Social and Behavioral Risk Factors of Sexually Transmitted Infections in Community College and University Female Students

Oswald Attin, MSHS, Ph.D., Liberty University
Cali Anderson, MPH, Liberty University

Abstract

Purpose: To compare female students' engagement in behavioral risk factors for Sexually Transmitted Infections (STIs) between a 4-year university and a 2-year community college and determine the impact of institutional setting on risky sexual behavior.

Methods: Participants aged 18-24 years were recruited from a local community college or university and 143 female students were included in the study. Paper questionnaires were distributed to all participants to identify various socioeconomic and behavioral risk factors known to be associated with a high incidence of STIs among college-aged students.

Results: Between the two institutional types, females from the community college were more likely to have parents with less educational attainment and a lower family income ($p<0.001$). In fact, students whose parents' highest level of education was a high school diploma were more likely to report not always using condoms during vaginal intercourse in comparison to students whose parents had a post graduate degree (OR: 8.62; 95% CI: 2.67-27.89, $p<0.001$).

Findings: Students within the community college reported lower parental income and education attainment in addition to more sexual partners and alcohol consumption in the past week.

Conclusion: The findings suggest a potential correlation between low socioeconomic status and STI contraction.

Purpose

The United States of America, like other countries, has been plagued with a rise in sexually transmitted infections (STIs), especially among college-aged young adults. According to Scholl, Katz, Cole & Heck (2010), more undergraduate college students are engaging in sexual activity and sexual experimentation, without taking preventative measures for disease transmission such as condom usage. Each year, roughly 19 million people are diagnosed with an STI, with half of those occurring among young people aged 15-24 years (Centers for Disease Control and Prevention (CDC), 2019; Collado, Johnson, Loya, Johnson, & Yi, 2017). Even though this age group accounts for only 27% of the population that is sexually active, they are disproportionately affected by STIs in comparison to other age groups (Collado et al., 2017; Subbarao & Akhilesh, 2017). The college years account for the majority of this time frame and, for many biological, behavioral, and cultural reasons, this age group is at a much higher risk of STI infection. For these reasons, STI research among college-aged students is essential.

Past research has assessed university **students'** knowledge on sexuality topics, including contraception and STIs and the *results* indicated a lack of knowledge surrounding these topics. The researchers found that it was imperative to provide sexual counseling and education to university students **(**Allen, Sherrod, & Williams, 2017; Fehr, Vidourek, & King, 2015; Karaoglu, Onal, Ozgul, & Karaoglu, 2009; Lally et al., 2015; Subbarao & Akhilesh, 2017). Further studies have shown an increase in STIs among university students across genders, particularly among females (Bontempi, Mugno, Bulme, Danvers, Vancour, 2009). Female college students may be disproportionately affected by STIs due to a lack of prevention and intervention methods to decrease these rates (Lewis, Melton, Succop, & Rosenthal, 2000; Lindley, Barnett, Brandt, Hardin & Burcin, 2008) Another study found that female students were unprepared to have sexual intimacy, faced pressure from males, and were

often prone to regret their decisions (Naghavi, Rotonda, Stewart, Tattersall, Winkler, 2012). Among female African American college students, Vasilenko, Lefkowitz, Maggs (2012) noted that, although the participants displayed a knowledgeable awareness about STIs and their consequences, they still engaged in risky sexual behaviors and were more likely to contract an STI. College environments foster behaviors favorable for STI contraction, but limited research compares risky sexual behaviors between institutional type. For these reasons, this study will compare female students' engagement in behavioral risk factors for STIs between a 4-year university and a 2-year community college to determine the impact of institutional setting on risky sexual behavior.

Methods

All participants were female college students aged 18-24 that were recruited from a local community college or university. To ensure college enrollment, all identities from students were confirmed by their institutional student ID. A total of 278 participants, 139 from each institution, were recruited for the study. Of the 278 participants, 68 females responded from the 2-year community college and 75 females from the 4-year university. The remaining 135 participants were male students that were not included in the final analyses. A self-developed questionnaire that was previously validated by a prior study was distributed to participants in sealed envelopes through a cross sectional study design (Attin, 2012; McMillan, 2000). Questions within the survey focused on identifying socioeconomic and behavioral risk factors known to be associated with a high incidence of STIs among college-aged students. Once the data were collected, the Statistical Product and Service Production (SPSS) software 20.0 was used to analyze the results. Both chi square and multiple regression analyses were conducted utilizing income of birth family and education level of parents as the independent variables and condom use, number of sexual partners, type of sex, and drinking habits as the dependent variables. Linear regression analysis was also conducted utilizing institution type as

the independent variable and number of lifetime partners and number of drinks as the dependent variables.

Results

Descriptive Statistics

A frequency analysis of sexual behavior risk factors showed that 35% (n = 19) of females in the 4-year university used condoms compared to 41% (n = 29) of females in a 2-year community college (p = 0.479) (Table 1). During vaginal intercourse, more females from the 4-year university used condoms (57%, n = 30) compared to those attending a 2-year community college (30%, n = 21; $p < 0.003$). Furthermore, the results showed that fewer 2-year female community college students (n = 48) had more than one partner in the past year as compared to their counterparts (n = 22). The results also indicated that 4-year university females engaged in more unwanted sex (n = 6) compared to community college students (n = 1; p = 0.038). However, findings suggested that there was no significance difference when examining students' engagement in intercourse under the influence of drugs or alcohol (p = 0.208).

Table 1

Frequencies of STI Sexual Risky Behaviors among Females By Institution Type[a]

	Four Year University (n=68)	**Community College (n=75)**	**X^2**	**p-value**
Condom used with oral contraception				
Yes	19 (35)	29 (41)	0.50	0.479
No	35 (65)	41 (59)		
Condom used during vaginal intercourse				
Always	30 (57)	21 (30)	8.80	**0.003**
Not always	23 (43)	49 (70)		
Condom used during anal intercourse				
Always	6 (67)	5 (100)	2.12	0.145
Not always	3 (33)	0 (0)		
More than one sexual partner in the past year				
1 partner	32 (59)	22 (31)	9.60	**0.002**
More than 1 partner	22 (41)	48 (67)		
Engaging in intercourse under the influence				
No	17 (25)	49 (65)	1.58	0.208
Yes	17 (25)	26 (35)		
Engaging in unwanted sex				
No	62 (91)	74 (99)	4.30	**0.038**
Yes	6 (9)	1 (1)		

[a] 0 = 4-year college, 1 = community college

A logistic regression analysis was performed to examine the association between institution type and risky behaviors (Table 2). Females enrolled in a community college were three times more likely to report not always using a condom during vaginal intercourse (OR: 3.04; 95% CI: 1.44-6.43; $p<0.01$) than those enrolled in a 4-year university. Furthermore,

females enrolled in a community college were also three times more likely to have more than one sexual partner within the last year (OR: 3.17, 95% CI: 1.51-6.66, p<0.01) and reported an average of three more lifetime partners than those enrolled in a 4-year university (OR: 0.30; 95% CI: -0.03-0.57; p<0.05). No significant differences were observed between university types for condom\oral contraception use or for engaging in intercourse under the influence. The linear regression analysis showed that institution type played a significant role in student's number of lifetime partners and drinking habits (P<0.05).

Table 2

Regression Analysis Examining the Association Between Institution Type[a] and STI Behavioral Risk Factors Among Females.

	Odds ratio	*SE*	95% CI
Logistic Regression Analysis			
Condom\condom with oral contraception used[b]			
Institution type[a]	0.77	0.37	0.37 – 1.60
Condom used during vaginal intercourse[c]			
Institution type[a]	3.04**	0.38	1.44 – 6.42
Condom used during anal intercourse[c]			
Institution type[a]	Cannot be computed due to limited sample size		
More than one sexual partner in the past year[d]			
Institution type[a]	3.17**	0.38	1.51-6.66
Engaging in intercourse under the influence[e]			
Institution type[a]	1.59	0.37	0.78-3.29
Engaging in unwanted sex[e]			
Institution type[a]	0.14	1.09	0.02-1.19
Linear Regression Analysis	B	*SE*	95% CI
Number of lifetime partners			
Institution type[a]	0.30*	0.14	0.03-0.57
Number of drinks			
Institution type[a]	0.05	0.13	-0.22 – 0.31

[a] 0 = 4 year college, 1= community college; [b] 0 = yes, 1 = no; [c]0 = always, 1 = not always; [d]0 = 1 partner or less , 1 = more than one partner; [e] 0 = no, 1= yes; *p < .05; **p < .01;***p < .001.

As shown in Table 3, after controlling for socioeconomic status, no significant differences were observed between females attending community college and those attending 4-year universities for reported condom use. However, parental educational attainment was found to be a significant predictor of condom use during vaginal intercourse. In fact, students whose parents highest level of education was a high school diploma were more than 8.5 times as likely to report not always using condoms during vaginal intercourse in comparison to students whose parents had a post graduate degree (OR: 8.62; 95% CI: 2.67-27.89, $p<0.001$). Similarly, students whose parents were college graduates were 4.6 times more likely to not always use condoms during vaginal intercourse in comparison to the same group with a post graduate degree (OR: 4.6, 95% CI: 1.55-13.69, $p<0.01$).

Table 3

Logistic Regression Analysis Eamining the Associations Between Institution Type[a], Parental Income & Education & Risky Behaviors Adjusted for Demographics (Females Only)

	Odds ratio	*SE*	95% CI
Condom used with oral contraception[b]			
Parental Education[c]			
High school graduate	0.89	0.54	0.31 – 2.60
College graduate	2.03	0.54	0.71 – 5.83
Income[d]			
Less than 19,999	1.41	0.64	0.40-4.95
20,000–49,999	0.55	0.61	0.17 – 1.81
Institution type[a]	0.70	0.44	0.30 – 1.64
Condom used during vaginal intercourse[e]			
Parental Education[c]			
High school graduate	8.62***	0.60	2.67-27.89
College graduate	4.6**	0.56	1.55 – 13.69
Income[d]			
Less than 19,999	0.96	0.65	0.27 – 3.43
20,000–49,999	1.13	0.63	0.33 – 3.90
Institution type[a]	1.89	0.46	0.77 – 4.62
Condom used during anal intercourse[e]	Cannot be computed due to limited sample size		

[a] 0 = 4 year college, 1= community college; [b] 0 = yes, 1 = no; [c] post graduate degree is the reference category; [d] 50,000 or more per year is the reference category; [e]0 = always, 1 = not always; *$p < .05$; **$p < .01$;***$p < .001$.

After controlling for parental socioeconomic status, females enrolled in a community college were nearly six times more likely to report more than one sexual partner within the past year (OR: 5.89; 95% CI: 2.15-16.14, p<0.01) (Table 4). Neither parent's educational attainment nor income status was a significant risk factor for number of sexual partners in the past year. However, when looking at engagement in sexual intercourse under the influence, parental educational attainment was found to be a significant predictor. Compared to females whose parents achieved a post graduate degree, those whose parents had a high school diploma were nearly four times more likely to engage in intercourse under the influence (OR: 3.92, 95% CI:

1.14 – 13.54, p<0.05) while those whose parents had a college degree were 4.5 times more likely (OR: 4.71, 95% CI: 1.44 – 15.35, p<0.05). Neither parental educational attainment nor income was a significant predictor for engaging in unwanted sex. As Table 5 shows, after controlling for parental education and income, there were no significant differences between females enrolled in community colleges and those enrolled in 4-year universities for the number of lifetime partners or the number of reported drinks within the past week. Compared to females whose parents had a post graduate degree, females whose parents had a high school diploma reported, on average, nearly 1.5 more drinks within the past week (OR: 0.76; 95% CI: 0.41-1.10, p<0.001).

Table 4

Logistic Regression Analysis Examining the Associations Between Institution Type[a], Parental Income & Education & Risky Behaviors, Adjusted for Demographics (Females Only) (continued)

	Odds ratio	*SE*	95% CI
More than one sexual partner in the past year[b]			
Parental Education[c]			
High school graduate	0.48	0.58	0.15 – 1.50
College graduate	1.00	0.56	0.34 – 3.03
Income[d]			
Less than 19,999	0.76	0.65	0.21 – 2.69
20,000- 49,999	3.09	0.63	0.91 – 10.54

Institution type[a]	5.89**	0.52	2.15 – 16.14
Engaging in intercourse under the influence[e]			
Parental Education[c]			
High school graduate	3.92*	0.63	1.14 – 13.54
College graduate	4.71*	1.55	1.44 – 15.35
Income[d]			
Less than 19,999	0.55	0.62	0.16 – 1.86
20,000–49,999	0.39	0.61	012 – 1.30
Institution type[a]	1.42	0.43	0.62 – 3.27
Engaging in unwanted sex[e]			
Parental Education[c]			
High school graduate	2.40	1.31	0.18- 31.34
College graduate	4.80	1.57	0.49 – 47.04
Income[d]			
Less than 19,999	2.37	1.26	0.20 – 27.80
20,000–49,999	2.17	1.21	0.20 – 23.48
Institution type[a]	0.10	1.14	0.01 – 1.00

[a] 0 = 4 year college, 1= community college; [b]0 = 1 partner or less , 1 = more than one partner; [c] post graduate degree is the reference category; [d] 50,000 or more per year is the reference category; [e] 0 = no, 1= yes; *$p < .05$; **$p < .01$;***$p < .001$.

Table 5

Linear Regression Analysis Examining the Associations Between Institution Type and Risky Behaviors, Adjusted for Demographics (Females Only)

	B	*SE*	95% confidence interval
Number of lifetime sexual partners			
Parental Education[b]			
High school graduate	0.16	0.19	-0.22 – 0.54
College graduate	-0.07	0.18	-0.43 – 0.29
Income[c]			
Less than 19,999	0.26	0.22	-0.17 – 0.69
20,000- 49,999	0.08	0.20	-0.33 – 0.48

Institution type[a]	0.16	0.15	-0.13 – 0.46
Number of drinks in the past week			
Parental Education[b]			
High school graduate	0.76***	0.18	0.41 – 1.10
College graduate	0.17	0.17	-0.16 – 0.50
Income[c]			
Less than 19,999	-0.06	0.20	-0.45 – 0.33
20,000–49,999	-0.13	0.19	-0.50 – 0.24
Institution type[a]	-0.17	0.14	-0.44 – 0.10

[a] 0 = 4 year college, 1= community college; [b] post graduate degree is the reference category; [c] 50,000 or more per year is the reference category; [e] 0 = no, 1= yes; **p* < .05; ***p* < .01;****p* < .001.

As shown in Table 6, the results of the chi-square analysis indicated that females 18-to-24 years of age enrolled in a 2-year community college were more likely to have parents with lower income and lower educational attainment than those enrolled in a 4-year university. Specifically, 65% of females from the 2-year community college had parents that were more likely to have lower income (e.g. less than $19,999) than parents of students from a 4-year university. Similarly, 75% of females in the 4-year university reported parents having a higher education at the graduate/post graduate level as compared to only 44% of 2-year community college students (p<0.001).

Table 6

Chi-square Analysis Examining Demographic Differences by Institution Type

	Four Year University (n=68)	**Community College (n=75)**	**X^2**	**p-value**
Income (n (%))				
Less than 19,999	20(29)	49(65)	20.31	**<0.001**
20,000-49,9999	29(43)	20(27)		
50,000 or more	19(28)	6(8)		
Parental Education (n(%))				

High school graduate	17(25)	42(56)	16.26	**<0.001**
College graduate	24(35)	21(28)		
Post college graduate	27(40)	12(16)		

Summary

The results showed that female students from both institutions, whether 2-year community college or 4-year university, displayed sexual risk behaviors that increasd the probability of contracting STIs. Additionally, female community college students had a lower SES and parents with a lower degree of education in comparison to the 4-year university females. Among students whose parents had a low educational attainment (i.e. high school diploma), the results indicated that condoms were not always used during vaginal intercourse, which demonstrates the effect of socioeconomic status on STI contraction. Several studies also highlight a lack of consistent condom usage among college students and potential association with low income (Fehr, Vidourek, King, & Nabors, 2017, 2018; Harling, Subramanian, Barnighausen, & Kawachi, 2013). When comparing female students between each institutional type, those in the community college reported having more sexual partners than their 4-year university counterparts.

Conclusion and Recommendations

This research compared female students in two educational settings, a 2-year community college and a 4-year university. Results from the study indicated that, depending on institutional setting, female college students exhibited different behavioral risk factors for STI contraction. Based on the results, interventions to reduce the number of sexual partners among 2-year community college students and to increase condom usage among 4-year university students are needed (Fehr, Vidourek, King, & Nabors, 2018). Such programs to increase students' awareness

of STIs are essential in college institutions to tackle the STI problem among young adults (Collado, Johnson, Loya, Johnson, & Yi, 2017; Fehr, Vidourek, King, & Nabors, 2017, 2018; Miller, 2018). Future studies could be performed to determine differences by age group, class (i.e. freshmen, sophomores, juniors, and seniors), or ethnic group. More in-depth studies could also identify specific risk factors of each institution such as low condom use, multiple sexual partners, and poor drinking habits. STIs have proven to be costly and devastating in the long run, and may cause irreversible damage. For these reasons, there is a need for primary, secondary, and tertiary prevention methods to tackle this ever-increasing burden. Increasing STI awareness on college campuses is critical, and public health officials must emphasize the importance of safe sexual behaviors.

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