

Impact of School Experiences and School Contextual Factors on STD/HIV-Related Risk Behaviors among African American College Students

Jiangmin Xu and Jingzhi Xu

Abstract— College students, especially African American college students, are among the highest risk groups and are more likely to be at risk for contracting sexually transmitted diseases (STDs) due to their substance abuse and high-risk sexual behaviors. Previous studies and educational interventions have focused on college student knowledge of STDs and Human immunodeficiency virus (HIV), but failed to examine the impacts of some important factors beyond the individual level of behavioral influence such as student's school experience and school contextual factors. In fact, the college environment offers many opportunities for those STD/HIV-related risk behaviors, including unsafe sex, multiple sexual partners, alcohol use, and substance abuse. Analyses were based on data gathered from 267 African American college students enrolled at Winston-Salem State University (WSSU) who participated in the American College Health Association-National College Health Assessment (ACHA-NCHA) survey. The findings indicate that STD/HIV knowledge and education have no significant effects on African American college students' substance abuse and high-risk sexual behaviors; instead, students' experience and school contextual factors are important factors in predicting their substance abuse and high-risk sexual behaviors.

Keywords—*Substance abuse; high-risk sexual behaviors; school experiences; sexually transmitted diseases*

I. INTRODUCTION

Sexually transmitted diseases (STDs) are the most pervasive infectious diseases occurring among sexually experienced college students in the United States and there are increasing numbers of college students infected with STDs [1]. College students are among the highest risk groups and are likely to be at risk for contracting STDs due to their substance abuse, alcohol drinking, inconsistent condom use, and multiple sexual partners [2]. The school environment offers great opportunity for these STD/HIV-related risk behaviors, including unsafe sex, multiple sexual partners, alcohol use, and substance abuse.

The transmission of STDs on African American college students is a significant health concern [3]. Many studies found that African American college students are a population with specific risks and needs. Compared with white students attending a traditionally white institution (TWI), black

students attending Historically Black Colleges and Universities (HBCUs) were more likely to have STD infections (OR=4.4) and more likely to have been tested for HIV (OR=8.4) [4]. Using a sample of the 1,130 college students from a large, urban, minority-serving university in a community with a high HIV/AIDS prevalence, Trepka and his colleagues found that 14.0% of participants had high-risk sexual behaviors (having more than one sexual partner in last year and not using a condom during last vaginal intercourse) and 11.9% have consistent high-risk sexual behavior [5]. Using a sample of 189 young black women aged 18-24 attending a minority-serving university, Alleyne [6] found that the type of sexual relationship in which the participants' were involved were associated with their condom use and other STD/HIV-related risk behaviors.

Sexual risky behaviors and substance abuse are two important factors associated with the occurrences of STDs among African American college students [5]. The riskier sexual behaviors were found to exist among African American students in HBCUs and sometime they coexist with more protective behaviors [4]. In addition, high-risk sexual behaviors and substance abuse are often correlated. Clinical studies indicate that heavy and dependent substance users engage in high frequency and high-risk sexual behaviors. The planned and unplanned sexual activities are often related with alcohol use and drug use that might increase the risk of HIV infection. Brown and Venable [7] found that the persons with unprotected vaginal sex were 39% and 32% more likely to use alcohol prior to sex. The relationships between substance abuse and high-risk sexual activities revealed these two interrelated factors are important for college HIV prevention efforts [8].

The common explanation for STD infection among college students was the lack of STD/HIV knowledge and education. The same explanation was also used to explain high-risk sexual behaviors among African American college students attending HBCUs [5] [9] [10]. As a result, a series of services and resources focusing on prevention of STD/HIV were provided to African American college students in HBCUs to help them better understand the dynamics and risk of unsafe sexual practices. However, acquiring STD/HIV knowledge and skills does not necessarily help college students to avoid or reduce high-risk sexual behaviors and having a perception of risk does not necessarily translate high-risk sexual behaviors into safe sexual behaviors. A study assessing HIV/AIDS knowledge and high-risk sexual

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Jiangmin Xu is with Winston-Salem State University, Winston Salem, NC 27101 USA (phone: 336-750-8659; fax: 336-750-2568; e-mail: xuji@wssu.edu)

Jingzhi Xu is with the School of Nursing, Johns Hopkins University, Baltimore, MD 21218 USA (email: ashleyxu@jhu.edu)

behaviors among 1051 African American undergraduate students found that 82% of students had average/high HIV knowledge scores; however, about 64% of participants had at least two or more sexual partners and had not used condoms during their last sexual intercourse [11]. In addition, many African American college students who are knowledgeable about HIV/AIDS still have high-risk sexual behaviors [10] [11]. The coexistence of high HIV/AIDS knowledge and high-risk sexual behaviors indicates that education and knowledge attainment did not necessarily translate into a change in attitudes about responsible sexual behavior [12]. A possible explanation is people did not realize the STD/HIV knowledge attainment in college students is different from middle/high school students.

As we know, school experiences and school contextual factors may have significant effects on the college students' STD/HIV-related risk behaviors. However, these factors were beyond the individual levels and received limited attention. This study explored school experiences and school contextual factors which determine the coexistence of high STD/HIV knowledge and STD/HIV-related risk behaviors in a population of African American college students attending a historically black university. Previous studies have simply attributed the occurrences of high-risk sexual behaviors to the lack of STD/HIV knowledge and education [10], but failed to examine the impacts of school experiences and school contextual factors on STD/HIV-related risk behaviors. In addition, few studies have been undertaken to examine the impacts of school experiences and school contextual factors on substance abuse and high-risk sexual behaviors among African American college students attending HBCUs.

The purpose of this study was threefold: first, to examine the prevalence of STD/HIV-related risk behaviors such as high-risk sexual behaviors and substance abuse among African American college students; second, to identify the impact of STD/HIV knowledge on STD/HIV-related risk behaviors among African American college students; and third, to determine whether student's school experiences and school contextual factors have significant impacts on their STD/HIV-related risk behaviors. The research findings will help us to better understand African American college students' needs and enhance their health promotion and prevention for STD/HIV-related risk behaviors.

II. METHODOLOGY

A. Sampling

The survey instrument used in this study was developed by the American College Health Association-National College Health Assessment (ACHA-NCHA). The datum was collected by ACHA in 2008 with the help of the student health service of Winston-Salem State University. A total of 344 students were randomly selected from the student population of Winston-Salem State University. Among these 344 students, 85.2% (294) are African American, 9.3% (32) are Caucasian, and 5.5% (19) are other ethnicity. In this study, we only include African American students to assess students' habits, behaviors, and perceptions on the most prevalent health topics.

B. Measures

Among African American college students, the exposure to STDs is dependent on the prevalence and patterns of the primary high-risk sexual behaviors associated with substance abuse and disease transmission. In this study, high-risk sexual behaviors include: 1. Having multiple sexual partners; 2. Inconsistent use of condoms or unprotected intercourse; 3. Having anal sex; and 4. Having a high-risk partner.

The school contextual factors include abusive activities against students' will within the last school year. The students were asked whether they have experienced some negative events including verbal threats, sexual touching, or attempted sexual penetration activities and other emotionally, physically, or sexually abusive activities.

The levels of STD/HIV knowledge and other health-related information among African-American college students were also examined. Students were asked whether they received the health-related knowledge and information from various sources such as flyers and leaflets, health center medical staff, health educators, friends, parents, television, magazines, and internet.

C. Statistical Analysis

Analyses were based on data gathered from 294 African American college students enrolled at Winston-Salem State University (WSSU). The Statistical software SPSS 20.0 [13] was used in this study. Frequency analyses were used to examine the prevalence of high-risk sexual behaviors and substance abuse among African American college students. Independent t-tests were used to test the effects of health-related information on college students' STD/HIV-related risk behaviors. Bivariate analyses with t-tests and χ^2 tests were also used to determine the significant differences in students' high-risk sexual behaviors and substance abuse, between those who had high-risk sexual behaviors and substance abuse and those who did not have. In this study, t-tests were used for continuous measures and chi-square tests were used for categorical measures. For example, t-tests were used to examine the impact of STD and HIV knowledge on high-risk sexual behaviors by some demographic characteristics, such as gender and age.

This study sought to determine if an individual school experience was also associated with African American college students' STD/HIV-related risk behaviors. Seven different school experiences were tested to understand the relationships between school experiences and STD/HIV-related risk behaviors. The multivariate analysis was performed with a regression model using an AMOS program [14]. Structural Equation Modeling (SEM) was used to identify the predictors of STD/HIV-related risk behaviors and examine the effects of school experiences on substance abuse and high-risk sexual behavior with individual factors. SEM is an important multivariate technique for estimating and testing the assumption related to the direct effects of school experiences on STD/HIV related risk behaviors. SEM has a significant advantage because it not only permits the measurement of

several variables and their interrelationships simultaneously, but it also allows us simultaneously to examine multiple dependent relationships between variables. Therefore, SEM is a versatile tool for us to operationalize and examine the concept of school experiences and STD/HIV-related risk behaviors. *P* values <0.05 were considered significant.

III. RESULTS

A. Descriptive statistics and sample characteristics

Ages ranged from 16 to 55 years old with a mean age of 33.43 years (S.D. 10.06). The participants had completed a mean of 11.19 years of education (S.D. 1.87, range 6-16). Almost thirty-one percent (30.4%) of the respondents were employed either full- or part-time. In this study, 90.5% (266) of samples are female students and 9.5% (28) are male students.

The information presented in Table 1 displays the percentage of college students who reported the number of sexual partners during last year. About 25.2% female students and 37.2% of male students had multiple sexual partners. Male student were 12.0% more likely to have more than one sexual partner than female students. Table 2 indicates many students and their partner(s) never or rarely used condoms during anal intercourse, oral sex, and vaginal intercourse with the last 30 days. About 5.3% of students never or rarely used condoms during anal intercourse; 33.8% of students never or rarely used condoms during oral sex; and about 24.3% of students never or rarely used condoms during vaginal intercourse.

Insert Tables 1 and 2 about here

Alcohol and marijuana use as self-reported primary problems were often associated with high-risk sexual behaviors [5]. In this study, about 33.5% of African American college students reported alcohol use and 4.8% reported marijuana use in the last 30 days. In addition, 60.8% of students had experiences of alcohol use and 17.5% of students had experiences of marijuana use.

Insert Table 3 about here

B. STD/HIV knowledge and other health information

The majority of college students had already received the health-related information and STD/HIV knowledge from various resources such as flyers and leaflets, medical staff, educators, friends, parents, television, and internet. Table 4 shows about 85.2% of African American college students received STD/HIV knowledge and other health-related information from flyers and leaflets, 74.0% from health center medical staff, 74.8% from health educators, 61.8% from friends, 78.7% from parents, 72.6% from TV, and 79.8% from the internet.

Insert Table 4 about here

C. Effects of Health-related Information on students' STD/HIV-related risk behaviors

To examine how the levels of various health-related information and HIV/STD knowledge impacts students' STD/HIV-related risk behaviors, independent t-tests were used to assess the relationship between the students' status with HIV/STD knowledge and health-related information and the students' STD/HIV-related risk behaviors. Table 5 displays the results of students' STD/HIV knowledge and health-related information predicting STD/HIV-related risk behaviors. STD/HIV-related risk behaviors were modeled by four variables including multiple sexual partners, condom use, alcohol use, and marijuana use. The research results found that the students' status with various health-related information and knowledge were not significantly associated with the reduction of high-risk behaviors such as multiple sexual partners, inconsistent condom use, alcohol use, and drug use.

Insert Table 5 about here

D. Students' school experiences

Students were asked "have you experienced the following events within the last school year?" These events include verbal threats for sex, sexual touching, attempted sexual penetration, emotionally abusive, physically abusive, and sexually abusive behavior. Table 6 shows that some students experienced verbal threats for sex (3.7%), sexual touching (6.8%), attempted sexual penetration (4.1%), sexual penetration against your will (2.7%), as well as emotionally abusive (18.1%), physically abusive (4.8%), and sexually abusive behavior (2.1%).

Insert Table 6 about here

E. Effects of school experiences on students' STD/HIV-related risk behaviors

Structural Equation Modeling (SEM) was also used to assess the relationship between school experiences and STD/HIV related risk behaviors among college students. Table 7 displays the results of linear regression modeling predicting STD/HIV related risk behaviors. The students' school experiences with sexual touching against their will and a physical abusive event were significant predictors of multiple sexual partners, condom use, and marijuana use. The experience with an emotionally abusive event was significant predictors of multiple sexual partners and alcohol use. The experiences with physical abuse and sexually abuse events were significantly associated with alcohol use and marijuana use.

Insert Table 7 about here

IV. QUALITATIVE INTERVIEW

In this study, we interviewed some college students for their perspectives on high-risk sexual behaviors and substance abuse. An African American female student in the Healthcare Management department detailed her perspective:

“African American student’s exposure to STDs is dependent on high-risk sexual behaviors associated with substance abuse and disease transmission. This may be true, but the lack of knowledge about HIV/AIDS knowledge and education should not really be an excuse at all. There is no explanation for this because everyone knows about HIV and if you are not protected that you run the risk of catching any sexually transmitted infections (STI) or STD. College students learn about sexually transmitted infections and diseases well before you get to college, and they also learn how to practice safe sex. There are all types of programs and books about HIV/AIDS and anyone with an inquiring mind knows about HIV/AIDS.

Some high risk behaviors that can lead to unprotected sex that go on here are drinking and smoking. Drinking and smoking any drug puts a college student in another state of mind which may cause you to engage in sexual activities that he/she may never engage in if he/she were in his/her right state of mind, which puts him/her at risk for all types of bad things to happen to him/her. I have heard some people being dared to take ten shots of the strongest alcohol, I have heard of some people being dared to kiss someone that they had a crush on, I have even seen someone being dared to be locked in a room for an hour with someone that everyone knows that they liked. We all make our own decisions. We know what is dangerous.”

The college environment offers many opportunities for those STD/HIV-related risk behaviors. Another African American female student described the school experiences and school environment as important factors for STD/HIV-related risk behaviors:

“From a students’ prospective like myself, when I see individuals passing out flyers and holding forums on HIV/AIDS and STD knowledge I usually avoid them because I feel like I know enough about the subjects. Hypothetically thinking, many other students may do the same as me, they may feel like it’s a waste of time so they don’t feel the need to learn more and become more educated on the subjects. Our environment here on campus also causes our students to perform high-risk sexual behaviors. From sleeping with more than one partner to not using protection, a college campus is the number one place to experience any of this. On a college campus we have so much freedom so we feel like we can do whatever we want to do because our parents aren’t around to tell us that sleeping with more than one person is wrong or not using a condom is wrong. Even though we all know that it’s wrong and it’s also putting us at risk we still continue doing it anyway. Living on a college campus plays a big role in influencing high-risk sexual behaviors. Ever had a friend tell you to do something just because they did it? I have! I remember at one point I wanted to lose my virginity just because my friends had already lost theirs so I felt left out. I felt as if I didn’t fit in anymore with my friends.”

V. DISCUSSION

African American college students are at risk for STD infection and other negative health consequences related to STD/HIV-related risk behaviors. The high-risk sexual behaviors and substance abuse are two important factors that influence STD infections among African American college students. The main findings in this study were that (a) HIV/STD knowledge and education have no significant effects on African American college students’ substance abuse and high-risk sexual behaviors; and (b) college students’ school experiences and other school contextual factors significantly predict the high-risk sexual behaviors and substance abuse.

It is often asserted that increased knowledge about HIV/AIDS should help promote risk-reducing behaviors. Therefore multiple social and financial resources were used to increase college students’ STD/HIV knowledge. However, the research findings and relevant data in this study provide some different information. After comparing the different influences of STD/HIV knowledge and school experience on African American college students’ high-risk sexual behaviors and substance abuse, this study found that (a) the students already received the STD/HIV knowledge and education from various information resources and (b) the STD/HIV knowledge and education the students received have no significant effects on their substance abuse and high-risk sexual behaviors. In other words, STD/HIV education and knowledge attainment did not necessarily translate into a change in attitudes about responsible sexual behavior. These findings are similar to those found in previous studies that the college students who possess adequate STD/HIV knowledge about the risks involved with sexual activity were still having unprotected sex and other STD/HIV related risk behaviors [10, 11, 12].

On the other hand, the findings from this study demonstrate that students’ school experiences and school contextual factors are often associated with STD/HIV-related risk behaviors. Compared with STD/HIV education and knowledge, students’ school experiences are more important in predicting substance abuse and high-risk sexual behaviors. For example, school experiences with emotionally, physically, and sexually abusive are associated with high-risk sexual behaviors and substance abuse.

Two limitations are associated with the present study: first, 91.1% of samples are female students. Therefore, the results must be interpreted cautiously. Secondly, the measurements for school experiences and school contextual factors will require further refinement. More studies are needed to further explore school experiences and school contextual factors that predict substance abuse and high-risk sexual behaviors in detail.

The present study provides a useful conceptual framework for understanding high-risk sexual behaviors and substance abuse among African American college students. The findings emphasize the importance of school experiences and school contextual factors in health promotion and STD/HIV prevention for African American college students. The findings also demonstrate that a variety of sources beyond the individual level of behavioral influence should be considered

when designing prevention programs. In this way, health professionals and school educators can effectively engage African American college students in dialogue about STD/HIV prevention and sexuality education.

TABLES

**TABLE 1
GENDER DISTRIBUTION**

College students reported the number of sexual partners during last year	Gender (%)		Total
	Female	Male	
Having had no sexual partner	22.5	25.7	22.4
Having had 1 sexual partner	52.3	37.1	50.6
Having had 2 sexual partners	13.8	17.1	14.7
Having had 3 sexual partners	5.0	14.3	5.9
Having had 4 sexual partners	3.7	5.7	3.8
Having had 5 or more sexual partners	2.7	0	2.4

**TABLE 2
TYPES OF SEXUAL ACTIVITIES**

How often did you or your partner(s) use a condom within the last 30 days	Anal intercourse (%)	Oral sex (%)	Vaginal intercourse (%)
Never did intercourse	79.2 (224)	36.9 (106)	17.6 (50)
Have not done intercourse in last 30 days	13.8 (39)	23.7 (68)	20.1 (57)
Never use condom	4.9 (14)	32.8 (94)	19.7 (56)
Rarely use condom	0.4 (1)	1.0 (3)	4.6 (13)
Sometimes use condom	0 (0)	0.7 (2)	4.6 (13)
Mostly use condom	1.0 (3)	2.1 (6)	8.5 (24)
Always use condom	0.7 (2)	2.8 (8)	25.0 (71)

**TABLE 3
ALCOHOL USE AND MARIJUANA USE**

	Alcohol use in last 30 days (%)	Marijuana use in last 30 days (%)
Never used	39.2(115)	82.5 (240)
Used, but not in the last 30 days	27.3 (80)	12.7 (37)
Used 1-2 days	16.0 (47)	2.4 (7)
Used 3-5 days	9.6 (28)	0.3 (1)
Used 6-9 days	5.1 (15)	0.3 (1)
Used 10-19 days	1.4 (4)	0 (0)
Used 20-29 days	0.7 (2)	0.7 (2)
Used all 30 days	0.7 (2)	1.0 (3)

**TABLE 4
THE PERCENT OF STUDENTS RECEIVED STD/HIV AND OTHER HEALTH-RELATED INFORMATION**

STD/HIV and other health-related information resources	Yes (%)	No (%)
Flyers and leaflets	85.2 (247)	14.8 (43)
Health center medical staff	74.0 (214)	26.0 (75)
Health educators	74.8 (217)	25.2 (73)
Friends	61.8 (178)	38.2 (110)
Parents	78.7 (226)	21.3 (97)
Television	72.6 (212)	27.4 (80)
Magazines	69.1 (229)	30.9 (89)
Internet	80.3 (233)	19.7 (57)

**TABLE 5
STANDARDIZED REGRESSION COEFFICIENTS FOR THE EFFECTS OF HEALTH-RELATED INFORMATION**

STD/HIV and other health-related	Multiple sexual partners	Inconsistent use of condoms	Alcohol use	Marijuana use

information resources				
Flyers and leaflets	0.050	0.087	-0.038	-0.023
Health center medical staff	-0.055	0.107	0.065	0.036
Health educators	0.071	0.047	0.017	-0.100
Friends	0.089	0.069	0.032	0.113
Parents	-0.022	0.076	-0.040	0.015
Television	-0.140	0.147	0.011	-0.094
Magazines	0.164	-0.198	-0.026	-0.037
Internet	0.066	-0.024	0.053	-0.054

p* < .05; ** *p* < .01; **p* < .001

**TABLE 6
SCHOOL CONTEXT AND STUDENTS' SCHOOL EXPERIENCES**

Have you experienced the following events with the last school year?	Yes (%)	No (%)
Verbal threats for sex against your will	3.7 (11)	96.3 (283)
Sexual touching against your will	6.8(20)	93.2 (273)
Attempted sexual penetration against your will	4.1(12)	95.9 (282)
Sexual penetration against your will	2.7 (8)	97.3 (285)
Emotionally abusive	18.1 (53)	81.6 (240)
Physically abusive	4.8 (14)	95.2 (280)
Sexually abusive	2.1 (6)	97.9 (285)

**TABLE 7
STANDARDIZED REGRESSION COEFFICIENTS FOR THE EFFECTS OF STUDENTS' SCHOOL EXPERIENCE**

Students' school context and school experiences	Multiple sexual partners	Inconsistent use of condoms	Alcohol use	Marijuana use
Verbal threats for sex against your will	-0.082	0.091	-0.097	-0.100
Sexual touching against your will	0.242**	0.117	0.258**	0.203*
Attempted sexual penetration against your will	-0.095	-0.069	0.071	-0.019
Sexual penetration against your will	0.066	0.018	-0.131	0.042
Emotionally abusive	0.136*	0.105	0.170**	0.081
Physically abusive	0.172*	-0.017	0.133*	0.281***
Sexually abusive	-0.123	-0.018	-0.156*	-0.170*

p* < .05; ** *p* < .01; **p* < .001

REFERENCES

- [1] American College Health Association, "American College Health Association National College Health Assessment spring 2006 reference group data report (abridged)", *J. Am Coll Health*, vol. 55, pp. 195-206, 2007.
- [2] H. D. Gayle, R. P. Keeling, M. Garcia-Tunon, B. W. Kilbourne, J. P. Narkunas, F. R. Ingram, M. F. Rogers and J. W. Curran, "Prevalence of the Human Immunodeficiency Virus among university students," *N. Engl. J. Med.*, vol. 323, pp. 1538-1541, 11/29; 2012/05, 1990.
- [3] J.R. Williams, J. Zenilman, J.P. Nanda, H. Mark, "Recruitment strategies and motivations for sexually transmitted disease testing among college students," *J. Am Coll Health*, vol. 57, pp.357-360, 2008.
- [4] S. I. Hou, "HIV-related behaviors among black students attending Historically Black Colleges and Universities (HBCUs) versus white students attending a traditionally white institution (TWI)," *AIDS Care*, vol. 21, pp. 1050-1057, Aug. 2009.
- [5] M. J. Trepka, S. Kim, V. Pekovic, P. Zamor, E. Velez and M. V. Gabaroni, "High-risk sexual behavior among students of a minority-serving university in a community with a high HIV/AIDS prevalence," *J. Am. Coll. Health*, vol. 57, pp. 77-84, Jul-Aug, 2008.
- [6] B. Alleyne, "HIV risk behaviors among a sample of young Black college women," *Journal of HIV/AIDS & Social Services*, vol. 7, pp. 351-371, 07, 2008.
- [7] J. L. Brown and P. A. Vanable, "Alcohol use, partner type, and risky sexual behavior among college students: Findings from an event-level study," *Addict. Behav.*, vol. 32, pp. 2940-2952, 12, 2007.
- [8] A. H. Butcher, D. T. Manning, and E.C. O'Neal, "HIV-related sexual behaviors of college students," *J. Am. Coll. Health*, vol. 40, pp. 115-118, 1991.
- [9] M. Bazargan, E. M. Kelly, J. A. Stein, B. A. Husaini and S. H. Bazargan, "Correlates of HIV risk-taking behaviors among African American college students: the effect of HIV knowledge, motivation, and behavioral skills," *J. Natl. Med. Assoc.*, vol. 92, pp. 391-404, Aug, 2000.
- [10] M. Y. Sutton, F. P. Hardnett, P. Wright, S. Wahi, S. Pathak, L. Warren-Jeanpiere and S. Jones, "HIV/AIDS knowledge scores and perceptions of risk among African American students attending historically black colleges and universities," *Public Health Rep.*, vol. 126, pp. 653-663, Sep-Oct, 2011.
- [11] E. H. Johnson, L. Gant, Y. A. Hinkle, D. Gilbert, C. Willis and T. Hoopwood, "Do African American men and women differ in their knowledge about AIDS, attitudes about condoms, and sexual behaviors?" *J. Natl. Med. Assoc.*, vol. 84, pp. 49-64, Jan, 1992.
- [12] J. A. Adepoju, M. P. Watkins and A. Richardson, "A survey of a HBCU's senior year nursing students' perception of the HIV/AIDS phenomenon: a follow-up study," *J. Natl. Black Nurses Assoc.*, vol. 20, pp. 38-41, Dec, 2009.
- [13] IBM *SPSS Statistics for Windows* [Version 20.0]. Armonk, NY: IBM Corp, 2011.
- [14] IBM *SPSS AMOS* [Version 21.0]. [Computer program]. Armonk, NY: IBM Corp, 2014.



Jiangmin Xu received his Ph.D. in sociology from Brigham Young University, Provo, UT, USA in 2003. Currently he serves a biostatistician and associate professor in the School of Health Sciences of Winston-Salem State University. His health-related interest concentrates on the prevention of substance abuse, treatment barriers, treatment process, alcohol use, HIV research, and application of statistical methodologies. His recent studies focus on alcohol use, substance abuse, and high-risk sexual behaviors among college students. He is currently involved in two related research projects.



Jingzhi Xu, RN. is a Ph.D. student in the School of Nursing at Johns Hopkins University. As a NIH pre-doctoral fellow, her research interest concentrates on cardiothoracic service, high risk sexual behaviors, and alcohol use.