexually active students uses condoms 100% of the time. Jemmott and Jemmott<sup>27</sup> have reported that the link between knowledge and protective behavior is weaker for African-American college students. In one of their studies they found only 20% of sexually active unmarried African-American undergraduates at an inner-city commuter university *always* used condoms when they engaged in sexual activities.

Similarly, although 90% of African-American male college students were reported to be sexually

active (with more than two partners in the last 6 months), only 37% used condoms consistently, with condoms most likely to be used for casual sexual encounters.<sup>28-30</sup> However, in a separate study of African-American male college students who used condoms consistently, Johnson et al.<sup>29</sup> found that these students did not find condoms to be unreliable or uncomfortable and that they (male students) acted angrily when their partners suggested that they not use a condom.

In their earliest stage of response to the concern over the HIV epidemic, many universities and colleges focused on providing students with information and dispelling myths about HIV/AIDS infection. Several studies indicated that, although some misperceptions persisted, college students possessed relatively high levels of knowledge about HIV/AIDS. However, researchers detected no significant consistent meaningful relationship between HIV/AIDS-related knowledge and adoption of safer sex practice.<sup>23,26,31-37</sup> A review of the literature also reported that many college students appeared to have difficulty in translating this knowledge into consistent behaviors that may protect their health.<sup>5</sup>

Studies have also indicated that the HIV/AIDS epidemic did have some effect on sexual activities, because a small proportion of college students have reportedly changed their sexual behavior by either becoming more selective of their sex partners (22%),<sup>38</sup> decreasing sexual activity (15%, [in Reference 38]), increasing use of condoms,<sup>39</sup> or by abstaining (10%, [in Reference 40]). Comparing the sexual practices in college women before and after the start of various sexually transmitted disease epidemics, DeBuono and colleagues<sup>41</sup> found that an increase in the usage of condoms in conjunction with other methods of contraception had increased among the female college students. On the other hand, other researchers who compared HIV/AIDS-related sexual behaviors of college students between the years of the onset of the HIV epidemics and in the late 1980s have also reported that college students have not consistently reduced HIV-related risky behaviors and many indeed may actually be increasing risky behaviors.<sup>42</sup>

### **HIV Knowledge, Attitudes, and Beliefs in the African-American Community**

Recent studies within the African-American community<sup>22,43,44</sup> that were designed to bring HIV edu-

cation into urban areas with a major African-American presence via the African-American churches found that both the church leadership and parishioners perceived the presence of HIV and its impact in a manner different from most Americans. When asked: "Do you believe that AIDS is a form of genocide?" 34% of the African-American church leadership felt that it was and 30% were unsure. The fact is that 65% of the church leadership, a major force for influencing attitudes within the African-American community, accepted the possibility of the current HIV/AIDS epidemic as indicative of governmental contrivance, rather than an outcome of human behavior.<sup>45</sup>

This finding was echoed in a similar study designed to assess AIDS knowledge, attitudes, and beliefs on a scale that indicated one's degree of knowledge with a 28-item questionnaire.<sup>44</sup> The knowledge portion used a five-point Likert scale from "I'm sure it's true"<sup>1</sup> to "I'm sure it's false."<sup>5</sup> The five-point scale was collapsed into a three-point scale of "true," "do not know," and "false." The correct response for each knowledge item was given one point; the incorrect and "do not know" responses were scored as zero. For AIDS knowledge, the mean score was 21.1 (SD = 5.5), or 73% correct. Knowledge about the major modes of transmission was generally good. However, knowledge about casual contact was low. This was especially true for items about the spread of HIV via "mosquito bites" and "use of toilet seats," in which about one-quarter (26% and 22%, respectively) indicated that they knew or believed that these were modes of transmission. Another 30% incorrectly believed that HIV was transmitted through donating blood to the Red Cross.

Furthermore, knowledge about the general nature of HIV was mixed. Most (93%) knew that AIDS destroys the body's immunity, and 87% knew that it is caused by a virus. However, about one-fifth (19.8%) incorrectly answered or did not know that "a person with HIV can spread it to others even before they get full-blown AIDS." About one-quarter (26%) incorrectly answered about the time period from infection with HIV to full-blown AIDS. Knowledge about specific aspects of risk reduction was also low, with less than one-half (47%) correctly answering that latex condoms are more effective than natural skin condoms in preventing HIV infection, and only two-thirds (66%) knew that cleaning needles with bleach and water could reduce risk of HIV transmission. Finally, knowledge about symp-

toms of HIV was also low. About two-thirds knew that “symptoms of AIDS usually appear 1 to 2 days after being infected,” and, that “excessive weight loss, night sweats, and fever could be signs of infection with the AIDS virus,” respectively.

Overall, the low level of knowledge about risk reduction activities gives cause for alarm. Knowledge about risk reduction activities must be accurate for individuals to protect themselves from infection under all circumstances. African-American college students share the behaviors of all college students who are likely to engage in risk sexual behaviors and experimentation. In addition, however, the lower levels of knowledge about the casual transmission of HIV and AIDS evidenced in the greater African-American community may well be reflected among African-American college students for several reasons. First, many of the students attend private African-American church-supported higher education institutions in which the policy of the administration may be reflective of the African-American church leadership.<sup>46</sup> Second, African-American college students may perceive broader community pressures to continue to be reflective of the community’s continuing concern about the persistence of inequality in many phases of social, economic, and political life.<sup>13</sup> And, finally, like their college counterparts, African-American college students may misjudge the gravity of their individual and collective experimentation with varying sexual behaviors.

### Intervention Studies

Earlier intervention studies on college students were educational in nature; they generally provided information about HIV, including its mode of transmission. These studies failed to produce significant changes in HIV risk behaviors among college students.<sup>1,39</sup> In one study, no differences in risky sexual behaviors (that is, intercourse without condom use with different sexual partners) were found among those receiving the HIV education and HIV testing, those receiving the education only, and the control group.<sup>47</sup> During the last 5 years, a new generation of intervention studies using information, motivation, and behavioral skills in negotiating and practicing safer sex has produced some promising results in the targeted college population. In one study testing the Information-Motivation-Behavioral (IMB) skills model among college students, an interven-

tion focusing simultaneously on increasing HIV/AIDS information, motivation for HIV prevention, and behavioral skills reported significant changes (improvements) in safer sexual practices, which were maintained for 2 months.<sup>2</sup> Other studies focusing on providing information along with either motivation or behavioral skills have also reported changes in risky sexual behaviors. Thus, there are clear indications that theoretically based interventions, which incorporate more IMB dimensions, can be successful in reducing the risks emanating from sexual behavior experimentation.<sup>4,31,39,42,48–50</sup>

The study populations of most of the interventions reported above, however, have consisted primarily of white students and did not include meaningful numbers of African-American students. Hence, it is not clear whether these interventions would be equally effective in the African-American college population. Only a handful of studies have exclusively focused on African-American college students; they have produced inconsistent results and have generally been descriptive rather than predictive in nature.<sup>27,51,52</sup> Therefore, despite a disproportionately higher rate of HIV/AIDS in the African-American community, studies of correlates and predictors of risky behavior and the effects of intervention programs aimed at risk reduction among the minority college students are almost nonexistent.

Johnson and colleagues<sup>10</sup> suggest that a major challenge is to develop safer sex messages and interventions for African-American college students that consider the diversity of behaviors, beliefs, and attitudes within these groups. They suggest, further, that by not understanding the diversity within groups, the “generic” programs that are developed are not likely to have a substantial effect on the reduction of HIV risky behaviors among African-American college students. Thus, the present study of sexually active African-American college students was undertaken to delineate the correlates of condom use.

### MODEL

This study used the IMB skills model of AIDS-preventive behavior developed by Fisher and his colleagues.<sup>1,2,53,54</sup> The IMB model was designed to understand and predict the practice of AIDS-preventive acts. The model holds that AIDS-preventive behavior is a function of individuals’ information

about AIDS prevention, motivation to engage in AIDS prevention, and behavioral skills for performing the specific acts involved in prevention.<sup>53</sup> Information regarding the means of AIDS transmission and information concerning specific methods of preventing infection are necessary prerequisites of risk-reduction behavior.<sup>1</sup> However, a strong relationship between level of information and level of motivation is not necessary. Highly informed individuals may have either high or low motivation to practice AIDS-preventive behavior, and highly motivated individuals may or may not be highly informed.<sup>53</sup> Conceptually, then, information and motivation are both thought to influence the use of behavioral skills to perform preventive behavior, but information and motivation are viewed as separate entities that influence the utilization of behavioral skills and the enactment of preventive behavior in quite separate ways.<sup>53</sup>

In this conceptualization, the motivation to practice an AIDS-preventive act is assumed to be a function of one's attitudes toward the AIDS-preventive act and of relevant subjective norms regarding the AIDS-preventive act. The model further assumes that factors such as perceived vulnerability to HIV, perceived costs and benefits of HIV prevention, and type of partner (primary vs. secondary) may affect motivation to practice AIDS prevention.<sup>53</sup> According to the IMB model, behavioral skills involve the possession, in one's behavioral repertoire, of the requisite skills to perform AIDS-preventive acts effectively (e.g., to be able to engage in public behaviors such as condom purchasing, HIV testing, or both; to possess verbal as well as nonverbal abilities to communicate about and to negotiate safer sex with one's partner; to refuse to have unsafe sex; to use a condom properly and consistently; to be able to observe safer sexual limits consistently; and to exit the situation if protected sex is not possible).<sup>1,53</sup>

Although the data are cross-sectional, we used a sequential model tested with a structural equation path analysis, described in more detail below, which positions informational and demographic variables as precursors to motivational variables. These variables all predict behavioral skills, which in turn predict the outcome variable of condom use.

## METHODS

Participants for this study were recruited from two historically African-American colleges and uni-

versities. A random sample of 19 classes during the spring of 1995 (from both schools) was drawn from a variety of undergraduate courses (e.g., sociology, psychology, finance, biology, mathematics, etc.). In-class announcements described the study as an anonymous questionnaire to assess the college student's attitudes, knowledge, and behaviors related to HIV/AIDS and "safe sex practice." Each student received a survey with a cover letter (informed consent), which described the purpose of the study and emphasized the aspects of anonymity and confidentiality of the questionnaire. Subjects were told to drop the (used or unused) questionnaire in a sealed box provided in the corner of the classroom. No personal identifying information was included on the survey instrument. Thus, subjects could in no way be linked with their responses. The Human Subjects Review Committee approved both the questionnaire and the method of administration at each university.

The questionnaire completion rate varied between 89% and 98% for all randomly selected classes. The collected data were from 393 African-American students enrolled in the selected classes. Because the focus of this study was on condom use among the sexually active nonmarried students, students who were either married or not sexually active in the prior 12 months ( $n = 140$ ) were excluded from the data analyses. The demographic characteristics for the remaining students ( $n = 253$ ) used in the analyses are presented in Table 1. The sample included both females (61.7%) and males (38.3%) and almost an equal proportion of all undergraduate ranks, including freshman (28.5%), sophomores (23.3%), juniors (22.9%), and seniors (25.3%). The mean age of the sample was 20.8 years. Almost 54.8% were between the ages of 18 and 20, another 33.6% were between the ages of 21 and 23, and 11.6% were aged 24 through 25 at the time of data collection. Four students had significant amounts of missing data and were excluded from the structural path analyses.

## Measures

The major segment of the instrument employed in this study has been adopted from Fisher et al.<sup>53</sup> The survey questionnaire included demographic information, measures of AIDS-related knowledge, measures of AIDS risk-reduction motivation, and

Table 1. Background Characteristics of Subjects (N = 253)

Characteristic	Frequency	Percentage
Sex		
Female	156	61.7
Male	97	38.3
Age		
18–20 years	138	54.8
21–23 years	85	33.6
>24 years	30	11.6
Academic rank		
Freshman	72	28.5
Sophomore	59	23.3
Junior	58	22.9
Senior	64	25.3
Residency		
On campus or in dormitory	63	24.9
Rental apartment	66	26.1
Own/parents	124	49.0
Number of sexual partners within last 6 months		
1	99	39.1
2–3	86	34.0
4–5	42	16.6
>6	26	10.3
Monogamous relationship		
Yes	96	37.9
No	157	62.1
Condom used within past 6 months		
Never	37	14.6
1%–33%	39	15.4
34%–66%	33	13.0
67%–99%	75	29.6
100%	69	27.4

measure of behavioral skills and personal efficacy behavioral skills.

**AIDS Knowledge and Information.** The questionnaire for this study contained 35 items that assessed the students' knowledge about HIV/AIDS. A factor analysis was employed to explore possible subdimensions within the items. The factor analysis indicated that at least two factors existed, and items pertaining to these two factors were summed to form two scales: (i) specific knowledge about HIV transmission through sexual activities (10 items), and (ii) general knowledge about HIV transmission through nonsexual activities (11 items). The intercorrelation between the two scales was modest ( $r = 0.48$ ) and was not considered to create the problem of multicollinearity when both scales were to be used as independent variables in the same equation.

**AIDS Risk-Reduction Motivation.** Motivation to en-

gage in AIDS-preventive behavior was measured in accord with the construct of the IMB model and included five subscales:

**Perceived Vulnerability.** Three questions measuring perceived vulnerability (chances of contracting HIV) included: "(i) When you compare yourself to most of your friends, what would you say are your chances of getting the virus; (ii) When you compare yourself to the average college student, what would you say are your chances of getting the virus that causes AIDS (response categories ranging from much lower = 1, to much higher = 5); and (iii) Considering all the different factors that may contribute to your getting the virus that causes AIDS, including your own past and present behavior, what would you say are your chances of getting the virus that causes AIDS (almost certainly will not = 1, to almost certainly will = 5)." A summed scale based

on these three items had an alpha coefficient of 0.76.

**Fear/Anxiety about Contracting HIV.** Anxiety about contracting the virus was assessed by the question, "how personally afraid are you of getting the virus that causes AIDS?" (A 5-point item). The correlation between the perceived vulnerability index and anxiety about contracting HIV was zero. It appears that these two indices are measuring two different concepts, and their presence in the same equation statistically is justified.

**Peer Support for Safer Sex.** Peer support for practicing safer sex was measured through summed responses to four items that asked the students, "In general, are your friends supportive of your doing the following: (i) using condoms; (ii) not having unsafe sex; (iii) talking about safe sex with possible sex partners; (iv) not getting drunk or high and then having unsafe sex." Responses ranged from Yes = 1, Don't know = 1.5, and No = 2. This scale was created by computing the unweighted sum of responses. The internal consistency of this scale was moderately high ( $\alpha = 0.79$ ). High scores indicate less support.

**Experiences with and Attitudes Toward Condoms.** In a review of recent research Norris and Ford<sup>55</sup> noted that, although the number of minority youth using a condom has increased, consistent use of condoms and condom use at last intercourse remains low. They blame negative experiences with condoms and argue that attitudes derived from beliefs based on direct experiences of condom use are fairly good predictors of behaviors. However, they noted that little is known about the relationship between negative and positive experiences and motivation to use condoms among minority youth. Following this recommendation, in the present study, two scales regarding condom use were developed. The experiences with and attitudes toward condoms were assessed with 13 items that used a 5-point scale. The first scale (seven items) tapped the experiences with condoms and included items such as "condoms break the mood; condoms make sex last too long; condoms often break; condoms smell bad; you can't have orgasm if condoms are used." The items of the second scale (6 items) measuring attitudes about condoms included "using condoms is too embarrassing; only sleazy people would want to use condoms; condoms are convenient and easy to get; if people knew I carried condoms with me, they might think I was sleazy; and I don't believe condoms

work." The alpha coefficients for both scales were acceptable (0.76 and 0.71, respectively). The association between these two scales was moderate ( $r = 0.43$ ).

**Monogamous Relationships.** The respondents were asked whether they were in a close relationship involving sexual intercourse at the time of interview. Those who reported being involved in close relationships were also asked whether the relationship with their partner was monogamous (i.e., neither of them had sexual intercourse with other people; Yes = 1, No = 0).

**Behavioral Skills and Personal Efficacy.** This scale, based on 28 items, measured behavioral skills and personal efficacy in negotiating and practicing safer sex. This scale was adopted from the Fisher et al.<sup>53</sup> study of heterosexual university students. Fisher and colleagues reported a Cronbach's alpha of 0.80 for their sample of 290 students. Some of the items of this scale determined how hard it would be for respondents to:

1. Discuss safer sex (using condoms all the time);
2. Avoid alcohol or drugs before sexual activities;
3. Use a condom under the influence of alcohol or drugs;
4. Make safer sex with a latex condom sexually exciting;
5. Be supportive if sexual partners brought up the topic of using condoms to reduce the risk of getting HIV.

Other items ascertained how effectively the subject "could discuss safer sex with the partner; convince the partner to practice only safer sex; persuade the partner to begin practicing safer sex; to continue practicing safer sex; use condoms every time; refuse to have unsafe sexual intercourse; persuade the partner to get an HIV blood test with him/her; and how effectively they could use a condom without discussing it at all, by just putting it on before sex." The reliability of this summed scale was very high ( $\alpha = 0.91$ ), and none of the correlation coefficients among the items was less than 0.30.

### Condom Use Outcome

The students reported the percentage of time that they used condoms in the last 6 months. To assess the plausibility of the model, we performed a path analysis using the EQS structural equations

Table 2. Correlations among the Model Variables

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Gender											
2. Age	0.12*										
3. HIV knowledge; sexual acts	-0.15†	-0.04									
4. HIV knowledge; nonsexual acts	-0.14*	-0.11*	0.48‡								
5. Low peer support	0.25‡	0.18†	-0.29‡	-0.15†							
6. Perceived vulnerability	0.07	0.00	-0.22‡	-0.04	0.05						
7. Fear/anxiety	0.06	0.07	-0.05	-0.06	0.19‡	0.01					
8. Monogamous relationship	-0.12*	0.02	0.03	-0.01	-0.06	-0.12*	0.06				
9. Experiences with condoms	-0.14*	-0.03	0.29‡	0.10	-0.14*	-0.17†	-0.18†	0.11*			
10. Attitudes about condoms	-0.16†	-0.10	0.36‡	0.31‡	-0.21‡	-0.15†	-0.10	0.09	0.43‡		
11. Behavioral skills	-0.20‡	-0.05	0.40‡	0.20‡	-0.36‡	-0.22‡	-0.12*	0.17†	0.39‡	0.49‡	
12. Percent time condom used	0.06	-0.10	0.29‡	0.07	-0.13*	-0.18†	-0.06	-0.11*	0.26‡	0.22‡	0.39‡

\* $p < 0.05$   
† $p < 0.01$   
‡ $p < 0.001$ .

modeling (SEM) program.<sup>56</sup> In this model, the informational variables of HIV/AIDS knowledge (sexual and nonsexual) and the demographic variables of age and gender predicted the motivational variables of peer support, perceived vulnerability, fear/anxiety, monogamous relationship, and experiences and attitudes about condoms. In turn, all variables predicted behavioral skills, and then all variables predicted the outcome of condom use percentage. To have degrees of freedom left over in the model to assess fit, only significant covariances among predictors at the same level of the model were included. These were assessed separately in initial analyses. The full predictive model was tested with all possible paths included, and the regression coefficients and variance explained by this model are reported below. In a subsequent model, we trimmed the nonsignificant paths to see if this more parsimonious model also fits well and explains the variance in the outcomes about as well as the fully saturated model.

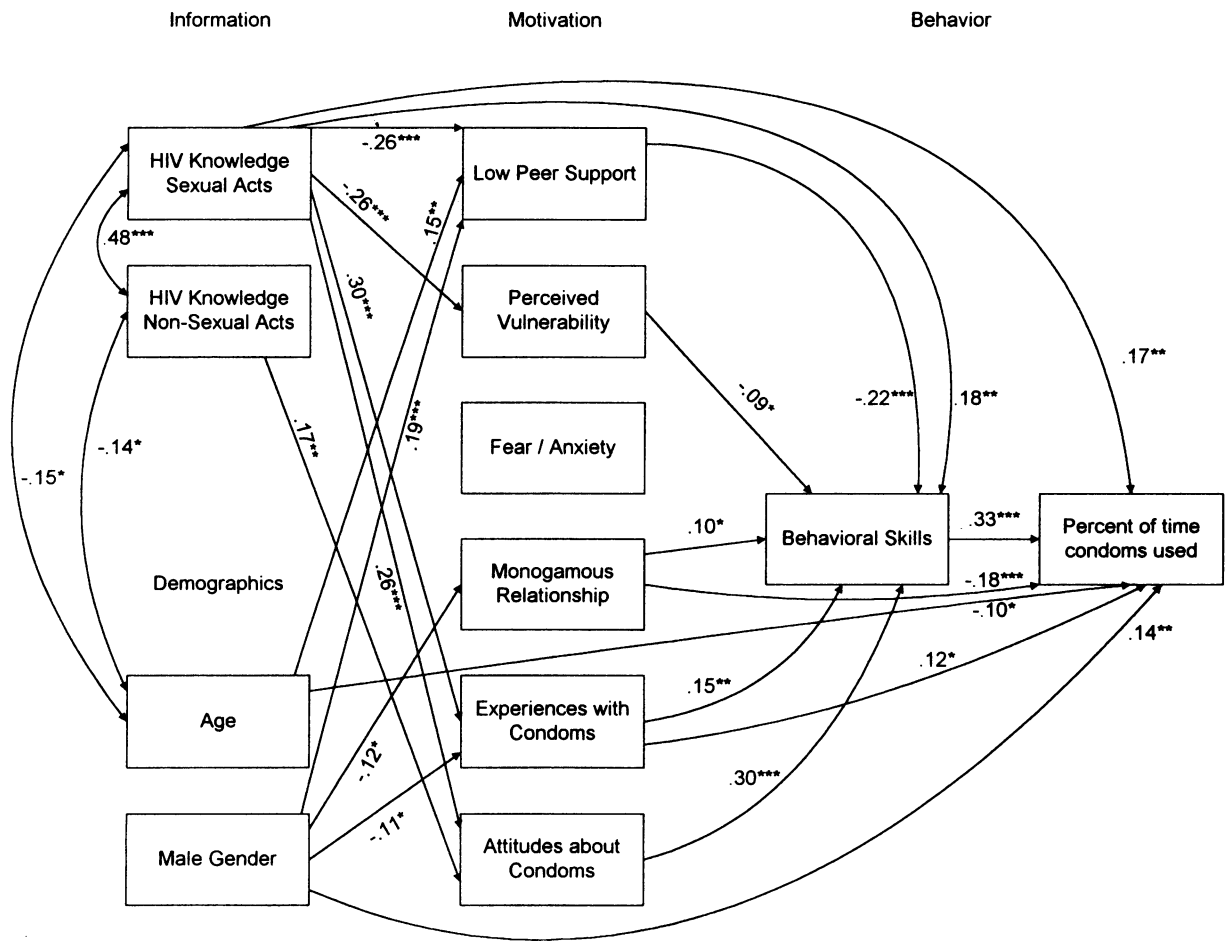
SEM compares a proposed hypothetical model explicating relationships in the data with a set of actual data. The closeness of the hypothetical model to the empirical data is evaluated through goodness-of-fit indexes, including the chi-square/degrees of

freedom ratio, fit indexes, and  $p$  values. A chi-square value no more than twice the degrees of freedom in the model generally indicates a plausible, well-fitting model. We report chi-square values for the maximum-likelihood estimator. In addition, we report an index of fit that ranges from 0 to 1, the Comparative Fit Index (CFI),<sup>56</sup> which is based upon the improvement in fit of the hypothesized model over a model of complete independence or noncorrelation among the measured variables. Values of 0.9 and higher are desirable and indicate that 90% or more of the covariation in the data is able to be reproduced by the hypothesized model.<sup>57</sup> We also report significant indirect effects of certain variables, which are mediated through other predictors.

## RESULTS

Sample characteristics are reported in Table 1. The mean number of sexual partners within 6 months was 3.32 (SD = 4.2). Over 39% of the sample reported only one sexual partner, another 34% reported two or three, 16.6% had four or five, and 10.3% admitted having six or more sexual partners in the previous 12 months. Although almost 38% of the sexually active students claimed that they were





**Figure 1.** Significant regression paths in the Information-Motivation-Behavioral (IMB) skills path model tested on 249 African-American college students. The double arrows ( $\leftrightarrow$ ) indicate covariances; the single arrows ( $\rightarrow$ ) are regression paths. Regression coefficients and covariances are standardized (\* =  $p \leq 0.05$ , \*\* =  $p \leq 0.01$ , \*\*\* =  $p \leq 0.001$ ).

involved in a mutually monogamous sexual relationship, only 27.3% of these sexually active students reported using condoms at all times. In addition, 65.7% of students correctly answered questions regarding transmission of HIV through sexual activities. In addition, 65.2% of the sample possessed correct general knowledge about HIV transmission through nonsexual activities.

The fit statistics for the saturated model were very good ( $\chi^2$  (14,  $N = 253$ ) = 16.88, CFI = 0.99;  $p = 0.26$ ). Significant regression paths are reported in Figure 1. The amount of variance explained by the full model for condom use percentage was 26%; for behavioral skills, the amount of variance explained was 37%. After trimming the model of nonsignificant paths, the fit indexes improved further. The fit

indexes for the trimmed model were as follows:  $\chi^2$  (37,  $N = 253$ ) = 30.82; CFI = 1.00,  $p = 0.75$ . In addition, although several paths were dropped from the trimmed model, the amount of variance explained for the outcome variables remained about the same: 25% for condom percentage and 36% for behavioral skills.

Correlated error residuals among intermediate predictors were not depicted for readability purposes and are not reported in the text. There were four correlated error residuals among the mediators: vulnerability and monogamy ( $-0.11$ ,  $p < 0.05$ ), low peer support and fear ( $-0.17$ ,  $p < 0.01$ ), condom experience and fear ( $-0.15$ ,  $p < 0.01$ ), and condom attitudes and condom experience ( $0.37$ ,  $p < 0.001$ ).

Significant predictors of condom use percentage included greater HIV knowledge (sexual acts), male gender, less age, nonmonogamous relationship, more experiences with condoms, and greater behavioral skills. Significant predictors of greater behavioral skills included more experiences with and positive attitudes toward condoms, a monogamous relationship, more peer support, greater HIV knowledge (sexual acts), and less perceived vulnerability.

Other predictive relationships were also of interest. For instance, males were less likely to report monogamous relationships than the females. Older students were more likely to report lower peer support for safe sexual practices. Both types of HIV knowledge (sexual and nonsexual) were associated with more positive attitudes about condoms.

We also examined the indirect effects on condom use percentage as reported in the trimmed model. Significant indirect predictors of more condom use mediated through behavioral skills or motivational variables included greater peer support, positive condom attitudes, and more HIV knowledge (sexual acts;  $p \leq 0.001$ ), more experiences with condoms and greater HIV knowledge (nonsexual acts;  $p \leq 0.01$ ), and younger age ( $p \leq 0.05$ ).

## DISCUSSION

It is now generally accepted that the spread of HIV is related to specific high risk behaviors. The present study employed the IMB model and delineated a set of behavioral and attitudinal correlates of condom use among African-American college students. The findings of the present research confirm the IMB model's central proposition that information and motivation work through behavioral skills to affect HIV/AIDS preventive behaviors. In addition, the findings indicate that the information and motivation component of the model may account for a significant proportion of the variance of condom use among this sample of African-American college students. The findings of this study also indicate that information and motivation had reliable effects on behavioral skills, and behavioral skills in turn had significant effects on HIV/AIDS-preventive behavior. Specifically, these results show that male students, those who had more knowledge about transmission of HIV through sexual activities and those with positive experiences with previous use of condoms, were more likely to use condoms

recently. Furthermore, condom use was also higher among those involved in nonmutually monogamous relationships and among those who had a higher level of behavioral skills in negotiating and practicing safer sex. In addition, a positive attitude toward condoms prevailed among those who had higher levels of knowledge about HIV infection through unprotected sex along with more positive experiences with the use of condoms. Students with positive experiences and positive attitudes toward condoms also reported higher levels of behavioral skills for practicing safer sex. In addition, levels of knowledge about HIV infection through unprotected sex showed a significant impact on behavioral skills.

Both the direct and indirect effects of experiences with condoms played a critical role in the current use of condoms in this sample. However, this finding is not new. For example, Norris and Ford<sup>55</sup> have reported a positive correlation between positive experiences with condoms and intentions to use condoms in a sample of low income urban African-American and Hispanic youths. This finding clearly points to educating young persons through creative activities such as role playing in the proper wearing and use of condoms, which in turn may significantly increase both the positive experiences and positive attitudes toward condoms in this population.

Our analyses also show that, when knowledge about HIV transmission was divided into sexual and nonsexual domains, only the knowledge about HIV transmission through sexual activities had a direct effect on condom use. Furthermore, sexual transmission knowledge was also related to both behavioral skills and positive attitudes toward condom use. By and large, this result is not consistent with other studies that have reported an absence of a relationship between HIV knowledge and condom use and practice of safer sex among college students.<sup>24,35,38,53,58,59</sup> Testing the IMB model among a sample of heterosexual university students ( $n = 174$ ), Fisher and colleagues<sup>53</sup> reported that the direct effects of information on AIDS-preventive behavior was nonsignificant. Similarly, McGuire and colleagues<sup>58</sup> observed that knowing a lot about HIV transmission was unrelated to safer sex behavior. They reported that knowledge failed to predict having fewer sex partners, adopting safer behaviors, and changing attitudes to reduce risk among their sample of college students.<sup>58</sup> In a 3-year series of cross-sectional comparisons among distinct but

characteristically similar college samples, Fisher and Misovich<sup>24</sup> detected that, although students' HIV-related knowledge was substantial, preventive behavior was infrequent.

This inconsistency may partially stem from the fact that this study divided HIV/AIDS-related knowledge to sexual and nonsexual indices. One major methodological shortcoming with the AIDS knowledge indices used in most studies is that they failed to differentiate the impact of various dimensions of the knowledge about HIV/AIDS on condom use and sexual behaviors. Most of these indices employed a summed composite score, which measured different broad domains of HIV/AIDS knowledge such as the nature of AIDS, transmission of HIV, risk reduction, and knowledge of risk groups. However, more differentiated indices are needed to examine the possible opposite impact of each of these domains of HIV/AIDS knowledge on condom use. For example, although correct specific knowledge about HIV transmission through sexual activities may lead to adoption of safer sex, incorrect information about HIV transmission through nonsexual activities (casual contacts) may lead to the same kind of behaviors. Thus it is important to evaluate separately the independent impact of the knowledge about HIV transmission on sexual and nonsexual activities.

Moreover, the level of knowledge about HIV (transmission through sexual activities) may play an important role in detecting a significant relationship between condom use and HIV knowledge. Our data indicate that only 65% of our sample answered correctly the items relative to transmission of HIV through sexual activities. Misconceptions about sexual transmission still prevailed. For instance, in our sample 15% of the sexually active students still believed that a person (having sex without condoms) was unlikely to get infected with HIV if the penis was withdrawn before orgasm. Another 28% believed that oral sex was safe if the discharge was not swallowed. These results indicate that, in this group of African-American students, further attention to specific education on sexual transmission is needed. Furthermore, education regarding oral, vaginal, and rectal intercourse is essential.

Johnson and colleagues<sup>29</sup> in a study of African-American male college students found no difference in condom use between those in monogamous and nonmonogamous relationships. In our study, students in monogamous relationships were less

likely to use condoms because of serial monogamy, that is, having sex with a series of one partner at a time for a short time. Indeed, over one-third of our sample reported being in a monogamous relationship for less than 6 months. Interestingly enough, 48% of the sample believed that if "two people have sex only with each other, they really do not have to practice safe sex." Obviously, the assumption that a monogamous relationship is a safe one is highly dangerous in that a short-lived monogamous relationship with an infected person confers no protection. The advisability of being tested for HIV before starting a monogamous relationship is apparent. There is a great need for students to understand and digest this issue.

The finding of the proclivity of African-American male college students to use condoms when engaged in casual sex and not when engaged in monogamous relationships, serial or not, gives pause for concern and needs to be addressed within any future diffusion of knowledge regarding HIV knowledge and safe sex behavior. These young men may be under the erroneous assumption that risk is lessened in monogamous relationships, hence, the less likelihood of using a condom. Monogamy in and of itself will not reduce risk. Failure to understand this necessity can place the female partner at risk.

The phasing of the AIDS epidemic has shifted with women of child-bearing age now being twice as likely as men to be infected with sexually transmitted agents such as gonorrhea, chlamydial disease, hepatitis B, and chancroid after a single exposure.<sup>60</sup> The efficiency of male-to-female transmission of the human immunodeficiency virus (HIV) is about four times as high as that of female-to-male transmission. Moreover, the rates of heterosexually acquired HIV among women have been increasing in the United States.<sup>61</sup> In 1995, heterosexual contact emerged as the leading cause of AIDS among American girls and women 15 to 44 years old;<sup>62</sup> in 1996, 6% of men and 40% of women with AIDS had been infected by heterosexual transmission.<sup>63</sup>

The African-American and Latino populations are disproportionately affected by sexually transmitted disease. The incidence of gonorrhea is substantially higher among African Americans and Latinos than among whites.<sup>64</sup> The proportion of cases of AIDS among minority groups has been increasing since 1992.<sup>65</sup> Differences in incidence of AIDS according to race and ethnicity are especially dramatic for women. In 1996, these rates were more than 17

and 6 times as high for African-American and Latino women, respectively, as for white women (61.7 and 22.7 as compared with 3.5 per 100,000).<sup>62,63</sup>

Changing sexual behavior is critical to controlling sexually transmitted infection. However, success in reducing high risk sexual behavior has been limited, particularly among women.<sup>62,66,67</sup> For women, change is impeded by inequalities between sexes and dependence on male partners for emotional and economic well-being; minority women are at a further disadvantage because of discrimination and their disproportionate poverty.<sup>61,66,68-73</sup> Emotionally needy female African-American college students often face the tension between gender and health, similar to those of their white female counterparts,<sup>74</sup> and the desire to be a part of an emotionally fulfilling relationship in which she demonstrates her support of "her man," who, like herself, must continually face varying forms of inequality.<sup>72,45</sup> In describing why African-American women forego the decision to use condoms, Sobo<sup>72</sup> notes that such a decision can

"...reduce feelings of powerlessness. It can also camouflage emotional and social dependence on men. At the same time, agreeing to unsafe sex reflects a real desire to signal commitment and repress knowledge of a relationship's fragility."

Changing the behavior of African-American college students who engage in monogamy, serial or not, will require that researchers and health educators develop sensitive messages and curricula that focus on the underlying emotional needs of both genders and the "romance narratives"<sup>74</sup> that each maintains as a part of their sexual attraction scripts. At the same time, these messages must be respectful of the intense desire for sexual bonding at this stage of human development, so as not to display sexual activity as necessarily punitive and/or life-threatening.

Beyond the immediate collegiate environment of African-American students is the larger issue of the perception of HIV/AIDS and its impact on the African-American communities of which it is a part. This study has suggested on several occasions that the issue of culture for African-American college students is important. To that extent, the degree to which the culture is affirming behaviors that preserve health and life would seem to correlate highly with the willingness of African-American college stu-

dents to align their behaviors accordingly. This suggests that researchers concerned with this subpopulation must also attend to the need to educate the leadership of the institutions where they are enrolled of the need for continuous efforts to develop consciousness and awareness of the importance of engaging in health-promoting behaviors. In addition, they should also focus on the need to influence and enlist the aid of the broad leadership in the African-American community to develop messages directed to African-American college students about their immediate and long-term importance to their respective families and to the larger African-American community, nationally. Motivation to be exemplars of the very behaviors that are critical to the continuity of the African-American community by college students may well serve as a powerful incentive to model those behaviors, as well as to serve as mentors of younger African Americans who are not enrolled in college but may aspire to do so.

From the programmatic perspective, research findings so far have provided a broader set of parameters within which intervention programs need to be developed. For instance, it is evident that programs aimed at self-control through assertive training for certain subgroups of students may be particularly useful in negotiating any sexual coercion that may be experienced. Furthermore, intervention programs need to focus on behavioral skills to negotiate safer sex. In this study, behavioral skills emerged as the important predictor of condom use. This played an important role in condom use both as a direct predictor as well as an intervening variable between knowledge, experience with condoms, and recent condom use. This finding reinforces the need for a comprehensive approach to HIV prevention as outlined by Fisher and Fisher<sup>1</sup> in their IMB model of HIV risk reduction, which focused on simultaneously changing information about HIV, changing motivation (both individual- and peer-supported norms for safer sex), and developing behavioral skills to negotiate safer sex. An intervention based on the IMB model was successful in both heterosexual college students and a sample of gay males.<sup>2</sup> Obviously, providing education about HIV alone (e.g., a course in AIDS 101) is not sufficient. Similarly, admonition regarding the use of condoms is equally insufficient to increase condom use. However, it appears that enhancing behavioral skills (such as exiting an unsafe situation and negotiating safer sex with serially monogamous partners),

changing motivation for HIV prevention, and improving positive experiences with condoms through better teaching as well as consideration of the inclusion of the African-American higher education and community leadership for motivating students to continue positive safe sex behaviors, offer a promise of significantly increasing the use of condoms among the African-American college population as a primary means of assuring the safe sexual health of this population.

## ACKNOWLEDGMENTS

This research was supported by the Association of Minority Health Professions Schools (DA-06), National Institutes of Health Grant G12 RR03026, the National Center for Research Resources, Research Centers in Minority Institutions, and Grant DA01070 from the National Institute on Drug Abuse.

## REFERENCES

1. Fisher JD, Fisher WA. Changing AIDS risk behavior. *Psychological Bulletin*. 1992;111:455-474.
2. Fisher JD, Fisher WA, Misovich SJ, Kimble DL, Malloy TF. Changing AIDS risk behavior: effects of an intervention emphasizing AIDS risk reduction information, motivation, and behavioral skills in a college student population. *Health Psychol*. 1996;15:114-123.
3. Lewis JE, Malow RM, Ireland SJ. HIV/AIDS risk in heterosexual college students: a review of a decade literature. *College Health*. 1997;45:147-158.
4. Ragon BM, Kittleson MJ, St. Pierre RW. The effect of a single affective HIV/AIDS educational program on college students knowledge and attitudes. *AIDS Educ Prev*. 1995;7:221-231.
5. Brien TM, Thombs DL, Mahoney CA, Wallnau L. Dimensions of self-efficacy among three distinct groups of condom users. *J Am College Health*. 1994;42:167-174.
6. DuBois WEB. *The Souls of Black Folk*. Chicago: A.G. McClurg; 1903.
7. Anderson RN, Kochanek KD, Murphy SL. Report of final mortality statistics, 1995. *Mon Vital Stat Rep*. 1997;45(suppl 2):1-80.
8. Centers for Disease Control and Prevention. *HIV/AIDS Surveill. Rep*. 1994;6:1-39.
9. Centers for Disease Control and Prevention. Update: heterosexual transmission of acquired immune-deficiency syndrome and human immunodeficiency virus infection—United States. *MMWR (Morb Mortal Wkly Rep)*. 1989;38:423-434.
10. Johnson EH, Gilbert D, Lollis C. Characteristics of African-American college students with HIV/AIDS. *J Natl Med Assoc*. 1994;86:931-940.
11. Levin JS. The role of the Black church in community medicine. *J Natl Med Assoc*. 1984;76:477-483.
12. Guinan ME. Black communities belief in AIDS as genocide: a barrier to overcome for HIV prevention. *Ann Epidemiol*. 1993;3:193-195.
13. Thomas SB, Quinn SC. The burdens of race and history on Black Americans attitudes toward needle exchange policy to prevent HIV disease. *J Public Health Policy*. 1993; Autumn:320-347.
14. Reid JD, Jedlicka ES, Shin Y. Trends in Black health. *Phylon*. 1977;38:105-116.
15. Omran RA. The epidemiology transition in North Carolina during the last 50-90 years: changing patterns of disease and cause of death. *N C Med J*. 1975;36:83-88.
16. Connerly PB. The health status of the Negro today and in the future. *Am J Public Health*. 1968;58:647-654.
17. Gary LE, ed. Health status. In: *Black Men*. Beverly Hills, CA: Sage Publications; 1981:47-71
18. Gorwitz K, Dennis R. On the decrease in the life expectancy of black males in Michigan. *Public Health Rep*. 1976;91:141-145.
19. Haynes MA. The gap in health status between black and white Americans. In: Williams RA, ed., *Textbook of Black-Related Diseases*. New York: McGraw-Hill; 1975:2-30.
20. McAdoo HP, ed. *Black Families*, 3rd edition. Beverly Hills, CA: Sage Publications; 1986:2-12.
21. Siegal JS. Estimates of coverage of the population by sex, race and age in 1970 Census. *Demography*. 1974;11:1-23.
22. Thomas SB, Quinn SC, Billingsley A, Caldwell C. The characteristics of Northern Black churches with community outreach programs. *Am J Public Health*. 1994;84:575-579.
23. Thurman QC, Franklin KM. AIDS and college health: knowledge, threat, and prevention at a Northeastern university. *J Am College Health*. 1990;38:179-184.
24. Fisher JD, Misovich JD. Evolution of college students' AIDS-related behavioral responses: attitudes, knowledge, and fear. *AIDS Educ Prev*. 1990;2:322-337.
25. Roscoe B, Kruger TL. AIDS: late adolescence, knowledge and its influence on sexual behavior. *Adolescence*. 1990;25:39-48.
26. Dommeyer CJ, Marquard JL, Gibson JE, Taylor RL. The effectiveness of an AIDS education campaign on a college campus. *J Am College Health*. 1989;38:131-135.
27. Jemmott LS, Jemmott JB III. Applying the Theory of Reasoned Action to AIDS risk behavior: condom use among Black women. *Nursing Res*. 1991;40:228-234.
28. Johnson RL, Douglas W, Nelson A. Sexual behaviors of African-American male college students and the risk of HIV infection. *J Natl Med Assoc*. 1992;84:864-868.
29. Johnson EH, Hinkle Y, Gilbert D, Gant LM. Black males who always use condoms: their attitudes, knowledge about AIDS, and sexual behavior. *J Natl Med Assoc*. 1992;84:341-352.
30. Thomas SB, Gilliam AG, Iwrey CG. Knowledge about AIDS and reported risk behaviors among Black college students. *J American College Health*. 1989;38:61-66.
31. Mahoney CA, Thombs DL, Ford OJ. Health belief and self-efficacy models: their utility in explaining college student condom use. *AIDS Educ Prev*. 1995;7:32-49.
32. Strader MK, Beaman ML. Comparison of selected college students and sexually transmitted disease, clinic patients knowledge about AIDS, risk behaviors and beliefs about condom use. *J Adv Nurs*. 1991;16:584-590.
33. Goertzel TG, Bluebond-Langner M. What is the impact of a campus AIDS education course? *J Am College Health*. 1991;40:87-92.
34. Butcher AH, Manning DT, O Neal EC. HIV related sexual behaviors of college students. *J Am College Health*. 1991;40:115-118.

35. MacDonald NE, Wells GA, Fisher WA, et al. High-risk STD/HIV behavior among college students. *JAMA*. 1990;263:3155-3159.
36. Manning DT, Barenberg N, Gallese L, Rice JC. College students knowledge and health beliefs about AIDS: implications for education and prevention. *J Am College Health*. 1989;37:254-259.
37. Katzman EM, Mulholland M, Sutherland EM. College students and AIDS: a preliminary survey of knowledge, attitudes, and behavior. *J Am College Health*. 1988;37:127-130.
38. Carroll L. Concern with AIDS and the sexual behavior of college students. *J Marriage Fam*. 1988;50:405-411.
39. Caron SL, Davis CM, Wynn RL, Roberts LW. America responds to AIDS, but did college students? Differences between March, 1987 and September, 1988. *AIDS Educ Prev*. 1992;4:18-28.
40. Hirschorn MW. AIDS is not seen as a major threat by many heterosexuals on campus. *Chron Higher Education*. 1986;32-34.
41. DeBuono BA, Zinner SH, Daamen M, McCormack WM. Sexual behavior of college women in 1975, 1986, and 1989. *N Engl J Med*. 1990;322:821-825.
42. Sikkema KJ, Winett RA, Lombard DN. Development and evaluation of an HIV risk reduction program for female college students. *AIDS Education and Prevention*. 1995;7:145-159.
43. Crawford I, Allison KW, Robinson WL, Hughes D, Samaryk M. Attitudes of African-American Baptist ministers toward AIDS. *J Community Psychol*. 1992;9:304-308.
44. Quinn SC, Thomas SB. Results of a baseline assessment of AIDS knowledge among Black church leaders. *Natl J Sociol*. 1994;8:89-107.
45. Quinn SC. AIDS and the African-American woman: the triple burden of race, class and gender. *J Clin Psychol*. 1993;41:469-477.
46. Franklin JH. *From Slavery to Freedom*. New York: A. Knopf; 1988.
47. Wenger NS, Greenberg JM, Hilborne LH, Kusseling F, Mangotich M, Shapiro MF. Effect of HIV antibody testing and AIDS education on communication about HIV risk and sexual behavior: a randomized, controlled trial in college students. *Ann Int Med*. 1992;117:905-911.
48. Basen-Enquist K. Evaluation of a theory based HIV program for college students. *AIDS Educ Prev*. 1994;6:412-424.
49. Turner JC, Garrison CA, Korpita E, Waller J, Addy C, Hill WR, Mohn LA. Promoting responsible sexual behavior through a college freshmen seminar. *AIDS Educ Prev*. 1994;6:266-277.
50. Vicenzi AE, Thiel R. AIDS education on the college campus: Roy's Adaptation Model directs inquiry. *Public Health Nurs*. 1992;9:270-276.
51. Gilliam A, Seltzer R. The efficacy of educational movies on AIDS knowledge and attitudes among college students. *J Am College Health*. 1989;36:261-265.
52. Flaskerud JH. Prevention of AIDS in Blacks and Hispanics: nursing implications. *J Community Health Nurs*. 1988;5:49-58.
53. Fisher JD, Fisher WA, Williams SS, Malloy TF. Empirical tests of an information-motivation-behavioral skills model of AIDS preventive behavior. *Health Psychol*. 1994;13:238-250.
54. Fisher WS, Fisher JD, Rye BJ. A general social psychological model for changing AIDS risk behavior. In: Pryor JB, Reeder GD, eds. *The Social Psychology of HIV Infection*. Hillsdale, NJ: Erlbaum; 1993:127-153.
55. Norris AE, Ford K. Associations between condom experiences and beliefs, intentions, and use in a sample of urban, low-income, African-American and Hispanic youth. *AIDS Educ Prev*. 1994;6:27-39.
56. Bentler PM. *EQS Structural Equations Program Manual*. Encino, CA: Multivariate Software Inc.; 1995.
57. Bentler PM, Stein JA. Structural equation modeling in medical research. *Statistical Methods Med Res*. 1992;1:159-181.
58. McGuire E III, Shega J, Nicholls G, Deese P, Landefeld CS. Sexual behavior, knowledge, and attitudes toward AIDS among college freshmen. *Am J Prev Med*. 1992;8:226-234.
59. Baldwin JD, Baldwin JL. Factors affecting AIDS-related sexual risk-taking behavior among college students. *J Sex Res*. 1988;25(2):181-196.
60. Harlap S, Klost K, Forrest JD. *Preventing Pregnancy, Protecting Health: A New Look At Birth Control Choices in the United States*. New York: Alan Guttmacher Institute; 1991.
61. Aral SO. Heterosexual transmission of HIV: the role of other sexually transmitted infections and behavior in its epidemiology, prevention, and control. *Ann Rev Public Health*. 1993;14:451-467.
62. Wortley PM, Fleming PL. AIDS in women in the United States: recent trends. *JAMA*. 1997;278:911-916.
63. Centers for Disease Control and Prevention. *HIV/AIDS Surveill Rep*. 1996;8:2.
64. Donovan P. *Testing Positive: Sexually Transmitted Disease and the Public Health Response*. New York: Alan Guttmacher Institute; 1993.
65. Centers for Disease Control and Prevention. Update: trends in AIDS incidence, death and prevalence—United States, 1996. *MMWR* 1997;46:165-173.
66. Amaro H. Love, sex, and power: considering women's realities in HIV prevention. *Am Psychol*. 1995;50:437-447.
67. Auerbach JD, Wypijewska C, Brodie HKH (eds.) *AIDS and Behavior: An Integrated Approach*. Washington, DC: National Academy Press; 1994.
68. Fullilove MT, Fullilove RE III, Haynes K, Gross S. Black women and AIDS prevention: a view towards understanding the gender rules. *J Sex Res*. 1990;27:47-54.
69. Mays VM, Cochran SD. Issues in the perception of AIDS risk and risk reduction activities by black and Hispanic/Latina women. *Am Psychol*. 1988;43:949-957.
70. Miller JB, Stiver IP. *The Healing Connection: How Women form Relationships in Therapy and in Life*. Boston: Beacon Press; 1997.
71. O Leary A, Jemmott LS, eds. General issues in the prevention of AIDS in women. In: *Women At Risk: Issues in the Primary Prevention of AIDS*. New York: Plenum Press; 1995.
72. Sobro ER. Inner-city women and AIDS: the psycho-social benefits of unsafe sex. *Cult Med Psychiatry*. 1993;17:455-485.
73. Worth D. Sexual decision-making and AIDS: why condom promotion among vulnerable women is likely to fail. *Stud Fam Plann*. 1989;20:297-307.
74. Rosenthal D, Gifford S, Moore S. Safe sex or safe love: competing discourses? *AIDS Care*. 1998;10:35-47.