

Increasing Knowledge of HIV Transmission: An Important Ingredient in HIV Risk Reduction among Young African American Women Attending Community College

Keisha Carr Paxton^{1*}, Brandilynn Villarreal² and Naomi M Hall³

¹Department of Psychology, California State University, Dominguez Hills, 1000 E. Victoria Street, Carson, CA 90747, United States of America (USA)

²Department of Psychology, California State University, Dominguez Hills 1000 E. Victoria Street, Carson, CA 90747, United States of America (USA)

³Department of Psychological Sciences, Winston-Salem State University, Winston-Salem, NC 27110, United States of America (USA)

*Corresponding author: Keisha Carr Paxton, Department of Psychology, California State University, Dominguez Hills 1000 E. Victoria Street, Carson, CA 90747, United States of America (USA), Tel: (310) 243-3411, Email: kpaxton@csudh.edu

Received Date: October 02, 2013, Accepted Date: December 06, 2013, Published Date: December 08, 2013

Citation: Paxton KC, Villarreal B, Hall NM (2013) Increasing Knowledge of HIV Transmission: An Important Ingredient in HIV Risk Reduction among Young African American Women Attending Community College. J HIV AIDS Infect Dis 2: 1-8.

Abstract

HIV/AIDS is currently the leading cause of death for African American women ages 25-34. As heterosexual behavior is the major mode of HIV transmission among this population, it is important to further understand the factors which may influence risky sexual behaviors and promote HIV testing behaviors. The target population for this study represents the convergence of two groups disproportionately at-risk for contracting HIV: African American women and college students. Specifically, the purpose of the study was to investigate HIV knowledge among young African American female students attending community college and its relationship to self-reported HIV testing behavior and condom use. Using a sample of 132 African American college women attending community college in a large Western city, the authors hypothesized that greater knowledge of HIV transmission routes and protection methods would be associated with having been tested for HIV. The results demonstrated that higher HIV knowledge was associated with having been tested for HIV. Consistent with recent previous studies, HIV knowledge may in fact play a role in HIV test seeking behavior among young African American female college students. The authors also hypothesized differences in HIV knowledge based on frequency of condom use: (1) consistent condom users/never had sexual intercourse, (2) inconsistent condom users, and (3) consistent condom non-users. The results indicate that inconsistent condom users had less HIV knowledge than consistent condom users or non-users, and those who have never had sex. These findings suggest that HIV knowledge may be a key method of decreasing HIV risk behaviors. Implications for intervention are discussed.

Increasing Knowledge of HIV Transmission

An Important Ingredient in HIV Risk Reduction among Young African American Women Attending Community College. HIV/AIDS is currently the leading cause of death for African American women ages 25-34 [1,2]. A subset of this population, African American women attending college, may be at an even greater risk for contracting HIV than women

not attending college, primarily due to an increase in high risk sexual behavior among the college population [3]. Accordingly, there is a dire need to understand the psychological and social factors associated with risky sexual behavior among young African American female college students. The current study will examine a sample of young, African American women ages 18-25 who attend community, a population that has been largely neglected in academia despite the disproportionate and alarming rates of new HIV cases every year in the United States. Specifically, this study will examine HIV knowledge and its relationship to self-reported HIV testing behavior and condom use among African American female college students living in a large Western city. Below, we discuss HIV knowledge and risk behaviors among college

students then among African American young women, as both of these groups are at increased risk of contracting HIV. African American young women who attend community college represent the intersection of these two populations and, thus, the confluence of risk for HIV is exacerbated.

HIV Knowledge

There is a general consensus in the literature that while college students are knowledgeable about HIV transmission, prevention methods, and what constitutes risky sexual behavior, as well as the consequences of such behavior, this knowledge does not translate into safer sex practices [4,5]. That is, those who are knowledgeable about HIV consistently engage in risky sexual practices, including inconsistent condom use and multiple sexual partners [6-8]. Students consider condoms as a means of contraception, but less as a means of disease protection [9]. While HIV knowledge may not be strongly related to proactive approaches to sexual health (e.g., using a condom), there is some evidence that it may be connected to reactive strategies such as being tested for HIV after engaging in risky sexual behaviors. HIV knowledge has demonstrated a small, but consistent relationship with HIV testing [10-13] found that low levels of HIV knowledge were related to a low rate of being tested for HIV among a sample of Asians in the United States. The relationship between knowledge of HIV and receiving HIV testing was also confirmed among a sample of South African adults [14].

Perception of Risk

Regardless of actual risk taking behavior, college students are likely to perceive themselves at low risk for contracting HIV [6,5,15]. That is, there is a disconnect between actual risk behavior and perception of personal risk. Furthermore, there is evidence that this perception of low risk may specifically lead individuals to participate in risky sexual behaviors [16,12]. College students may view themselves as invulnerable and adopt an "it won't happen to me" stance [17,18]. Related to this invincible attitude is the belief that individuals are able to identify and choose HIV negative, or safe, partners [16].

Although college students in general perceive themselves at low risk for contracting HIV, there is evidence that African Americans are more concerned about contracting HIV and perceive themselves to be more at-risk for HIV than European Americans [19,5,12].

HIV Testing Behavior

The rationale for HIV antibody testing as a preventative measure rests on reducing transmission and controlling the spread of HIV on a widespread scale [4,20]. Being tested for HIV enlightens individuals about their personal HIV status. When individuals are not tested, and hence do not know their HIV status, they are unknowingly infecting individuals with the disease, which exponentially increases the rate of HIV in the population. However, when individuals know they are HIV-positive, it is hoped that they are less likely to participate in risky sexual behaviors and infect others with HIV.

HIV antibody testing is also an effective intervention that influences sexual behavior at the individual level [21]. The behaviors of getting tested for HIV may, itself, influence at-

risk individuals to adapt safer sexual behaviors to decrease their personal risk of contracting HIV [22, 12]. In other words, individuals may be more concerned about their own sexual health and weigh risky sexual behavior and possible consequences more realistically. Therefore, receiving an HIV test can be an effective intervention, regardless of the actual results of the test. If an individual tests HIV-positive, he or she can begin aggressive treatments, hopefully in the early stages of the virus [23,6,12]. Even when an individual tests HIV-negative, the experience of being tested can produce a number of positive outcomes. According to Sande [24], receiving HIV-negative results can lead to a reduction in HIV anxiety and may be associated with behavioral change such as less risky sexual practices. That is, HIV testing results may be a wake-up call of sorts, alerting the individual to the real danger of contracting HIV if he or she continues to participate in risky sexual behaviors [4]. Alternatively, and hopefully less likely, the HIV-negative results may confirm an individual's perception of invulnerability: that he or she is at low risk for contracting HIV regardless of actual risky sexual behavior [12]. Overall, there are mixed results in the literature regarding the behavioral consequences of HIV testing, which need to be further investigated.

HIV Testing Rates

According to the CDC [25], the rate of American adults who have been tested for HIV has increased from 37% in 2000 to 45% in 2010. This still means that 55% of American adults have not been tested for HIV. Current estimates of college students' rates of HIV testing are similar to the general population. However, older estimates of the college population seem to reflect a lower percentage of students being tested for HIV: [7] reported only 37% of commuter students were tested, [4] reported 33% had been tested, and a low of 25% was reported by MacNair-Semands and Simono [26]. However, recent estimates converge at 40-50% of college students having been tested for HIV. Brener ND, Gowda VR [27] reported that a sample of college students had a 52% HIV testing rate. Similarly, a study conducted by Opt and Loffredo [5] found that among a sample of students from a private, church affiliated college, 45.7% of students had been tested for HIV. In an even narrower study by Roberts and Kennedy [28] which used a sample of diverse college women, 52% had been tested for HIV. The CDC launched an initiative to examine HIV testing and sexual behavior on seven historically Black college campuses and found that of the 8,500 students surveyed, 42% had been tested for HIV [29]. Overall, the low rate of HIV testing in college populations, despite at-risk sexual behavior, necessitates an understanding of the specific factors influencing HIV testing among college students [12].

Reasons for Receiving or Not Receiving an HIV Test

There is a need to investigate correlates of HIV testing behavior including both health-seeking and deterring determinates Boshamer & Bruce [30,31,5] reported the most frequent motivations for students to seek out HIV tests, which appear to be influenced by more reactive than proactive purposes: (a) part of a routine check-up (37%), (b) had surgery or donated

blood (36%), and (c) had unprotected sex (24%). In other words, their reasons for receiving an HIV test were primarily reactive; there was some outside source or basis for the participants to be tested. Similarly, in a study by King [12], the findings suggest that only a small percentage of participants were tested because of their perception of being at-risk (19.5%) versus external factors such as doctor's suggestion (19.2%) or joining the military (13%). King [12] concludes that although students may have been tested for HIV, they most likely were not the ones to initiate the testing behavior; they were not proactive. Overall, however, the findings versus proactive and reactive rationale among college students are mixed. In a study of college students receiving AIDS testing, Anastasi et al. [4] reported the following primary reasons for being tested for HIV: (a) just wanted to know, (b) had unprotected sex, and (c) was just beginning a sexual relationship, indicating a mix of proactive and reactive testing approaches.

In the Opt and Loffredo [5] study with college students, among the participants who had not received HIV testing, the two primary reasons reported for not being tested were: (a) they were married or in a monogamous relationship (32%), and (b) they were not sexually active (26%). In the same study, married participants had a lower rate of HIV testing (38.9%) compared to partnered (56.7%) or single participants (54.8%; [5]). Past research has demonstrated that if women are in a monogamous relationship, they are less likely to perceive themselves at-risk for HIV, regardless of if they are or not [32,28,14]. That is, because they are monogamous, they assume that their partner is also monogamous, leading to a "false sense of security" which colors their perception of risk [28]. Unfortunately, their partners are not always monogamous. In many cases, women are not aware of their partner's outside sexual activity, which may be quite risky [31,28].

In addition to relationship status and not having had sexual intercourse, others have reported different reasons for at-risk individuals not seeking an HIV test: they (a) fear becoming aware of being HIV positive (25%), (b) believe have not been exposed to HIV (low risk; 18%), (c) think they are HIV-negative (13%), (d) wish to avoid the possibility of being HIV-positive (8%), and (e) believe even if they are HIV-positive, there is little they can do about it (6%) [33].

According to Dorr, Krueckeberg, Stratham, and Wood [35], in general, college students who were tested for HIV different from non-tested students in the following ways: they perceive more benefits and less barriers when seeking out an HIV test, they were more aware of the future consequences of their actions, and they engaged in riskier sexual behavior overall.

Barriers to HIV Testing

A study by Huang, Wong, De Leon, and Park [13] classified two types of barriers to getting tested for HIV: structural and psychosocial. Structural barriers can refer to a lack of access to health care or information about HIV. As stated previously, a lack of information about HIV is usually not an issue with college populations [4]. Psychosocial barriers, on the other hand, are very pertinent to the college population and revolve around individuals perceiving themselves at low risk for HIV infection. In the study by Opt & Loffredo [5], psychosocial

barriers include being married or in a monogamous relationship, which is especially salient for women. Wilson, et al. [22] reported that one of the most prominent barriers to HIV testing in females involves the perception that they are at low risk of contracting HIV based on their own sexual behavior. However, as mentioned previously, an individual's sexual risk perception must take into account the risky sexual behavior of a romantic or sexual partner. Because females are not participating in risky sexual behavior, they assume their partners are not as well; this contributes to them not seeking periodic HIV tests.

Condom Use and HIV Knowledge

It has been widely established that the vast majority of college students are inconsistent condoms users, despite having relatively high levels of HIV knowledge [36,37,15,28] confirm that the lack of consistent condom use is a prime suspect in the alarming rates of HIV infection in college women. Furthermore, researchers have identified that condom use, and in particular, negative attitudes toward condoms, is a significant contributor to risky sexual behavior among African American college students [38,39]. Indeed, comparing ethnic groups, African Americans are the least likely to use condoms [40-42]. According to the CDC [43], the most common route to HIV contraction for African American women is by having unprotected sexual intercourse with a man who has HIV.

Although measures of HIV knowledge do not usually have a significant positive relationship to condom use, this relationship may be mediated by another variable. For example, there is ample evidence that a woman's condom use is heavily influenced by many factors, one of the most significant being her partner. Specifically among young women, several studies have found that partner resistance to using condoms was the primary factor in women not using a condom [44-45,28]. Apparently, the problem lies not in the young women's ability to initiate conversation about condom use and safer sex; rather, been unable to successfully negotiate condom use with her partner [47]. That is, ultimately, in a male-female Latina or African American relationship, it was the willingness of the male partner to use a condom that actually predicted condom use [48].

African American women in particular may experience a great deal of power imbalance in relationships due to traditional gender role adherence in African American culture [49]. This adherence has been suggested as a factor in African American women's challenges negotiating safer sex practices [47,50]. Similarly, traditional gender roles may directly or indirectly relate to other barriers to condom use among women, such as anxiety and embarrassment when communicating about sex or low sexual assertiveness [51,52].

Another important factor that influences women's condom use is her relationship status. There is evidence that being involved in a committed relationship places an African American woman at-risk for HIV for many reasons [53-55]. That is, monogamy is not a protective factor against HIV infection [12]. In fact, what many college students consider monogamy is actually serial monogamy: back-to-back exclusive sexual

relationships that last for relatively short amounts of time [56,57]. Therefore, serial monogamist's sexual behavior still consists of many sexual partners, which places an individual at-risk for contracting HIV.

In addition to serial monogamists, partners in committed, long-term monogamous relationships are also at-risk for HIV infection. Foreman [54] found in their study of African American college students that relationship status affected condom use and negotiation such that condom use was more likely in casual sexual relationships than committed relationships. In casual relationships, the cost of initiating and negotiating safer sex may be lower than for committed relationships [58]. That is, these individuals have little invested and derive minimal psychological benefits from sexual encounters; in other words, an entire relationship is not at risk. Roberts & Kennedy [28] found that monogamous women (women who had a regular sexual partner) reported significantly more resistance from their partners to use condoms. As the relationship develops, young women may feel pressure from their partner to stop or skip the use of condoms. Although there are several reasons why women may succumb to this pressure, including low-self esteem, the need to feel loved, financial dependence on partner and avoiding confrontation [18], some of the most powerful influences stem from gender role and power status in the relationship [28].

Many researchers studying the gender-ratio imbalance among African American men and women conclude that this phenomenon also contributes to African American women experiencing less power in the relationship in general, and when negotiating condom use in particular [59]. Due to the lack of African American partners, especially at the college level, African American young women may be especially concerned about the solidity of their relationship. That is, African American young women may decide it is more important to invest in the relationship and risk infection of HIV or another Sexually Transmitted Infection (STI) than lose the relationship altogether. As a means to ensure compliance in the relationship, an otherwise assertive young woman may be pressured into agreeing to no longer use a condom with her partner.

In other words, for African American women, the role of a condom in a relationship may signify more than a means of protection against STIs and pregnancy. Agreeing to no longer use a condom may be a way for a young African American woman to establish a commitment to the relationship. According to researchers, for a female, agreeing to not use a condom may lead to perceptions or messages of intimacy, trust, and closeness to her partner [60-62].

Unfortunately, the desire to strengthen the relationship by not using a condom indefinitely increases African American women's risk for contracting HIV. Although she may be committed to the relationship (monogamous) and believe her partner to be, this is a dangerous assumption to make. According to Paranjape and colleagues [63], simply trusting her sexual partner is monogamous places an African American woman at-risk. Most likely, the female partner is unaware of the male partner's risky sexual behavior, including having multiple partners and not consistently using a condom with each one [64,65,42]. Other risky behaviors men may partici-

pate in include injection drug use and sexual behavior with men who have sex with men [66,2].

Purpose of Study

A significant number of individuals who are at-risk for HIV are not utilizing HIV testing services. In addition, there is a dearth of literature exploring health seeking behaviors among a college population in general, and the African American college population in particular [67,5]. Therefore, it is important to further understand the factors which contribute to HIV-test seeking behaviors among African American female college students. Specifically, the authors hypothesize that a greater knowledge of HIV transmission routes and protection methods would be positively and significantly associated with having been tested for HIV versus not having been tested for HIV.

With respect to condom use, the researchers examined the differences in HIV knowledge between three groups of condom users: (1) consistent condom users/never had sexual intercourse, (2) inconsistent condom users, and (3) consistent condom non-users. Based on previous research regarding relationship status and condom use, it was hypothesized that there would be differences between the three types of condom users and amount of HIV knowledge. Consistent condoms users would have a high amount of HIV knowledge because they recognize the risk associated with unsafe sexual situations. Similarly, consistent condom non-users (i.e., women who consistently do not use condoms) are most likely dating one partner exclusively (in a monogamous relationship), have a high amount of HIV knowledge, and perceive themselves at low risk for HIV infection. Inconsistent condoms users, however, are participating in high risk sexual behavior and this may be associated with a lower amount of HIV knowledge. Therefore, the relationship between HIV knowledge and type of condom use will be further explored.

Methods

Participants

The participants included 132 African American women from three community colleges in a large Western city noted for being one of the epicenters of HIV/AIDS in the United States. These community colleges were selected for this study because each had a high percentage of African American students, a population which is disproportionately at-risk for contracting HIV. African American female community college students were chosen because they more closely mirror the general population of African American women compared to university students. Inclusion criteria necessitated that participants be female, between 18 and 25 years of age, a student at one of the three community colleges, and self-identify as African American.

Recruitment/Procedure

The design of this study included a convenience sample of participants recruited as part of a larger mixed methods study examining sexuality among young female African American college students. Students were recruited via classroom presentations, fliers, tables at campus events, and word of mouth.

Once inclusion criteria were assessed, participants were given an informed consent form to read and asked by staff if they had any questions. They were then taken to a secluded area where they completed a 15-20 minute pencil-and-paper questionnaire on site. As an incentive for participating, each participant received two movie passes.

The institutional review board of Charles R. Drew University of Medicine and Science approved the conduct of this study. Furthermore, a Certificate of Confidentiality was provided by the National Institutes of Health.

Measures

“The African American Young Women’s Health Survey” questionnaire contained author-developed questions to assess participant’s current and past sexual behavior as well as HIV testing behavior and history of STIs. Specific questions asked included, “Have you ever been tested for HIV/AIDS?” and if so, “Where were you tested for HIV/AIDS?” Specific questions also assessed participants’ use of male condoms within the last 12 months. Additionally, demographic data was collected, including participants’ age, education level, and current relationship status.

An HIV Knowledge test was used to assess participants’ knowledge of HIV transmission routes, appropriate prevention methods, and consequences of participating in risky sexual behaviors. The test contained 15 true-false items. One point was given for each correct answer.

Design

The study investigated the relationship between HIV knowledge and two sexual health variables: HIV testing behavior and male condom use. In particular, HIV testing behavior was dichotomized into participants who had been tested for HIV/AIDS, and those who had never been tested for HIV/AIDS in their lifetime. The researchers divided condom use into three groups: (1) consistent condom users/never had sexual intercourse, (2) inconsistent condom users, and (3) consistent condom non-users.

Analytic Plan

Analyses were performed using SPSS statistical software. Demographic data were analyzed to determine key sample characteristics. An independent sample t-test was used to determine an association between HIV knowledge and having been tested for HIV. An Analysis of Variance (ANOVA) was used to compare the differences in HIV knowledge among three groups of condom users. Chi Square analyses were also used to further illuminate the relationship between condom use, romantic relationship status, and HIV knowledge.

Results

Participant Demographics

The vast majority of the sample (94.7%) was single and had never been married. Fifty-eight participants (44%) had been pregnant at least once in their lifetime. Regarding current romantic relationship status, 17.4% live with their partner, 43.2% date one person regularly, 5.3% date more than one person regularly, 15.9% date occasionally, and 17.4% have not had a relationship in the past 3 months. Twenty-eight participants (21%) reported having a STI. As expected, the mean

score for HIV knowledge was fairly high at 10.8 (sd = 1.7), with a range from 5-14.

Testing Location	n	Percent
AIDS Service Organization	3	2.3
Public Health/Sexually Transmitted Disease (STD) Clinic	17	12.9
Hospital/Emergency Room	10	7.6
Private Doctor’s Office	26	19.7
Mobile Testing Van	4	3
General Medical Clinic	12	9.1
HMO (Health Maintenance Organization)	7	5.3
Military Physical Exam	6	4.5
Correctional Facility Medical Exam	4	3
Other	6	4.5

Table 1: Frequency Table of HIV/AIDS Testing Locations

HIV Testing

Over half of the sample had been tested for HIV/AIDS (67.4%); however, 28.8% of participants had never been tested for HIV and were unaware of their HIV status. The majority of the sample were tested for HIV/AIDS by a private doctor (19.7%; see table 1 for a complete list of HIV/AIDS testing locations).

An independent samples t-test was used to determine the difference in HIV knowledge between those who had been tested for HIV and those who had not. Specifically, having been tested for HIV was significantly associated with scoring higher on a measure of HIV knowledge versus not having been tested for HIV ($t=-3.367$, $p<.001$).

Condom Use

Differences in amount of HIV knowledge for consistent condom users/never had sexual intercourse, inconsistent condom users, and consistent condom non-users were tested using a one-way ANOVA. The results reveal significant differences between the groups ($F=3.012$, $p<.054$).

Using chi square analysis, of those who consistently used condoms or never had sexual intercourse, 27 participants (49%) lived with their partner or dated one person regularly, 14 participants (26%) dated more than one person regularly or dated occasionally, and 14 participants (26%) had not had a relationship in the past three months. Of those who inconsistently used condoms, 13 participants (68%) lived with their partner or dated one person regularly, 5 participants (26%) dated more than one person regularly or dated occasionally, and 1 participant (5%) had not had a relationship in the past three months. Of those who consistently did not use con-

doms, 38 participants (75%) lived with their partner or dated one person regularly, 7 participants (13.7%) dated more than one person regularly or dated occasionally, and 6 participants (12%) had not had a relationship in the past three months.

Discussion

While HIV knowledge may not be strongly related to proactive approaches to sexual health (e.g., using a condom), there is some evidence that HIV knowledge may be connected to reactive strategies such as being tested for HIV after engaging in risky sexual behaviors [13,14]. This finding was confirmed in the current study through examination of the first hypothesis. Compared to participants who have not been tested for HIV, those who had been tested for HIV demonstrated a significantly greater amount of HIV knowledge. That is, perhaps HIV knowledge is not powerful enough to influence behaviors in the moment of partaking in risky sexual behavior, but when these barriers are removed, HIV knowledge may have enough influence to initiate an HIV test. In turn, being tested for HIV will most likely influence at-risk individuals to adopt safer sexual behaviors [22]. On a more widespread level, being tested for HIV will prevent the spread of the disease among already disproportionately impacted groups. The results have implications for developing more effective HIV testing interventions targeting African American young women attending college.

With regard to the second hypothesis, this study found a significant relationship between HIV knowledge and condom use such that less HIV knowledge was associated with inconsistent condom use. In other words, inconsistent condom users had significantly less HIV knowledge compared to consistent condom users/never had sexual intercourse and consistent condom non-users. However, the mechanisms behind the association between relationship status and inconsistent condom use are unclear. Chi square analysis revealed that just over two-thirds of those who are inconsistent condom users lived with their partner or dated one person regularly. Just over one-fourth of the sample dated more than one person regularly or dated occasionally. These findings suggest that the majority of inconsistent condom users may be in monogamous, committed relationships. Similarly, three-fourths of participants who consistently did not use condoms were living with their partner or dated one person regularly. The existing research is clear about the at-risk status of women in monogamous relationship who assume their partners are also monogamous (e.g., Jenkins [42]). If the male partner is not consistently using a condom with his primary female partner, it is plausible that he might not be using a condom with other partners, thus placing his primary partner unknowingly at risk.

There are several possible limitations to this study. First, regarding HIV testing behavior, it is not clear from the data why participants sought an HIV test. That is, it is not clear how many participants were tested for HIV for external reasons (because they were pregnant, joining the military, etc.) versus being tested because she believed she was at-risk of contracting HIV. Additionally, we cannot make conclusions on the relationship status of inconsistent condom users based on

the data gathered from the survey. For example, although the survey assessed whether participants lived with their partner or dated one person regularly, monogamy was not specifically addressed. Future research should also differentiate between monogamy and serial monogamy. Another potential limitation may be that our sample of community college African American young women is not representative of all African American women.

Conclusion

While many researchers have dismissed knowledge of HIV as playing a significant role in reducing risky sexual behavior, it may play a valuable role in HIV testing behavior among young African American college women. In addition, HIV knowledge may also play a role in the sexual behavior of African American young women, specifically condom use. Perhaps previous research has not found a relationship between HIV knowledge and condom use because it depends on the type of relationship between couples. That is, relationship status may influence the relationship between HIV knowledge and condom use such that different types of relationships, and different types of condoms users, have different levels of HIV knowledge. This hypothesis needs to be further tested among samples of young African American college women. The topic of sexuality among women, and HIV risk behaviors in particular, is so multifaceted and contextual that future research must continue both quantitative and qualitative methods of data collection to fully understand the complexities of this topic.

Acknowledgements

This study was supported by the National Institute of General Medical Sciences (# S06- GM068510-01). We gratefully acknowledge the support of the community colleges that graciously allowed us to conduct this study on their campuses.

References

- 1) Jemmott LS, Jemmott JB 3rd, O'Leary A (2007) Effects on sexual risk behavior and STD rate of brief HIV/STD prevention interventions for African American women in primary care settings. *Am J Public Health* 97: 1034-1040.
- 2) Centers for Disease Control and Prevention (2012) Estimated HIV incidence among adults and adolescents in the United States, 2007–2010. HIV Surveillance Supplemental Report, 17(4). US Department of Health and Human Services: Washington, D.C.
- 3) Davis C, Sloan M, MacMaster S, Kilbourne B (2007) HIV/AIDS knowledge and sexual activity: an examination of racial differences in a college sample. *Health Soc Work* 32: 211-218.
- 4) Anastasi MC, Sawyer RG, Pinciario PJ (1999) A descriptive analysis of students seeking HIV antibody testing at a university health service. *J Am Coll Health* 48: 13-20.
- 5) Opt SK, Loffredo DA (2004) College students and HIV/AIDS: More insights on knowledge, testing, and sexual practices. *J Psychol* 138: 389-402.
- 6) Lewis JE, Malow RM, Ireland SJ (1997) HIV/AIDS risk in heterosexual college students. A review of a decade of literature. *J Am Coll Health* 45: 147-159.
- 7) Bernard Amy L, Prince Alice (1998) HIV testing practices and attitudes of college students. *Am J Health Stud* 14: 84-95.
- 8) Lewis J, Miguez-Burbano M, Malow R (2009) HIV risk behavior among college students in the United States. *Coll Stud J* 43: 475-491.

- 9) O'Sullivan LF, Udell W, Montrose VA, Antonello P, Hoffman S (2010) A cognitive analysis of college students' explanations for engaging in unprotected sexual intercourse. *Arch Sex Behav* 39: 1121-1131.
- 10) Phillips K (1993) Subjective knowledge of AIDS and use of HIV testing. *American Journal of Public Health* 83: 1460-1462.
- 11) Goodman E, Bercochea JE (1994) Predictors of HIV testing among run-away and homeless adolescents. *J Adolesc Health* 15: 566-572.
- 12) King AN (2006) Factors influencing the decision to be tested for HIV among heterosexual college students. Dissertation Abstracts International: Section B: The Sciences and Engineering, 67: 2209B. (UMI No. 3215052) Retrieved May 15, 2009, from Academic Search Premier database.
- 13) Huang ZJ, Wong FY, De Leon JM, Park RJ (2008) Self-reported HIV testing behaviors among a sample of southeast Asians in an urban setting in the United States. *AIDS Educ Prev* 20: 65-77.
- 14) Haile BJ, Chambers JW, Garrison J L (2007) Correlated of HIV knowledge and testing: Results of a 2003 South African survey. *J Black Stud* 38: 194-208.
- 15) Winfield EB, Whaley AL (2005) Relationship status, psychological orientation, and sexual risk taking in a heterosexual African American college sample. *J Black Psychol* 31: 189-204.
- 16) O'Leary A, Goodhart F, Jemmott LS, Boccher-Lattimore D (1992) Predictors of safer sex on the college campus: a social cognitive theory analysis. *J Am Coll Health* 40: 254-263.
- 17) Mattson M (2002) Impact of HIV test counseling on college students. sexual beliefs and behaviors. *Am J Health Behav* 26: 121-136.
- 18) Leone P, Adimora A, Foust E, Williams D, Buie M, et al. (2005) HIV transmission among Black women-North Carolina, 2004. *MMWR Weekly* 54: 89-94.
- 19) The Kaiser Family Foundation (2001) The AIDS epidemic at 20 years: The view from America Survey. Menlo Park, CA: The Henry J. Kaiser Family Foundation.
- 20) Heffelfinger JD, Sullivan PS, Branson BM, Mastro TD, Purcell DW, et al. (2008) Advancing HIV prevention demonstration projects: New strategies for a changing epidemic. *Public Health Rep Suppl* 3: 5-15.
- 21) Wenger NS, Linn LS, Epstein M, Shapiro MF (1991) Reduction of high-risk sexual behavior among heterosexuals undergoing HIV antibody testing: a randomized clinical trial. *Am J Public Health* 81: 1580-1585.
- 22) Wilson TE, Jaccard J, Minkoff H (1996) HIV-Antibody Testing: Beliefs Affecting the Consistency Between Women's Behavioral Intentions and Behavior. *J Appl Soc Psychol* 1734-1748.
- 23) Hayden J (1994) HIV testing on campus. The next step. *J Coll Stud Dev* 35: 208-211.
- 24) Sande J (2001) AIDS Information Centre Background. A paper presented at a conference organised by the United Nations High Commission for Refugees. Pope Paul memorial centre, Kampala.
- 25) Centers for Disease Control and Prevention (2013) HIV testing trends in the United States, 2000-2011.
- 26) MacNair-Semands R, Simono RB (1996) College student risk behaviors: Implications for the HIV-AIDS pandemic. *J Coll Stud Dev* 37: 574-587.
- 27) Brenner ND, Gowda VR (2001) U.S. College students' reports of receiving health information on college campuses. *J Am Coll Health* 49: 223-228.
- 28) Roberts ST, Kennedy BL (2006) Why are young college women not using condoms? Their perceived risk, drug use, and developmental vulnerability may provide important clues to sexual risk. *Arch Psychiatr Nurs* 20: 32-40.
- 29) Thomas PE, Voetsch AC, Song B, Calloway D, Goode C, et al. (2008) HIV risk behaviors and testing history in historically black college and university settings. *Public Health Reports Suppl* 3:115-125.
- 30) Boshamer CB, Bruce KE (1999) A scale to measure attitudes about HIV-antibody testing: development and psychometric validation. *AIDS Educ Prev* 11: 400-413.
- 31) Peltzer K, Mpofu E, Baguma P, Lawal B (2002) Attitudes toward HIV-antibody testing among university students in four African countries. *Int J Adv Couns* 24: 193-203.
- 32) Marín BV, Tschann JM, Gómez CA, Kegeles SM (1993) Acculturation and gender differences in sexual attitudes and behaviors: Hispanic vs non-Hispanic white unmarried adults. *Am J Public Health* 83: 1759-1761.
- 33) Galvan FH, Bing EG, Bluthenthal RN (2000) Accessing HIV Testing and Care. *J Acquir Immune Defic Syndr, Suppl 2*:S151-S156.
- 34) Coates TJ, Chesney M, Folkman S, Hulley SB, Haynes-Sanstad K, et al. (1996) Designing behavioural and social science to impact practice and policy in HIV prevention and care. The Executive Committee of the Center for AIDS Prevention Studies (CAPS). *Int J STD AIDS* 7: 2-12.
- 35) Dorr N, Krueckeberg S, Strathman A, Wood MD (1999) Psychosocial correlates of voluntary HIV antibody testing in college students. *AIDS Educ Prev* 11: 14-27.
- 36) Mahoney CA, Thombs DL, Ford OJ (1995) Health belief and self-efficacy models: their utility in explaining college student condom use. *AIDS Educ Prev* 7: 32-49.
- 37) Simkins L (1995) Risk of HIV transmission in sexual behaviors of college students. *Psychol Rep* 76: 787-799.
- 38) Bazargan M, Kelly EM, Stein JA, Husaini BA, Bazargan SH (2000) Correlates of HIV risk-taking behaviors among African-American college students: the effect of HIV knowledge, motivation, and behavioral skills. *J Natl Med Assoc* 92: 391-404.
- 39) Duncan C, Miller DM, Borskey EJ, Fomby B, Dawson P (2002) Barriers to safer sex practices among African American college students. *J Natl Med Assoc* 94: 944-951.
- 40) Wingood GM, DiClemente RJ (1998) Partner influences and gender-related factors associated with noncondom use among young adult African American women. *Am J Community Psychol* 26: 29-51.
- 41) Wyatt GE, Carmona JV, Loeb TB, Guthrie D, Chin D, et al. (2000). Factors affecting HIV contraceptive decision-making among women. *Sex Roles*, 42: 495-521.
- 42) Jenkins CC (2008) Are young adult college attending African American women protecting themselves from HIV/AIDS? A study of sexual assertiveness characteristics. ProQuest, Michigan, USA.
- 43) Centers for Disease Control and Prevention (2007) HIV/AIDS and African Americans.
- 44) Carrier JM, Magana JR (1991) Use of ethnosexual data on men of Mexican origin for HIV/AIDS prevention programs. *Journal of Sex Research* 28: 189-200.
- 45) Flaskerud JH, Nyamathi AM, Uman GC (1997) Longitudinal effects of an HIV testing and counseling programme for low-income Latina women. *Ethn Health* 2: 89-103.
- 46) Stevens PE (1995) Impact of HIV/AIDS on women in the United States: Challenges of primary and secondary prevention. *Health Care for Women International* 16: 577- 595.
- 47) Wingood GM, Hunter-Gamble D, DiClemente RJ (1993) A Pilot Study of Sexual Communication and Negotiation among Young African American Women: Implications for HIV Prevention. *J Black Psychol* 19:193-203.
- 48) Fleisher JM, Senie RT, Minkoff H, Jaccard J (1994) Condom use relative to knowledge of sexually transmitted disease prevention, method of birth control, and past or present infection. *J Community Health* 19: 395-407.
- 49) Ehrhardt A A, Yingling S, Zawadzki R, Martinez-Ramirez M (1992) Prevention of heterosexual transmission of HIV: Barriers for women. *J Psychol Human Sex* 5: 37-67.
- 50) Otto-Salaj L, Reed B, Brondino MJ, Gore-Felton C, Kelly JA, et al. (2008) Condom use negotiation in heterosexual African American adults: responses to types of social power-based strategies. *J Sex Res* 45: 150-163.
- 51) Wyatt GE, Riederle MH (1994) Reconceptualizing Issues That Affect Women's Sexual Decision-Making And Sexual Functioning. *Psychol Women Q* 18: 611-625.
- 52) Bowleg L, Belgrave FZ, Reisen CA (2000) Gender roles, power strategies, and precautionary sexual self-efficacy: Implications for Black and Latina women's HIV/AIDS protective behaviors. *Sex Roles* 42: 613-36.

- 53) St Lawrence JS, Eldridge GD, Reitman D, Little CE, Shelby MC, Brasfield TL (1998) Factors influencing condom use among African American women: implications for risk reduction interventions. *Am J Community Psychol* 26: 7-28.
- 54) Foreman FE (2003) Intimate risk: Sexual risk behavior among African American college women. *J Black Stud* 33: 637-653.
- 55) Ickovics JR, Beren SE, Grigorenko EL, Morrill AC, Druley JA, et al. (2002) Pathways of risk: Race, social class, stress, and coping as factors predicting heterosexual risk behaviors for HIV among women. *AIDS and Behavior* 6: 339-350.
- 56) Miller KS, Hennessy M, Wendell DA, Webber MP, Schoenbaum EE (1996) Behavioral risks for HIV infection associated with HIV testing intentions. *AIDS Education and Prevention* 8: 394-402.
- 57) Brooks-Gunn J, Boyer CB, Hein K (1998) Preventing HIV infection and AIDS in children and adolescents. *Behavioral research and intervention strategies. Am Psychol* 43: 958-964.
- 58) Bowen SP, Michal-Johnson P (1990) A rhetorical perspective for HIV education with Black urban adolescents. *Communication Research* 17: 848-866.
- 59) Ferguson YO, Quinn SC, Eng E, Sandelowski M (2006) The gender ratio imbalance and its relationship to risk of HIV/AIDS among African American women at historically Black colleges and universities. *AIDS Care* 18: 323-331.
- 60) Sobo EJ (1995) *Choosing unsafe sex: AIDS risk denial among disadvantaged women*. Philadelphia: University of Pennsylvania Press.
- 61) Hynie M, Lydon JE, Cote S, Weiner S (1998) Relational sexual scripts and women's condom use: The importance of internalized norms. *Journal of Sex Research* 35: 370-380.
- 62) Jones R, Oliver M (2007) Young urban women's patterns of unprotected sex with men engaging in HIV risk behaviors. *AIDS Behav* 11: 812-821.
- 63) Paranjape A, Bernstein L, St George DM, Doyle J, Henderson S, et al. (2006) Effect of relationship factors on safer sex decisions in older inner-city women. *J Womens Health (Larchmt)* 15: 90-97.
- 64) Fullilove MT, Fullilove RE, Haynes K, Gross S (1990) Black women and AIDS prevention: A view towards understanding the gender rules. *The Journal of Sex Research* 27: 47-64.
- 65) Dolcini MM, Catania JA (2000) Psychosocial profiles of women with risky sexual partners: The National Aids Behavioral Survey (NABS). *AIDS and Behavior* 4: 297-308.
- 66) McNair LD, Prather CM (2004) African American women and AIDS: Factors influencing risk and reaction to HIV disease. *J Black Psychol* 30: 106-123.
- 67) Barth KR, Cook RL, Downs JS, Switzer GE, Fischhoff B (2002) Social stigma and negative consequences: Factors that influence college students' decisions to seek testing for sexually transmitted infections. *J Am Coll Health* 50: 153-159.