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Finding Factors Linked to Sexual Behavior and Unwanted Results in Young, Adult, Urban Female Populations: A Comparative Analysis

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ABSTRACT

Background

Sexually transmitted infections (STIs) and unwanted pregnancies affect adolescent females annually. This study's objective was to determine factors leading to disproportionate risk of STIs and unplanned pregnancies utilizing a survey to compare a presumed high-risk urban female population with an age-matched expected low-risk urban female population.

Methods

Adolescent women ages 18-24 were surveyed during 2017 utilizing a qualtrics survey. The survey was given at a local urban university and participating students received research credit. The survey was also given at an urban Emergency Department (ED) using an iPad to participants during their visit. The main outcomes measured were STI and unplanned pregnancy rates.

Results

The ED cohort had higher rates of chlamydia (52% *vs* 5%), gonorrhea (20% *vs* 0%), trichomoniasis (30% *vs* 2%), pregnancy (60% *vs* 2%), and perceived themselves to be a higher-risk for pregnancy (3.4 *vs* 1.9) than the University cohort. They were younger the first time they had vaginal sex (15.6 *vs* 16.3-years), though median age of first oral sex was similar between groups. The ED cohort was older (21.4-years-old *vs* 19.1-years-old) and more likely to be non-white (64% *vs* 6%). There were no differences between the cohorts in regard to educational background and sexual orientation. After adjustments were made, the University cohort was more likely to use condoms and had a lower rate of lifetime partners.

Conclusion

Young, urban females use condoms and birth control less frequently and have more male partners than an age-matched university population.

Keywords
Young; Urban; Females; STI; Sexual behavior.

INTRODUCTION

Adolescents (15-19-years-old) and young adults (20-24-years-old) account for approximately 25% of the sexually experienced population with the average age of first intercourse being 17.3-years.[1-5] Restricting to those who engaged in any type of sexual activity before age 18, the average first age of oral sex is 15.8, vaginal sex 15.5, and anal sex 16.4-years.[6] Regardless of age, when people begin to engage in sexual activity (whether oral, vaginal, or anal sex), the risk for exposure to sexually transmitted infections (STIs) and risk of pregnancy increases compared to peers who are abstinent. According to the US Department of Health in 2017, 40% of US high schoolers (grades 9-12) reported a history of having sex with 10% reporting sex with more than 4 total partners.[7] Of those sexually active high-schoolers, only half (54%) reported using a condom during their last sexual encounter for contraception and STI prevention.[7] While additional forms of contraceptives were reported, 14% of respondents reported not using any

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method to prevent pregnancy or STI.[7]

The Centers for Disease Control and Prevention (CDC) estimates that there are approximately 26 million new STI diagnoses each year (when compiling rates of chlamydia, gonorrhea, hepatitis B, herpes simplex virus-2 (HSV-2), HIV, human papillomavirus (HPV), syphilis, and trichomoniasis) resulting in an annual medical burden of approximately $16 billion.[4] Of these new cases, 45% occur in the 15-24-year-old age group with rates of cases of chlamydia and gonorrhea rising over the past several years.[1,4,8] Between 2014 and 2018, the rate of chlamydia cases increased 15% (from 948,102 to 1,087,277) and gonorrhea cases increased 35% (184,668 to 249,081) for those in the adolescent and young adult populations.[8-10] For trichomoniasis, rates vary greatly depending on the population of patients. Studies have demonstrated rates ranging from 2.3% for adolescents, 3.1% for women aged 14-49, all the way up to 12.6% in patients who were screened at family planning clinics.[11-13] Pregnancy is another potentially undesired outcome of unprotected vaginal sex in the adolescent age group. Approximately 45% of all pregnancies (regardless of patient age) are unplanned.[14] According to the US Department of Health and Human Resources, the rate of teen (aged 15-19) pregnancy in 2013 was 43 per 1,000 females and there were 212,062 total births to females under 20-years-old in 2016.[7] The highest rate of births occurred among non-Hispanic white (39%), Hispanic (36%), and non-Hispanic black (22%) populations.[7] Although these numbers are striking, they do represent a 67% decline in teen pregnancy rate between 1988 and 2013.[7] However, the 2013 teen abortion rate was 11 per 1,000 females indicating that unplanned pregnancies are still occurring.[7]

While literature discusses rates of STIs and unplanned pregnancies at length, there is far less discussion on the reasons that individuals participate in unprotected sex or a patient's perceived risk of conception. Several studies have demonstrated that up to one-third of patients believed they were low-risk for pregnancy at the time of conception.[15] The most common reason for a self-perceived low-risk of pregnancy was women thinking they could not get pregnant.[14,15] Nearly 60% of women have concerns about their fertility status despite no indication from a medical provider that they are infertile.[15] Given a perceived infertile state, some women do not see the need to use contraception during sex. In a study performed at medical clinics where women presented for an abortion, 28% of participants reported never using contraception in the past with the most common reason being that they did not think they could get pregnant.[15] Some of the additional reported reasons for not using contraception included difficulty obtaining contraception, not planning on having sex, ambivalence about becoming pregnant, side effects of contraception, contraceptive cost, and partner/relationship related reasons (for example: partner not wanting to use contraception).[15] The study also found that teenagers underestimated their risk of getting pregnant from unprotected sex when compared with older participants.[15] In terms of perceived risk of contracting STIs, very little literature exists regarding self-perceived risk for non-HIV or hepatitis STIs. In one retrospective case series study (which took a feminist approach), researchers interviewed ten participants on their experience with contracting an STI.[16] Participants reported that they previously thought they were low-risk for getting an STI as they didn't believe they participated in risky sexual behaviors.[16] In hindsight, most of the participants were able to recognize the risky behaviors that led to STI transmission and many were able to pinpoint reasons that likely influenced their participation in unprotected sex (age, naive state, and perceived monogamy of partner).[16] Participants also stated they felt women with STIs are stereotyped and stigmatized, which they have subsequently felt as a result of their STI diagnosis.[16] Each of these reasons may influence an individual's perceived risk of an STI thus influencing their perceived need to use appropriate barrier protection to prevent STI transmission.

Overall, early initiation of sexual activity increases the likelihood of STIs and unintended pregnancies; however, the role of self-perceived risk in relation to these outcomes is unclear. The current study aimed to evaluate and compare two Pittsburgh urban, young adult groups (one at a local emergency department and the other at a local private university) in terms of engagement in sexual activity and associated outcomes. The study compared risky behaviors (number of lifetime partners, frequency of contraceptive use) and self-perceived risk of STIs and becoming pregnant between groups.

MATERIALS AND METHODS

Materials

A 71-item survey was created for the study. The first page included the participant consent. Of the seventy question items, forty-four questions were adapted from several published studies in which permission was granted for use and are located in Appendix A.[17-20] The remaining twenty-six questions used in the survey were created by the researchers of the current study. The survey was administered through Qualtrics. The survey questions and possible responses can be found in Appendix A.

Participants/Procedures

The study was performed by surveying two distinct samples of females aged 18-24 from January-December 2017. IRB approval was obtained from both the University and the hospital where the study took place. One group of participants were patients at an urban emergency department located in a women's hospital. These participants were surveyed during their stay in the emergency department in the privacy of their patient rooms and completed the survey on a secure portable tablet computer. The other group of participants were university students at a small urban-based private university. The Qualtrics, Utah, USA survey was presented to the University group only through Sona Systems, MD, USA a program through which surveys are available to students to receive research credit in certain academic courses. After entering their personal demographics, students are matched with surveys they qualify for; in this case, female students in our age group had access to the survey.

Participant informed consent was obtained prior to the start of the survey for both groups. All responses were recorded

electronically on a secure tablet, laptop, or desktop and the results were sent to a secure server. There were no identifiers used and the participants had the opportunity to exit the survey at any time. Neither group received financial compensation for participating in this study.

Outcomes

The outcomes for the study included the self-reported number of male partners and frequency of condom and contraception use as measured by Likert scale response.

Covariates

Demographic information included race (non-white, white, or other), age, setting (urban ED or an urban university), educational status (any schooling up to GED/high school diploma, some university, university degree), relationship status (single, married/domestic partner, widowed, divorced, or separated), perception of risk of contracting an STI and/or becoming pregnant (on a Likert scale of 1-7, 1=not very true of me, 7=very true of me), age of menarche, current height and weight, self-perception of attractiveness (Likert scale 1-10, 1=extremely unattractive, 10=extremely attractive), high-levels of self-esteem (Likert scale 1-5, 1=not very true of me, 5=very true of me), sexual orientation (heterosexual, gay/lesbian, bisexual, other), history of sex in the past 15-years, history of pregnancy and age, history of unplanned pregnancy, and history of STI's. The rate of condom use and birth control use was measured on a Likert scale of 1-5 (1=never, 2=sometimes, 3=half of the time, 4=most of the time, 5=every time).

Statistical Analyses

Our analysis set included all survey respondents that consented and completed the demographic questions. Additionally, we restricted our analyses to those respondents who self-described as being in heterosexual or bisexual relationships since the risk of pregnancy in a female-female sexual encounter does not exist. Descriptive statistics were calculated overall and by group. Sample means and standard deviations were used for continuous measures, while sample proportions were used to categorical variables. Between-group comparisons were facilitated by two-sample *t*-tests for continuous variables Fisher's exact test for categorical variables. The latter was chosen as a conservative approach due to small cell sizes in corresponding contingency tables. The primary analyses utilized generalized linear models to compare the lifetime number of male partners (Poisson regression), frequency of condoms during sex (linear regression), and frequency of birth control (linear regression) between groups. Additionally, we augmented our models with covariates that were imbalanced between groups in order to calculate adjusted point estimates.

RESULTS

One hundred and eighty-nine women between the ages of 18 and 24 were surveyed about their sexual behaviors, pregnancy, and any

Table 1. *Demographics*

Factor	Level	ED	University	*p*
N		82	87	
Age (Q2), mean (SD)		21.4 (1.6)	19.1 (1.2)	<0.001
Race (derived from Q73)	Non-white	50 (64%)	5 (6%)	<0.001
	Other	2 (3%)	1 (1%)	
	White	26 (33%)	80 (93%)	
Highest Education (Q7)	Any schooling up to and including high school diploma or equivalent (for example: GED)	35 (43%)	33 (38%)	0.14
	University degree (Associates, Bachelor's, Master's, Professional, and/or Doctorate degree)	8 (10%)	3 (3%)	
	Some University credit (no degree) OR trade/technical/vocational training	38 (47%)	51 (59%)	
Marriage Status (Q8)	Divorced	1 (1%)	0 (0%)	0.066
	Married or domestic partner	4 (5%)	0 (0%)	
	Separated	1 (1%)	1 (1%)	
	Single, never married	75 (91%)	86 (99%)	
	Widowed	1 (1%)	0 (0%)	
Height (derived from Q15), mean (SD)		64.2 (2.9)	64.1 (2.5)	0.83
Weight (derived from Q74), mean (SD)		162.0 (49.8)	144.5 (31.1)	0.007
BMI, mean (SD)		27.6 (7.6)	24.6 (4.8)	0.003

Comparing females 18 to 24-years-old presenting to an urban emergency department or attending an urban college. These populations were surveyed on age, race, education status, marriage status, height, weight, and BMI. The populations were similar in education level, marriage status and height. The university population was younger than the emergency department population (average age 19.1 [1.2] vs 21.4 [1.6]; p<0.001). The emergency department population was racially more non-white (64% vs 6%; p<0.001), weighed more (average of 162 lb. [49.8] vs 144.5 lb. [31.1]; p=0.007), and had a higher BMI (27.6 [7.6] vs 24.6 [4.8]; p=0.003) compared to the emergency department population.

Table 2. *Sexual Health History*

Factor	Level	ED	University	p
N		82	87	
Sexual Orientation (derived from Q18)	Bisexual	18 (22%)	8 (9%)	0.032
	Heterosexual or straight	64 (78%)	79 (91%)	
Past Sex (Q19)	No, I have not had any sex (vaginal, oral, or anal)	1 (1%)	25 (29%)	<0.001
	Yes	81 (99%)	62 (71%)	
Perception of Attractiveness (Q16), mean (SD)		6.5 (2.6)	6.0 (1.8)	0.098
High Self-Esteem (Q17), mean (SD)		3.3 (1.5)	3.0 (1.1)	0.11
History of Chlamydia (Q23)	No	39 (48%)	59 (95%)	<0.001
	Yes	42 (52%)	3 (5%)	
History of Gonorrhea (Q26)	No	65 (80%)	62 (100%)	<0.001
	Yes	16 (20%)	0 (0%)	
History of Trichomoniasis (Q39)	No	57 (70%)	61 (98%)	<0.001
	Yes	24 (30%)	1 (2%)	
Ever Pregnant (Q20)	No	32 (40%)	61 (98%)	<0.001
	Yes	49 (60%)	1 (2%)	
Ever Unplanned Pregnancy (Q22)	No	7 (15%)	0 (0%)	1.00
	Yes	40 (85%)	1 (100%)	
Age at First Vaginal Sex (Q45), mean (SD)		15.6 (2.1)	16.3 (1.6)	0.037
Age at First Oral Sex (Q48), mean (SD)		16.1 (3.1)	16.0 (1.7)	0.80
Age at First Anal Sex (Q51), mean (SD)		19.4 (2.2)	17.2 (1.3)	<0.001

Comparing females 18 to 24-years old presenting to an urban emergency department or attending an urban college. Both populations had similar rates of perception of attractiveness, self-esteem, unplanned pregnancy, and age of first oral sex.The emergency department population was more likely to be bisexual (22% vs 9%; p=0.032), have a history of chlamydia (52% vs 5%; p<.001), a history of gonorrhea (20 % vs 0%; p<.001), a history of trichomoniasis (30% vs 2%; p<.001), ever been pregnant (60% vs 2%; p<.001), and younger age of first vaginal sex (15.6 [2.1] vs 16.3 [1.6] years; p=0.037) compared to the university population.The university population had earlier first anal sex (17.2 [1.3] vs 19.4 [2.2]; years p<.001) compared to the emergency department population.

history of sexually transmitted infections. Of those that began the survey, 186 completed. Restricting to only those who self-identified as either bisexual or heterosexual resulted in data from 169 participants. Eighty-two of those surveyed were from an urban ED and eighty-seven were from the University cohort.

With respect to demographics, the ED cohort was older (21.4-years *vs* 19.1, $p<0.001$), non-white (64% *vs* 6%, $p<0.001$), and more likely to be bisexual (22% *vs* 9%, $p=0.032$). The two cohorts were similar in terms of educational background and marriage status. The ED cohort participants were more likely to have had sex than the University cohort (99% *vs* 71%, $p<0.001$) and to have histories of chlamydia (52% *vs* 5%, $p<0.001$), gonorrhea (20% *vs* 0%, $p<0.001$), and trichomoniasis (30% *vs* 2%, $p<0.001$). The ED cohort had a higher rate of having been pregnant in comparison to the University cohort (60% *vs* 2%, p<0.001). When comparing age of first-time sex between the ED and University cohorts, there was no difference in age of first oral sex (16.1-years *vs* 16.0), but there was a statistically significant difference between the first-time vaginal sex (15.6-years *vs* 16.3, $p=0.037$) and first anal sex (19.4-years *vs* 17.2, $p<0.001$). There was no significant difference to how the two cohorts perceived themselves in terms of attractiveness or their self-esteem, nor was there any difference in their weight and BMI (Tables 1 and 2).

Questions were also asked about the women's perception of being high-risk for STIs and pregnancy. The ED cohort believed they were at a higher risk of contracting an STI (2.1 *vs* 1.5, $p=0.011$) and becoming pregnant (3.4 *vs* 1.9, $p<0.001$) compared to the University cohort (Table 3).

Table 3. *Perception of Risk*

Factor	ED	University	p
N	82	87	
High Risk STI (Q12), mean (SD)	2.1 (1.6)	1.5 (1.1)	0.011
High Risk Pregnancy (Q13), mean (SD)	3.4 (2.3)	1.9 (1.2)	<0.001

Comparing females 18 to 24 years old presenting to an urban emergency department or attending an urban college.The population was surveyed for their perception of risk for sexually transmitted infections or pregnancy on a scale of 1 to 7 with 7 being the highest risk.The emergency department population had higher perceived risk of sexually transmitted infection (2.1 [1.6] vs 1.5 [1.1]; p=0.011 and risk of pregnancy (3.4 [2.3] vs 1.9 [1.2]; p<.001) than the university population.

When comparing the ED cohort to the University cohort, those surveyed in the ED reported a higher mean number of male lifetime partners than those in the University group (50.5 *vs* 18.5 lifetime partners, $p<0.001$). The University cohort had a 63% reduction (risk ratio 0.37 {0.34, 0.39}, $p<0.001$) in the rate of lifetime partners than the ED cohort. After adjusting for confounders in Tables 1 and 2 (age, race, sexual orientation, BMI, history of chlamydia, gonorrhea, trichomoniasis, history of pregnancy, age at first vaginal sex, and age at first anal sex), the reduction in rate of lifetime partners for University decreased to 30% (RR 0.70 {0.61, 0.81}, $p<0.001$; Table 4).

There were several respondents who reported extreme values for the number of male lifetime partners. As a sensitivity analysis, we restricted this outcome to values less than 250 lifetime partners in the ED cohort, the reduction rate of lifetime partners for the University cohort was 46% (RR 0.54 {0.51, 0.58}, $p<0.001$) lower than the ED cohort. After adjusting for confounders, the reduction in the rate of lifetime partners went down to 13% (RR 0.87 {0.74, 1.02}, $p=0.076$). The ED cohort women were also less likely to use condoms during sex (2.6 *vs* 3.5, $p<.001$) and were less likely to use birth control during sex (2.4 *vs* 4.1, $p<.001$). After adjusting for confounders, the mean difference in condom use increased to 1.78 units ({0.47, 3.08}, $p=0.008$) favoring the University cohort (Table 4).

DISCUSSION

Subjects from the emergency department group reported higher levels of self-perceived risk of pregnancy and STI compared to the University subjects. However, despite emergency department subjects rating themselves as high-risk for pregnancy, this group reported lower rates of condom and birth control use compared to the University participants. The emergency department subjects also reported higher rates of unplanned pregnancies, as well as chlamydia, gonorrhea, and trichomoniasis. Perception of attractiveness and self-esteem did not differ between the two cohorts and these factors do not appear to influence differences in behavior or outcomes related to risky sexual behavior.

The emergency department population had significantly higher rates of STIs than the University population for chlamydia, gonorrhea, and trichomoniasis. Previous research has shown STI rates are higher in socioeconomically disadvantaged and minority populations, which could potentially account for this difference based on demographic differences between the two study groups.[21] Rates of pregnancy were also significantly higher in the ED population compared to the University group and the vast majority were unplanned in each group. Previous research has shown higher rates of unplanned pregnancies in poor and minority populations. The higher rates are thought to be related to poorer access to birth control.[22] The ED group in this study did have a larger number of non-white respondents compared to the University group, which aligns with prior research regarding minority populations having higher rates of unplanned pregnancy. However, it must be noted that income was not assessed in the current study and thus it is unclear the role of income played in the access to condoms and birth control for the participants in each group.

Interestingly, ED cohort participants correctly perceive they are at higher risk for unplanned pregnancy and STIs compared to the University cohort despite the lower rate of condom and birth control use. Differences in condom usage rates is likely multifactorial.[23] Several tools are available that aim at assessing women's perceived barriers to condom use. One such tool is the Condom Barrier Scale, which evaluates factors such as motivational barriers, partner barriers, negative effect on sexual experience, and access barriers.[23] Since these factors were not assessed in this study, it is unclear whether these factors differ between the two study populations. The factors that affect usage of condoms and other birth control methods will be critical to evaluate to determine why people who perceive themselves to be high-risk do not subsequently take measures to decrease risk (such as using condoms or birth control).

Table 4. *High Risk Behaviors and Prevention*

Factor	ED	University	RR/Beta	*p*	aRR/Beta[1]	adj p[1]
N		82	87			
Lifetime Number of Male Partners (derived from Q44), mean (SD)	50.5 (99.1)	18.5 (25.0)	0.37 (0.34, 0.39)	<0.001	0.70 (0.61, 0.81)	<.001
Lifetime Number of Male Partners (restricting to < 250), mean (SD)	33.9 (41.8)	18.5 (25.0)	0.54 (0.51, 0.58)	<0.001	0.87 (0.74, 1.02)	0.076
Frequency of Condoms During Sex (derived from Q59), mean (SD)	2.6 (1.2)	3.5 (1.3)	0.90 (0.48, 1.32)	<0.001	1.78 (0.47, 3.08)	.008
Frequency of Birth Control During Sex (derived from Q60), mean (SD)	2.4 (1.6)	4.1 (1.6)	1.73 (1.18, 2.28)	<0.001	0.49 (-1.33, 2.32)	0.597

[1]Adjusted risk ratios and beta coefficients were estimated from models controlling for the following cofounders: age, race, sexual orientation, BMI, history of chlamydia, gonorrhea, trichomoniasis, history of pregnancy, age at first vaginal sex, and age at first anal sex.
Comparing females 18 to 24-years-old presenting to an urban emergency department or attending an urban college. Models adjusting for confounders were developed to determine if these confounders were responsible for the significant differences between the two cohorts. The emergency department subjects had more lifetime partners (mean 50.5 [99.1] vs 18.5 [25]; p<.001) after adjusting for confounders the difference was still significant (p<0.001). If subjects with greater than 250 partners were removed, emergency department subjects lifetime male partners were 33.9 (41.8) vs 18.5 (25) p<0.001 after adjusting for confounders p=0.076; frequency of condom use on a 1 to 5 scale in the emergency department population was 2.5 (1.2) vs 3.5 (1.3) p<0.001 after adjusting for confounders p=.008; frequency of birth control use on a 1 to 5 scale in the emergency department population was 2.4 (1.6) vs 4.1 (1.6) p<0.001 after adjusting for confounders the difference was no longer significant..

The two study populations have distinctly different racial characteristics with the ED group having a much larger non-white respondent rate compared to the University group. Previous studies have found racial/ethnic disparities when analyzing data including that it is more common for black and Hispanic teens to engage in sex in adolescence and have a higher number of total lifetime partners compared to white peers.[24] In addition, Hispanics are twice as likely to contract gonorrhea or chlamydia compared to whites and had the lowest rates of condom use among all racial/ethnic groups.[25] In the current study, when the data was adjusted for age, race, sexual orientation, BMI, and self-perceived risk of STI and pregnancy, there were no significant differences between the two groups for rates of condom and birth control use. Therefore, it may be inferred that some combination of these variables likely contributes to differences in condom and birth control use among adolescent women.

Total number of lifetime male partners in the emergency department population was significantly higher than the University age group. This significant difference is maintained even after adjusting for age, race, sexual orientation, BMI, and self-perceived risk of STI and pregnancy. The observed difference in number of sexual partners could be related to several factors. First, the ED population used a provided portable tablet whereas the University group used their own equipment. Differences in comfort using equipment to complete the survey may have increased the rate of input error for the number of partners in the ED group. Second, the emergency department population may have higher rates of sex workers compared to the University group; prior studies have shown this can increase the number of lifetime partners by approximately 70 per month of work.[26] Four subjects reported greater than 250 sexual partners. Given that the total number of subjects for the emergency department cohort was only 82, these four subjects may have an oversized influence on the average number of sexual partners regardless for the circumstances surrounding the numbers (input error, sex worker, other factors). In addition, age of first vaginal sex was found to be earlier in the emergency department population compared to the University cohortwith the ED group having a higher percentage of African Americans comparatively. Prior researchers have found African American teens to have an earlier age of first sex compared to white peers which seems to be further supported by the current study, resulting in an increase in the number of years of sexual activity.[27,28] Multiple studies have demonstrated that earlier age at first sex (especially before 15-years-old) makes an adolescent more likely to have a higher number of total lifetime sexual partners and increases the risk for STI.[3,25,27]

Future studies will need to better assess barriers to condom use in the emergency department population. Preliminary data suggests high-levels of partner resistance in this population to condom usage (unpublished data). Additionally, it would be important to determine if availability of condoms for distribution from emergency departments would increase condom use and decrease STI and unplanned pregnancy rates. To further evaluate the causes of significantly higher rates of male partners among the emergency medicine population, behavioral surveys of emergency patients with greater than 100 sexual partners may provide some insight into this difference. Additionally, some evidence suggests different societal norms within neighborhoods affect rates of participation in risky sexual behavior regardless of other factors.[2] However, other researchers cite neighborhood factors such as poverty, unemployment, female-headed households, and single-parent households as contributing factors to adolescent risky sexual behaviors.[24] Regardless, additional studies with larger samples are needed to further delineate the factors leading to participation in risky sexual behaviors.

CONCLUSION

In this comparison study of two cohorts, we found earlier age of first intercourse, higher rates of STIs and unplanned pregnancies, as well as lower rates of condom use in those surveyed in the ED. Those in the ED also perceived themselves to be at a higher-risk of contracting an STI or becoming pregnant compared to those surveyed at the University. After adjusting for demographics, the University cohort had a lower lifetime number of partners as well as higher rates of condom use. It has been determined through this study that those who came to the ED have riskier sexual behavior compared to those surveyed at the University even after adjusting for multiple demographic variables.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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APPENDIX

APPENDIX A

The complete survey as administered to participants is below. Skip patterns are also delineated to aid in understanding of answer flow for participants. Sources of material where permission was granted for use in this study are indicated following the question item by a superscript with the coinciding source at the end of the appendix. Survey items from outside sources in some instances were modified to fit the current study objectives. All other items were created by the researchers of the current study.

Q1 (Consent) The purpose of this research study is to evaluate sexual behaviors, unexpected pregnancy and sexually transmitted infections in young adult females aged 18-24 […]
o Yes, I'd like to participate in this survey
o No, I do not want to participate in this survey
→ Skip To: End of Survey
Q2 I am currently taking this survey as a:
o Student at _____University
o Patient in the Emergency Department at _____ Hospital
o Exit the survey
→ Skip To: End of Survey
Q3 Which of the following best describes your age?
o 17 years old or younger
→ Skip To: End of Survey
o 18 years old
o 19 years old
o 20 years old
o 21 years old
o 22 years old
o 23 years old
o 24 years old
o 25 years old or older
→ Skip To: End of Survey
Q4 Ethnicity origin (or Race): Please specify your ethnicity. (May select more than one)
□ White
□ Black or African American
□ Native American or American Indian
□ Asian/Pacific Islander
□ Hispanic or Latino
□ Other
□ Exit the survey
→ Skip To: End of Survey
Q5 What is your highest degree of level of school you have completed? If currently enrolled, highest degree received.
o Any schooling up to and including high school diploma or equivalent (for example: GED)
o Some college credit (no degree) OR trade/technical/vocational training
o College degree (Associates, Bachelor's, Master's, Professional, and/or Doctorate degree)
o Exit the survey
→ Skip To: End of Survey
Q6 What is your marriage status?
o Single, never married
o Married or domestic partner
o Widowed
o Divorced
o Separated
o exit the survey
→ Skip To: End of Survey

Q7 I am at high risk for getting a STD (sexually transmitted disease). Rate your risk on a scale from 1 (not very true of me) to 7 (very true of me).
o 1-Not very true of me
o 2
o 3
o 4 True
o 5
o 6
o 7-Very true of me
o Exit survey
→ Skip To: End of Survey
Q8 I am at high risk for getting pregnant. Rate your risk on a scale from 1 (not very true of me) to 7 (very true of me).
o 1-Not very true of me
o 2
o 3
o 4 True
o 5
o 6
o 7-Very true of me
o Exit survey
→ Skip To: End of Survey
Q9 Age at your first menstrual period (in years):
_____
Q10 What is your current height (in feet and inches)? Example: 5 ft 4 in
_____
Q11 What is your current weight (in pounds)?
_____
Q12 Rate what you perceive to be your own level of attractiveness on a scale from 1 (extremely unattractive) to 10 (extremely attractive).[1]
o 1 extremely unattractive
o 2
o 3
o 4
o 5 attractive
o 6
o 7
o 8
o 9
o 10 extremely attractive
o Exit the survey
→ Skip To: End of Survey
Q13 I have high self esteem.[2]
o 1-Not very true of me
o 2
o 3- True
o 4
o 5-Very true of me
o Exit survey
→ Skip To: End of Survey
Q14 Do you consider yourself to be:[3]
o Heterosexual or straight
o Gay or lesbian
o Bisexual
o Other

o Exit survey
→ Skip To: End of Survey
Q15 In the past 15 years, have you had sex (including vaginal, oral, and/or anal)?
o Yes
o No, I have not had any sex (vaginal, oral, or anal)
→ Skip To: Q19
o Exit the survey
→ Skip To: End of Survey
Q16 Have you ever been pregnant?[4]
o Yes
→ Go To: Q17 and Q18
o No
→ Skip To: Q20
o Exit survey
→ Skip To: End of Survey
Q17 Please record your age at FIRST pregnancy (in years):[4]

Q18 Have you ever had an unplanned pregnancy?
o Yes
→ Skip To: Q20
o No
→ Skip To: Q20
o Exit survey
→ Skip To: End of Survey
Q19 Reasons why you are NOT currently sexually active? (Check all that apply)
□ Worried about sexually transmitted diseases
→ Skip To: End of Survey
□ Have not found the right person
→ Skip To: End of Survey
□ Too busy for a relationship
→ Skip To: End of Survey
□ Concerned about getting pregnant
→ Skip To: End of Survey
□ Religious or cultural concerns
→ Skip To: End of Survey
□ Exit the survey
→ Skip To: End of Survey
The following sets of questions are about Sexually Transmitted Diseases (STD's)
Q20 Have you ever had Chlamydia?[4]
o Yes
→ Go to Q21 and Q22
o No
→ Skip To: Q23
o Exit survey
→ Skip To: End of Survey
Q21 How old were you when you first knew you had Chlamydia? (record age in years)[4]

Q22 Have you ever been treated for Chlamydia more than once?[4]
o Yes
o No
o Exit survey
→ Skip To: End of Survey
Q23 Have you ever had Gonorrhea?[4]
o Yes

→ Go to Q24 and Q25

o No

→ Skip To: Q26

o Exit survey

→ Skip To: End of Survey

Q24 How old were you when you first knew you had Gonorrhea? (record age in years)[4]

_____

Q25 Have you been treated for Gonorrhea more than once?[4]

o Yes

o No

o Exit survey

→ Skip To: End of Survey

Q26 Have you ever had Syphilis?4

o Yes

→ Go to Q27 and Q28

o No

→ Skip To: Q29

o Exit survey

→ Skip To: End of Survey

Q27 How old were you when you first knew you had Syphilis? (record age in years)[4]

_____

Q28 Have you been treated for Syphilis more than once?[4]

o Yes

o No

o Exit survey

→ Skip To: End of Survey

Q29 Have you ever had Pelvic Inflammatory Disease (PID)?[4]

o Yes

→ Go to Q30 and Q31

o No

→ Skip To: Q32

o Exit survey

Skip To: End of Survey

Q30 How old were you when you first knew you had Pelvic Inflammatory Disease (PID)? (record age in years)[4]

_____

Q31 Have you been treated for Pelvic Inflammatory Disease (PID) more than once?[4]

o Yes

o No

o Exit survey

→ Skip To: End of Survey

Q32 Have you ever had Genital Warts?[4]

o Yes

→ Go to Q33

o No

→ Skip To: Q34

o Exit survey

→ Skip To: End of Survey

Q33 How old were you when you first knew you had Genital Warts? (record age in years)[4]

_____

Q34 Have you ever had Genital Herpes?[4]

o Yes

→ Go to Q35

o No

→ Skip To: Q36

o Exit survey
→ Skip To: End of Survey
Q35 How old were you when you first knew you had Genital Herpes? (record age in years)[4]
_____
Q36 Have you ever had Trichomoniasis?
o Yes
→ Go to Q37 and Q38
o No
→ Skip To: Q39
o Exit survey
→ Skip To: End of Survey
Q37 How old were you when you first knew you had Trichomoniasis? (record age in years)
_____
Q38 Have you ever been treated for Trichomoniasis more than once?
o Yes
o No
o Exit survey
→ Skip To: End of Survey
Q39 How often do you get screened for sexually transmitted diseases (including Gonorrhea, Chlamydia, Trichomoniasis, Syphilis)?
o I have never been screened for sexually transmitted diseases
o Less than once per year
o Every year
o Twice a year
o More than twice per year
o Exit the survey
→ Skip To: End of Survey
Q40 In the past 15 years, who have you had sex with (vaginal, oral, and/or anal)?[3]
o Men only
→ Go to Q41 (answer all follow-up questions) then go to Q55-Q58, Q60 (answer all follow-up questions), and Q70 (answer all follow-up questions)
o Women only
→ Skip To: Q51
o Both men and women
→ Go to Q41 (answer all follow-up questions) then go to Q55-Q58, Q60(answer all follow-up questions), and Q70(answer all follow-up questions)
o Exit the survey
→ Skip To: End of Survey
Q41 Indicate the number of MALE partners with which you have done the following during YOUR ENTIRE LIFETIME[4]:
_____ Given oral sex (mouth on private parts)
→ Number >0, go to Q45, Q46, and Q47
_____ Received oral sex
→ Number >0, go to Q45, Q46, and Q47
_____ Had vaginal intercourse
→ Number >0, go to Q42, Q43, and Q44
_____ Had anal sex
→ Number >0, go to Q48, Q49, and Q50
_____ Had sex (oral, vaginal, and/or anal) as part of a non-committed relationship "friends with benefits"
_____ Have been given money, gifts, or favors in exchange for sexual activity
_____ Had sexual intercourse in a "one-night stand"
_____ Had sexual intercourse without contraception -unprotected sex
_____ Had sexual intercourse after drinking alcohol
_____ Had sexual intercourse while high on drugs (including marijuana and prescription narcotics)
Q42 As best you can recall, how old were you the first time you had voluntary (not forced) vaginal sex with a MALE partner (age closest to half year, example 16.5 years)?[4]

Q43 As best you can recall, how old was your MALE partner the first time you had voluntary (not forced) vaginal sex?[4]

Q44 Did you use a condom the FIRST TIME you had voluntary (not forced) vaginal sex with a MALE partner?
o Yes
o No
o Unsure
o Exit survey
→ Skip To: End of Survey

Q45 As best you can recall, how old were you the first time you had voluntary (not forced) oral sex (mouth on private parts) with a MALE partner (age closest to half year, example 16.5 years)?[4]

Q46 As best you can recall, how old was your MALE partner the first time you had voluntary (not forced) oral sex?[4]

Q47 Did you use a condom or dental dam (a thin latex sheet that covers the genitals during oral sex) the FIRST TIME you had voluntary (not forced) oral sex with a MALE partner?
o Yes
o No
o Unsure
o Exit survey
→ Skip To: End of Survey

Q48 As best you can recall, how old were you the first time you had voluntary (not forced) anal sex with a MALE partner (age closest to half year, example 16.5 years)?[4]

Q49 As best you can recall, how old was your MALE partner the first time you had voluntary (not forced) anal sex?[4]

Q50 Did you use a condom the FIRST TIME you had voluntary (not forced) anal sex with a MALE partner?
o Yes
o No
o Unsure
o Exit survey
→ Skip To: End of Survey

Q51 Indicate the number of FEMALE partners with which you have done the following during YOUR ENTIRE LIFETIME.[4]
_____ Given oral sex (mouth on private parts)
→ Number >0, go to Q52, Q53, and Q54
_____ Received oral sex
→ Number >0, go to Q52, Q53, and Q54
_____ Had sex as part of a non-committed relationship "friends with benefits"
_____ Had been given money, gifts, or favors in exchange for sexual activity
_____ Had sex in a "one-night stand"
_____ Had sexual intercourse after drinking alcohol
_____ Had sex while high on drugs (including marijuana and prescription narcotics)

Q52 As best you can recall, how old were you the first time you had voluntary (not forced) oral sex (mouth on private parts) with a FEMALE partner (age closet to half year, example 16.5 years)?[4]

Q53 As best you can recall, how old was your FEMALE partner the first time you had voluntary (not forced) oral sex?[4]

Q54 Did you use a dental dam (a thin latex sheet that covers the genitals during oral sex) the FIRST TIME you had voluntary (not forced) oral sex with a FEMALE partner?
o Yes
o No
o Unsure
o Exit survey
→ Skip To: End of Survey

Q55 How often do you use condoms when you have sex?[4]
o Never
o Sometimes
o Half of the time
o Most of the time
o Every time
o Exit survey
→ Skip To: End of Survey
Q56 How often do you use birth control other than condoms when you have sex?[4]
o Never
o Sometimes
o Half of the time
o Most of the time
o Every time
o Exit survey
→ Skip To: End of Survey
Q57 What type or types of birth control are you currently using or have previously used in YOUR ENTIRE LIFETIME? (check all that apply)[4]
□ Rhythm method -timing when I have sex according to where I am in my menstrual cycle
□ Pull out method-make sure the other person pulls out in time
□ Birth control pills
□ Sponge
□ Spermicides and/or creams or foams
□ Intrauterine device (example: IUD [Mirena], coil, loop
□ Monthly vaginal ring, "The Ring" (example: NuvaRing)
□ Diaphragm or cervical cap
□ Condoms
□ "The Shot" (example: Depo-Provera)
□ Implant under the skin (example: Norplant)
□ Contraceptive patch
□ "Morning after" pill
□ None
□ I don't remember or I am unsure
□ Other
Q58 Have you ever had VAGINAL intercourse without a condom?[4]
o Yes
→ Go to Q59
o No
→ Skip To: Q60
o Exit the survey
→ Skip To: End of Survey
Q59 Choose the option below that best applies to you regarding VAGINAL sex:[4]
o I never use a condom when I have vaginal sex
o I hardly ever use a condom when I have vaginal sex
o Sometimes I use a condom when I have vaginal sex, but not very often
o I use a condom about half of the time I have vaginal sex
o Almost every time I have vaginal sex I use a condom
Q60 Have you ever had ANAL intercourse without a condom?[4]
o Yes
→ Go to Q61
o No
→ Skip To: Q62
o Exit the survey
→ Skip To: End of Survey

Q61 Choose the option below that best applies to you regarding ANAL sex:[4]
o I never use a condom when I have anal sex
o I hardly ever use a condom when I have anal sex
o Sometimes I use a condom when I have anal sex, but not very often
o I use a condom about half of the time I have anal sex
o Almost every time I have anal sex I use a condom
Q62 Have you ever engaged in oral sex without a condom or dental dam (a thin latex sheet that covers the genitals during oral sex)?[4]
o Yes
→ Go to Q63
o No
→ Skip To: Q64
o Exit the survey
→ Skip To: End of Survey
Q63 Choose the option below that best applies to you regarding ORAL sex[4]:
o I never use a condom or dental dam when I have oral sex
o I hardly ever use a condom or dental dam when I have oral sex
o Sometimes I use a condom or dental dam when I have oral sex, but not very often
o I use a condom or dental dam about half of the time I have oral sex
o Almost every time I have oral sex I use a condom or dental dam
Q64 Have you ever had sex with multiple people at the same time (example: have you had sex with more than one male or female in the same sexual encounter?
o Yes
→ Go to Q65
o No
→ Skip To: Q66
o Exit the survey
→ Skip To: End of Survey
Q65 Did you use a condom or dental dam each and every time?
o Yes
o No
o Exit the survey
→ Skip To: End of Survey
Q66 Have you ever had oral, vaginal, or anal sex with an intravenous (IV) drug user?[4]
o Yes
→ Go to Q67
o No
→ Skip To: Q68
o Exit the survey
→ Skip To: End of Survey
Q67 Did you use a condom or dental dam each and every time?
o Yes
o No
o Exit the survey
→ Skip To: End of Survey
Q68 Have you ever had oral, vaginal, or anal sex with someone who is bisexual?[4]
o Yes
→ Go to Q69
o No
→ Skip To: Q70
o Exit the survey
→ Skip To: End of Survey
Q69 Did you use a condom or dental dam each and every time?
o Yes
o No

o Exit the survey
→ Skip To: End of Survey

Q70 Have you ever had oral, vaginal, or anal sex with a homosexual MALE?[4]

o Yes
→ Go to Q71

o No
→ Skip To: End of Survey

o Exit the survey
→ Skip To: End of Survey

Q71 Did you use a condom or dental dam each and every time?

o Yes
→ Go to: End of Survey

o No
→ Go to: End of Survey

o Exit the survey
→ Go to: End of Survey

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