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The Prevalence of Sexual Abstinence and Its Predictors in American University Students: A School-Based Cross-sectional Study

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ABSTRACT

Background & aim: Abstinence can be a healthy approach for adolescents to prevent risky sexual behaviors. Understanding the pattern of sexual behaviors and the related factors of sexual decision-making is essential for an effective educational program for college students. This study was performed to determine the prevalence of sexual abstinence and its associated factors among American university students.

Methods: In this study, 808 university students from different countries attending Central Michigan University (CMU) in the United States of America were recruited in 2018-2019. In this cross-sectional survey, the students were randomly selected and invited by email to participate in the study. A self-administered questionnaire extracted from World Health Organization (WHO) questionnaire on sexual health was used for data collection through Qualtrics software. Statistical analysis was done using IBM SPSS software.

Results: The mean age of the participants was 23.87±7.56 years. The prevalence of sexual abstinence was 14.9%. The prevalence of sexual abstinence was significantly different among females and males ($P<0.05$). Fears of pregnancy (37.5%) and HIV/AIDS or other sexually transmitted diseases (32.8%) were the common reasons for not having sex. Income was also significantly associated with sexual abstinence in university students ($P<0.01$).

Conclusion: Overall, the prevalence of sexual abstinence was low in American university students. Comprehensive sex education should be considered as precedence in this population, particularly among the younger university students.

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Introduction

Based on the definition of World Health Organization, sexual health is not merely the absence of disease or sexual problems. Still, it includes physical, mental, emotional, and social well-being concerning sexuality(1). Sexual health, as an essential part of public health, can affect health and quality of life(2). Due to the rising age of marriage, most young people initiate a premarital sexual relationship. In the U.S., the median interval between age of marriage and the first sexual relationship is reported as 8.7 and 11.7 years respectively (3). Sexual activity among never-married women in the United States has increased, and sexual abstinence decreased rapidly among women born in the late 1940s(4).

The prevalence of sexually transmitted infections (STIs) and the consequences of unwanted pregnancy in teenagers are the serious public health concerns and highlighted the potential risks of adolescent sexual activity worldwide(5). The majority of Americans initiate sexual activity before marriage in college, if not earlier (6) which predisposes them to sexually transmitted diseases, unwanted pregnancies, and unsafe abortions (5).

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Various approaches have been used to delay sexual activity and prevent high-risk sexual behaviors in young people. As a healthy choice for adolescents, abstinence can prevent HIV, other sexually transmitted infections, and unwanted pregnancies. Abstinence-only until marriage (AOUM) as a unique approach for adolescent sexual health was established in 1981(3, 7). However, there is a lack of consensus on the effectiveness of abstinence programs in reducing the risky sexual behaviors (8). Comprehensive sex education and Sexual Risk Avoidance Education (SRAE) are the better strategies to delay the initiation of sexual relationships and change sexual risk behaviors (3, 9).

The decision to delay the sexual relationship is formed by individual, family, and socio-cultural factors. Sexual avoidance and its role in preventing high-risk behaviors vary in different cultures, communities, and geographies (8).

Despite the high prevalence of risky behaviors in the university setting, exposure and vulnerability to risky sexual behavior due to many biological and social determinants(2), freedom of living away from home , and increased exposure to mixed-gender environments (10, 11), few studies have focused on sexual patterns and abstinence in this population (12). This study was performed with aim to determine the abstinence rate and establish the associated factors among American university students.

Materials and Methods

This cross-sectional survey was performed on the university students from different countries attending Central Michigan University (CMU) in the United States of America in 2018-2019. The protocol of the study was approved by the Ethics committee of the Institutional Review Board (IRB) at CMU (IRB: 1031916–4).

We extracted a sampling frame from the Registrar's office. A random sampling technique was used to send the email invitations to students in three phases and they were invited to participate in the study. If they agreed to participate in the study, an electronic questionnaire was sent to them. The inclusion criteria were registered students willing to participate in the study, and the exclusion criteria were reluctance to participate. The School of Health Sciences was not included in the sampling. Sample size (n=900) was calculated using the prevalence of 19%, expectant increase of 25%, 1.96 Z value, 5% of precision, power of 80% and 20% non-respondent rate(13, 14). A self-administered structured questionnaire was extracted from World Health Organization (WHO) questionnaire and was used for data collection (15). The World Health Organization illustrative questionnaire has been used many times in other countries and validated previously in several surveys (16-18). Missing data for each variable was in the range of 10% to 22%. The questionnaires were sent by Qualtrics online software.

STD/HIV knowledge score was estimated based on the information about the risk factors associated with having sex and the knowledge of how to practice safely using ten questions. A higher score on this scale indicates the higher level of knowledge. Due to its non-normal distribution as a continuous variable, knowledge was made dichotomous. Knowledge was divided into low and high, and the data was split around the median number of correct answers. Belief about the protection role of condoms and practice was measured with two and six true-false questions, respectively. Attitudes were assessed by the answer to the five questions with a choice of one of 3 answers (Agree=1, do not know/not sure=2, disagree=3). A higher score on this scale indicates a higher level of knowledge of condom use. A total score of sexual behavior (Sexuality, gender, and norms) was estimated by 23 questions with a choice of one of 3 answers (Agree=1, do not know/not sure=2, disagree=3). SPSS software (version 26.0) was used for statistical analysis. Descriptive and bivariate analyses were performed. The association between the independent variables and sexual abstinence was evaluated by logistic regression.

Results

Among those who were approached to participate in the study, 808 students accepted to participate in the study and completed the survey (participation rate was 32.3 %.). However, some of the questions related to sexual relationships were left empty. Majority of respondents were females (n =636, 68.8%). The mean age of the students was 23.87 ±7.56 years.

The majority were undergraduate (68.2%) and single (95.4%) (Table 1).

More than 460 (85.1%) of the university students had sexual intercourse in their life, while 81 (14.9%) didn't have. Of those who did not ever have sexual intercourse, 63 (77.8%) were female, and only 18 (22.2%) were male.

Table 1. Sociodemographic characteristics of students

Variables	N (%)
Gender	
Male	167 (18.1)
Female	636 (68.8)
Education	
Undergraduate	549 (68.2)
Graduate	256(31.8
Work	
Yes	520(68.8)
No	236(31.2)
Income	
$1000 or less	430 (66.7)
More than $1000	215 (33.3)
Are you a religious person?	
Yes	471(60.7)
No	305(39.3)
Relationship status	
Single	601(95.4)
No single	29(4.60) *
Total score of STD knowledge, Mean± SD	3.48±1.68
Total score of condom knowledge, Mean± SD	12.25±1.39
Total score of sexual attitudes, Mean± SD	42.46±3.66

*All of total frequency less than 808 are missing values due to the sensitivity of the main question

Table 2. Relationship between never having sex and sociodemographic characteristics, level of STD/HIV knowledge, level of condom knowledge and sexual attitude

Variables	Ever had sex + N (%)	Ever had sex– N (%)	P-Value
Gender			
Male	370(85.5)	18(16.4)	
Female	92(83.6)	63(14.5)	0.365
Education			
Undergraduate	148(94.3)	9(5.7)	0.001
Graduate	315(81.4)	72(18.6)	
Work			
Yes	309(88.8)	39(11.2)	0.124
No	151(84.8)	27(15.2)	
Income			
$1000 or less	264(85.7)	44(14.3)	0.001
More than $1000	125(94.7)	7(5.3)	
Are you a religious person?			
Yes	274(80.8)	57(17.2)	0.036
No	189(88.7)	24(11.3)	
Age Mean± SD	23.82±6.98	20.23±3.34	0.001
Total score of STD/HIV knowledge Mean± SD	4.22±1.69	3.68±1.24	0.001
Total score of condom knowledge, Mean± SD	12.26±1.39	11.89±1.69	0.437
Total score of sexual attitudes, Mean± SD	42.87±3.45	40.56±3.78	0.001

We assessed the relationship with the variable of "have you ever had sexual intercourse" with sociodemographic characteristics including gender, education, working for pay, income and found an association with income and education (p=0.001). There was also a significant relationship between age and having sex (age of those who never had sex was 20.23±3.35 versus those who did (23.82 ±6.98, Mann Whitney U test, P=0.001). Also, the level of STD/HIV knowledge and the score of sexual attitudes were statistically significantly lower in the students who never had sex than those with sex (P<0.001) (Table 2).

Table 3. The association between sex and socio-demographic characteristics using Logistic regression

Variables	Univariate			Multivariate		
	OR	CI	P-Value	OR	CI	P-Value
Gender	1.14	0.64-2.03	0.63	0.73	0.26-2.06	0.55
Education	0.26	0.13-0.54	0.01	0.44	0.15-1.30	0.14
Working for pay	0.70	0.41-1.19	0.19	1.55	0.55-4.32	0.40
Income	2.97	1.30-6.79	0.01	1.31	0.40-4.23	0.64
Are you a religious person?	1.63	0.98-2.73	0.05	0.90	0.34-2.38	0.90
Age Mean± SD	0.81	0.74-0.89	<0.001	0.98	0.90-1.06	0.62
Total score of STD/HIV knowledge	0.89	0.79-0.99	0.01	1.34	1.15-1.58	0.01
Total score of condom knowledge	0.81	0.69-0.94	0.01	0.61	0.42-0.88	0.01
Total score of sexual attitudes	0.83	0.76-0.90	<0.001	0.94	0.83-1.08	0.42

Univariate logistic regression analysis was conducted to estimate the association between sex and sociodemographic characteristics which was consistent with bivariate analysis (Table 3). Multivariate logistic regression showed that those with sexual activity were 34% more likely to have a higher score of knowledge related to STD/HIV (95%CI 1.15-1.58). However, such individuals were 39% less likely to know condom use (95%CI 0.42-0.88).

Are the reasons for not having sex different between females and males?

Reasons for not having sex were shown in Table 4. Fears of pregnancy and HIV/AIDS, or other sexually transmitted diseases were the common reasons for not having sex. . But fear of pregnancy was the first reason for sexual abstinence in the female college students (P<0.01).These reasons were then compared between males and females (Table 5). Females were more likely to note that they did not have the opportunity to have sex (70.2% in female versus 29.8%, in male P=0.007). More females thought that sex before marriage is wrong (93.9% of females versus 6.1% in males, P=0.05, Fisher test.

The feeling of not ready to have sex

This statement was associated with education (P=0.05). There were 23.3% of graduates than 76.7% of undergraduates who did not have sex as they felt not ready for it. There was also an association between the total score of sexual attitudes and feeling of not ready to have sex (Applies: 39.90±3.75 versus Not applies: 42.66±3.44, P=0.05). More than 10% of students with income more than $1000 per month noted that they feel not ready for sex (versus 89.7% with income of $1000 per month or less, P=0.02).

I have not had the opportunity

This variable was not associated with any socio-demographic characteristics, scores of knowledge, attitude, and sexually risky behaviors.

Sex before marriage is wrong

Only 3.0% of the students with no religion thought that sex before marriage is wrong compared to 97.0% of those who had one type of faith (P=0.001). There was an association between the total score of sexual attitudes and this item (Applies: 38.22±3.95 versus Not applies: 42.84±3.27, P=0.05).

I am afraid of getting pregnant

There was an association between salary per month, and afraid of geeting pregnant.. 79.3% of

students with $1000 or less noted that they are afraid of getting pregnant compared to those with salary greater than $1000 per month (20.7%, P=0.009).

Table 4. Frequency of reasons for having/not having sex, future plans

Variable	Frequency (%)
The feeling of not ready to have sex	
Applies	41(5.1)
Do not apply	331(84.7)
Don't know	19(4.9)
Have not had the opportunity	
Applies	47(12.0)
Do not apply	339(86.3)
Don't know	7(1.8)
sex before marriage is wrong	
Applies	33(8.4)
Do not apply	340(86.7)
Don't know	19(4.8)
Afraid of getting pregnant	
Applies	147(37.5)
Do not apply	227(57.9)
Don't know	18(4.6)
Afraid of getting HIV/AIDS or other STDs	
Applies	129(32.8)
Do not apply	245(62.3)
Don't know	19(4.8)
What are your plans for sexual intercourse?	
wait until marriage	24(6.5)
wait until I am engaged to be married	6(1.6)
wait until I find someone, I love	196(53.0)
have sexual intercourse when an opportunity comes along	144(38.9)
Any pressure from others to have a sexual relation?	
A great deal	29(22.7)
A little	97(75.8)
None	2(1.6)
Who pressure you to have sex? (Multiple choice was possible)	
Friends	84(10.4)
Relatives	7(0.9)
Work colleagues	9(1.1)
Partner	50(6.2)
Others	13(1.6)

Afraid of getting HIV/AIDS or other STDs

Those who earned $1000 and lower were more likely to be afraid of sex due to STDs (83.1%) than those who earned more than $1000 per month (16.9%) P=0.003). We assessed the association between the total score of knowledge on STD and fear of getting HIV among those who did not have sex and those who did. The mean total score of knowledge was 4.79±1.67 in those who responded positively to the statement, compared to those who had sex (4.00±1.62) (P=0.001).

Discussion

Overally, the prevalence of sexual abstinence was low among the university students. Sexual abstinence as a strategy to prevent the risky sexual behavior has been recommended and resulted in successes, especially in African countries (3, 8). Although the prevalence of sexual abstinence varies in different countries with different socio-cultural contexts, there is a typical pattern leading to a dramatic decline in the prevalence of sexual abstinence.

Table 5. Main reasons for not engaging in sexual relationship by gender

		Female 314(80.5)	Male 76(19.5)	P-value
1	**The feeling of not ready to have sex**			
	Applies	36(87.8)	5(12.2)	
	Do not apply	264(80.0)	66(20.0)	0.366
	Don't know	14(73.7)	5(26.3)	
2	**I have not had the opportunity***			
	Applies	33(70.2)	14(29.8)	
	Do not apply	278(82.2)	60(17.8)	0.007
	Don't know	3(42.9)	4(57.1)	
3	**Sex before marriage is wrong**			
	Applies	31(93.9)	2(6.1)	
	Do not apply	268(79.1)	71(20.9)	0.050
	Don't know	14(73.7)	5(26.3)	
4	**afraid of getting pregnant**			
	Applies	132(90.4)	14(9.6)	
	Do not apply	170(74.9)	57(25.1)	0.001
	Don't know	12(66.7)	6(33.3)	
5	**afraid of getting HIV/AIDS or other STDs**			
	Applies	113(88.3)	15(11.7)	
	Do not apply	191(78.0)	54(22.0)	0.002
	Don't know	11(57.9)	8(42.1)	
6	**What are your plans for a sexual relations?**			
	I plan to wait until marriage	22(91.7)	2(8.3)	
	I plan to wait until I am engaged to be married	3(50.0)	3(50.0)	0.001
	I plan to wait until I find someone, I love	172(87.7)	24(12.2)	
	I plan to have sexual intercourse when an opportunity comes along	101(70.6)	42(29.4)	
7	**Any pressure from others to have sexual intercourse?**			
	A great deal	98(77.8)	28(22.2)	0.279
	A little/None	317(80.7)	76(19.3)	

This high rate of sexual activity increases the risk of unwanted pregnancy, STIs, and adverse reproductive health outcomes in this young population (19, 20). Among developed countries, U.S. youth has the highest rate of sexually transmitted disease, and each year ten million new cases of sexually transmitted infections are detected among college-aged youth (21).

Wu et al. (2020) evaluated the trend of sexual abstinence in the United States women who were born between 1938 to 1983. The abstinence rate was 48-50% in women born in the late 1930s and early 1940s. This rate decreased to 9-12% in women born between the late 1940s and the early 1960s. One per nine never-married women who were born between the mid-1960s and the early 1980s have abstained. Alhassan and Dodoo (2020) reported sexual abstinence in one-fifth of 235 never-married youth aged 20-24 years in poor urban Accra, Ghana (22). Similar to the finding of the present study, 76.7% of Portuguese college students, reported by Santos et al., were sexually active (2016) (2).

Based on the findings of the present study, among the students who never had sex, only 22% were males. Also, significant differences were seen in the reasons of sexual abstinence between males and females. This pattern was similar to that reported by other countries. Gender-based differences in the rate of abstaining sex and the primary reasons for sexual abstinence were reported previously. Kabiru and colleagues (2007) showed that female African youths have two times more desire to wait until marriage to initiate a sexual relationship. Also, fear of pregnancy was reported four times more in females than males for abstaining sex (23). Conversely, in Ghana, the prevalence of sexual abstinence is lower in girls than in boys (22% versus 26%) Due to financial problems in young girls (22).

In the present study, never having sex was significantly associated with age, STD/HIV knowledge, and condom knowledge. In line with the results of the current study, Oladepo et al. (2011) reported a higher rate of premarital sexual abstinence in younger Nigerian adolescence (24).

The study in sub-Saharan African countries showed more prevalent absenting sex in younger adolescents (23). Reduced parental control, influences of peers and media, and development of secondary sexual characteristics were reported as the potential causes of higher sexual relations in older adolescence (25-27). In four sub-Saharan African countries, abstainers were significantly younger than sexually active adolescents. Pre-puberty-based abstinence interventions in young girls and boys whose sexual identity is still evolving can be more effective than older ages (23).

Higher knowledge about STD/HIV and condom use can change individuals' attitudes from traditional beliefs to logical thinking and will lead to healthier sex. On the other hand, perhaps, little knowledge leads to the false power to handle sexual behavior with confidence and reduces fear of pregnancy and HIV/AIDS; two important reasons for sexual abstinence in adolescents noted in the literature (12, 28).

Three common motivations to avoid sex in this study were fears of pregnancy, HIV/AIDS, or other sexually transmitted infections, followed by not having the opportunity. A qualitative research by Long-Middleton et al. (2012) showed that readiness, fear, beliefs and values, partner worthiness, and lack of opportunity are the main reasons for sexual abstinence in young women (12). Patrick et al. stated that the values (Moral or ethical objections and religious belief), health (avoiding pregnancy and disease), and not being ready for sex (emotional readiness) were three motivations to avoid sex in adolescences (29).

In the present study, great pressure from others, particularly from friends, to have sexual intercourse was reported in male and female college students. Delay in the first relationship in adolescence with friends who believe in postponing a sexual relationship has already been reported (30, 31). Wana (2019) reported that peer pressure is the essential factor associated with high-risk sexual behavior among Ethiopian school adolescents (32). Kreager and Staff (2009) also reported that more significant numbers of sexual partners positively correlate with men's peer acceptance and negatively correlate with females' peer acceptance (33).

The present study has revealed that lower income has a significant association with not being ready for a sexual relationship, being afraid of pregnancy, and HIV infection, although this pattern was opposite of what was reported in low-income countries (34).

This study had some limitations. Self-reporting sexual behaviors may be a source of bias and lead to over-or underreport by the students who would like to boost or hide their sexual activities, which was also reported as a limitation in the studies of others (35, 36). Also, we focused on vaginal sex and intercourse. Other sexual relationships may have different patterns. The strength of this study was a relatively large sample size. Moreover, the anonymous nature of the research and using an online method to collect information could increase the validity of the results.

Conclusion

Despite the critical role of sexual relations in human development, the high rate of sexual activity, especially in male university students, leads to higher risk of unwanted pregnancy and sexually transmitted diseases. University students should be educated about the healthy activities, and the interventions are needed to improve students' sexual behavior. To understand the reasons behind sexual abstinence, we should learn the mechanism by which decisions are made surrounding sexual activity and plan accordingly to promote adolescent health.

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Conflicts of interest

Authors declared no conflicts of interest.

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