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Sexual risk behavior and knowledge about sexually transmitted infections in a university population in Sorocaba, Brazil

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ABSTRACT

Introduction: Sexually transmitted infections (STIs) are a major public health problem to which young people are highly exposed and knowledge about vulnerabilities that affect them is needed. **Objective:** To evaluate the knowledge about STIs and sexual behavior of a university population in the city of Sorocaba/SP. **Methods:** A descriptive, cross-sectional study was conducted with data collection realized by an online application with qualitative and quantitative characteristics. **Results:** Four hundred and seventy-seven (477) university students from different areas of knowledge were analyzed. The majority pointed to the beginning of sexual life between 15 and 18 years old. Information about sex education was obtained mainly through parents and/or guardians, while little additional knowledge was obtained after entering higher education. Biological and Health Sciences students achieved a higher score on the knowledge questionnaire and were less likely (0.391) to contract STIs when compared to Applied Social Sciences or Engineering students (2.8 and 2.9 more likely, respectively). **Conclusion:** Students who demonstrated greater knowledge about STIs and acquired more information on the subject during graduation were less likely to become infected, suggesting that campaigns aimed at the university public are essential for the prevention and control of these pathogens.

Keywords: Sexually transmitted diseases; health risk behavior; health vulnerability; universities.

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INTRODUCTION

Sexually transmitted infections (STIs) are a major public health problem. Their incidence can be measured by estimates made by the World Health Organization (WHO), which point to 218 million new cases of syphilis, chlamydia, or gonorrhea, plus 1.5 million new people infected with the human immunodeficiency virus (HIV) in 2020 and 3 million new cases of hepatitis B and C in 2019[1]. Furthermore, data from 2020 shows that around 604,127 new cases of cervical cancer are diagnosed each year worldwide,

69.4 percent of which are related to HPV[2]. In Brazil, Ministry of Health data from 2020 points to approximately 3,275,590 new cases of HIV and hepatitis B and C, an acquired immunodeficiency syndrome (AIDS), and syphilis[3-5]. Among the different STIs, some are silent, which facilitates their spread and promotes high morbidity and mortality rates. In this category, the infections stand out, as they are transmitted sexually. Therefore, sexual health education measures are essential for controlling the infection of new individuals.

University students are particularly vulnerable to STIs. Studies related to health education show that their knowledge of the subject is low, and most are unaware of the main symptoms, as well as the forms of transmission and prevention[6]. In this context, a study conducted with university students in Rio de Janeiro showed that their knowledge of STIs was below average[7]. A survey of university students in Campinas found that 81 percent had doubts about the subject[8]. For all the STIs mentioned, condoms remain the most effective method of prevention, if they are used correctly and constantly. However, studies show that there is low adherence to this form of prevention among the public. According to a study carried out by Spindola et al.[9], 62.84 percent of participants reported not using condoms in all sexual relations.

It is therefore clear that university students are vulnerable to the situations to which they are exposed. It is therefore imperative to know the risk behaviors and knowledge of this population on the subject so that health education measures can be designed and applied to this group.

METHODS

This research consists of a descriptive, cross-sectional study, with data collected through the online application of a questionnaire with qualitative and quantitative characteristics. The instruments were adapted from published studies to characterize sexual behavior and knowledge about STIs. To determine sexual behavior, the questionnaire was adapted from the study *Comportamento sexual de universitários da área da saúde em uma Universidade do Rio Grande do Sul*, by Boff and Jucá[10], and to identify knowledge on the subject, the questionnaire from the article *Adaptação transcultural do Questionário sobre Conhecimento de Doenças Sexualmente Transmissíveis para o português brasileiro*, by Teixeira et al, was adapted[11].

The data collection instrument was made available to all 6,790 students at the higher education institution (HEI) via registered email. A total of 477 students from different areas of knowledge took part in the survey. The questionnaires were applied online, due to their practicality, anonymity, and subsequent ease of analyzing the results, as approved by the Higher Education Institution's Human Research Ethics Committee, under no. 4,032,951. Everyone was briefed on the study's objectives and informed of the anonymity and confidentiality of the research, so they agreed to take part by signing up on the website created exclusively for the research. After collection, the database was completely deleted from the server and the data was only stored by one of the researchers.

The inclusion criteria were students enrolled at the HEI who agreed to participate in the study after reading the Free and Informed Consent Form. Students under the age of 18 and/or those who had not completed the questionnaires provided were excluded.

Statistical analyses were carried out using GraphPad Prism 7 software. The normal distribution of quantitative variables was checked using the Shapiro-Wilk test. Variables with a non-normal distribution were expressed as medians and analyzed using the Mann-Whitney test to compare two independent groups and the Kruskal-Wallis test followed by Dunn's post-test to compare three or more groups. Parameters grouped in a 2x2 distribution were analyzed using Fisher's exact test to determine odds ratios and their respective confidence intervals. The results were considered statistically significant when $p<0.05$.

RESULTS

Of the 477 participants, 41.5% belonged to the area of Biological Sciences; 19.1%, to Science in Human Culture; 14%, to Social Sciences; 9,4%, to Engineering; 5.7%, to Linguistics, Art Theory And Practice; 4%, to Technological Courses; 3,4%, to Applied Mathematics And Earth And Planetary Sciences; and 2,9%, to Environmental Sciences. Of these, 82% said they identified as cisgender; 10.3% couldn't answer; 4.4% chose the "other" option; 0.8% as transgender; and 0.6% as non-binary. As for sexual orientation, 71.7% said they were heterosexual; 17.4%, bisexual; 6.7%, homosexual; 1.9%, pansexual; and 1.3% didn't know how to answer. Regarding marital status, 77.8% defined themselves as single and 21.2% were in a stable relationship or had been in one (married, divorced, living with a partner, etc.) (Table 1).

36.3% of students obtained their knowledge/information about sex education before entering the HEI from their parents or guardians. Students also acquired this information from school (30.6%), the internet (19.3%), and friends (6.5%). It is worth noting that 6.5% of the answers indicated "other", indicating that the information was provided by health professionals, parents, and/or school, while 0.8% said they had never had access to this type of information. In addition, 57.2% of the students answered that they had not received any additional information on the subject after entering the HEI, while 17% had received information in the regular or formal curriculum, and 24.5% had received this information informally (Table 1).

When analyzing the data on sexual behavior, we found that the age of first sexual intercourse ranged from 9 to 27 years old,

Table 1: Stratification by undergraduate course area, gender, sexual orientation, marital status, and access to information on sex education before and after entering the higher education institution Sorocaba, Brazil, 2021 (n=477).

Variables	f	%	Variables	f	%
Area			**Marital status**		
Biological Sciences	198	41.5	Single	371	77.8
Science In Human Culture	91	19.1	Married	48	10.1
Social Sciences	67	14	Living with a partner	27	5.7
Engineering	45	9.4	Stable union	20	4.2
Linguistics, Art Theory and Practice	27	5.7	Divorced	4	1
Technological Courses	19	4	Preferred not to answer	5	0.6
Applied Mathematics and Earth and Planetary Sciences	16	3.4	Widowed	1	0.2
Environmental Sciences	14	2.9			
Gender			**Information about education before joining the HEI***		
Cisgender	391	82	Parents or guardians	173	36.3
Could not answer	49	10.3	School	146	30.6
Other	21	4.4	Internet	92	19.3
Preferred not to answer	9	1.9	Friends	31	6.5
Transgender	4	0.8	Other (health professionals, country and/or school)	31	6.5
Non-binary	3	0.6	No information	4	0.8
Sexual orientation			**Information on education after joining the HEI***		
Heterosexual	342	71.7	No information received	273	57.2
Bisexual	83	17.4	Informally	117	24.5
Homosexual	32	6.7	Through the regular or formal curriculum	81	17
Pansexual	9	1.9	Preferred not to answer	6	1.3
Couldn't answer	6	1.3			
Preferred not to answer	3	0.6			
Other	1	0.2			

**Higher education institution*

with the majority being between 15 and 18 years old (72.9%). According to the reports, the first sexual intercourse occurred with a boyfriend or girlfriend (63.5%), followed by a friend (15.7%), acquaintance (14.5%), stranger (3%) and family member (0.5%) (Table 2).

About contraceptive care, 37.9% of the students reported using a male condom; 31.4%, hormonal contraceptives; 15.9% do not use any; 9.4% use another method; and 3.5% answered that they opt for a female condom, interrupted intercourse, oral or anal sex. About the use of condoms during sexual intercourse, 49.9% reported always using the male condom; 20.5% used the male condom occasionally; 18.7% used neither; 4% always used one of the two condoms; and only one participant reported continuous use of the female condom. Regarding the use of the morning-after pill, 49.7% have never used it; 27.7% have used it at least once; and 21.4% always use it. Regarding obtaining contraceptive methods, 79.2% bought them from pharmacies; 12.8% did not use any type of contraceptive; 3.8% used another type of method; and 2.5% received them from health services (Table 2).

Regarding the use of drugs as a stimulus to engage in a sexual relationship, 64.6% had never done so; 30.4% said they had already used alcohol; and 4.6% claimed to use another stimulus, such as tetrahydrocannabinol - *Cannabis sativa* subspecies *sativa* ("marijuana") - 3.4- methylenedioxymethamphetamine (MDMA or "ecstasy") and lysergic acid diethylamide (LSD). The main reasons why participants have or have had sex were passion (45.9%), attraction without love (20.1%), other (12.2%), vanity (3.8%) self-affirmation (3.6%), and 11.7% described not engaging in sex. The results showed that 84.9% of the students had never contracted an STI or had not been diagnosed and that 14.3% had already contracted some kind of infection. According to the students, the greatest motivators for practicing safe sex would be conversation circles (26%), condom distribution (16.1%), medical advice (15.3%), lectures (13.8%), psychological counseling (13%), leaflets (2.5%) and courses (1.5%), while 11.7% pointed out that several of the options together would be important (Table 2).

As for the level of knowledge about STIs, most of the questions were answered correctly. Questions with a general intuitive consensus were answered correctly by most of the students (e.g. "the

Table 2: Responses of the university population on sexual behavior obtained through the questionnaire. Sorocaba, Brazil, 2021 (n=477).

Variables	f	%	Variables	f	%	Variables	f	%
Age at first intercourse (N = 400)*			**Use of condoms**			**The main reason why you have or have had sex**		
17 years old	92	23	Always use the masculine	238	50	Love	219	46
16 years old	78	19.5	Occasional use of the masculine	98	20	Attraction, without love	96	20
15 years old	70	17.5	Do not use any	89	19	Other	58	12
18 years old	64	16	Preferred not to answer	32	6	Do not engage in sexual relations	56	12
14 years old	36	9	Always use some	19	4	Vanity	18	4
19 years old	27	6.8	Always use the feminine	1	0.2	Self-affirmation	17	3
21 years old	13	3.3				Preferred not to answer	13	3
20 years old	10	2.5						
22 years old	10	2.5						
With whom the first relationship took place (N = 417)**			**Use of the morning-after pill (emergency pill)**			**Sexually transmitted infections**		
Boyfriend/girlfriend	271	65	Never used	237	50	Never contracted	410	85
Friend	67	16.1	Used once	132	28	Already contracted	63	14
Acquainted	62	14.9	Always use	102	21	Preferred not to answer	4	1
Strange	13	3.1	Preferred not to answer	6	1			
Preferred not to answer	2	0.5	**Obtaining contraceptive methods**			**Motivators for practicing safe sex**		
Family	2	0.5	Pharmacy	378	79	Conversation circles	124	26
The main method of contraception			Don't use any method	61	13	Distribution of condoms	77	16
Male condom	181	38	Other	18	4	Medical advice	73	15
Hormonal contraceptive	150	31	Health services	12	3	Lectures	66	14
None	76	16	Preferred not to answer	8	2	Psychological counseling	62	13
Another method	45	9	**Use of drugs as a stimulus**			Other (more than one)	56	12
Interrupted intercourse	10	2	Never used	308	65	Flyers	12	3
Preferred not to answer	8	2	Alcohol	145	30	Courses	7	1
Female condom	5	1	Other	22	5			

** Only ages with more than 10 answers are considered.*
***Number of university students who have engaged in sexual activity. Fifty-three (53) students have not engaged in sexual relations; for this reason, they were not counted, and seven (7) preferred not to answer if they had already engaged.*

same virus causes all STIs", with 80.9% correct), but less common questions, which require a certain level of technical knowledge, were answered with a considerable amount of uncertainty (e.g. "having anal sex increases the risk of a person getting hepatitis B", with 53% of uncertain answers). Although the number of correct answers was considerably high, we can see that around 30% of the public evaluated did not know the subject (Table 3).

Non-parametric Mann-Whitney and Kruskal-Wallis tests followed by Dunn's post-tests were carried out to compare the median scores obtained by each participant on the sexual knowledge questionnaire. The comparisons were made by grouping the participants' scores by area of study at the HEI, marital status, how information on sex education was obtained after entering the HEI, previous engagement in sexual relations, and previous development of STIs. Among the median scores grouped by area of study, the median score for individuals from the Biological and Health Sciences is significantly higher (15), compared to the median scores for individuals from the Humanities, Social and Applied Sciences and Linguistics, Literature and Arts (12, 12 and 11, respectively) (Figure 1A). Similarly, obtaining information after entering the HEI also results in significantly higher median scores, both for the information present in the regular or formal curriculum (15) and for that obtained informally (14), compared to the median scores of participants who did not receive any additional information (12) (Figure 1B). The median scores obtained by students who had already had sexual intercourse (14) were significantly higher than those who had never had sexual intercourse (12) (Figure 1C). The median scores grouped by marital status or previous sexually transmitted infection were not significantly different (Figures 1D and 1E).

After checking which conditions resulted in significant differences in knowledge about STIs, by comparing the median

Table 3: Stratification of the level of knowledge about sexually transmitted infections among university students, according to the answers provided in the questionnaire. Sorocaba, Brazil, 2021 (n=477).

Question	*Hits* (%)	Errors (%)	Uncertainties (%)
Genital herpes and Human Papillomavirus (HPV) are caused by the same virus as AIDS.	68	10	22
Frequent urinary infections are caused by chlamydia.	32	26	42
There is treatment for gonorrhea and chlamydia.	88	2	10
It is easier to catch HIV if a person also has another Sexually Transmitted Infection (STI).	42	31	26
Having anal sex increases a person's risk of catching hepatitis B.	27	20	53
Soon after catching HIV, the person develops open sores on the genitals.	59	14	27
A woman with genital herpes can pass the infection on to her baby during childbirth.	63	8	29
A person can look at their body and tell if they have an STI.	54	32	14
The same virus causes all STIs.	81	3	16
HPV can cause genital warts and cancer.	76	4	20
A man can only get genital warts by having vaginal sex.	77	5	18
STIs can lead to health problems, which are generally more serious in men than in women.	45	14	41
If a person tests positive for HIV, that test can tell you how ill a person will become.	73	7	20
There is a vaccine for gonorrhea and chlamydia.	56	6	38
A person with genital herpes must have open sores to pass the infection on to their sexual partner.	50	28	22
If a person has had gonorrhea in the past, they are immune and cannot catch it again.	67	3	29
The human papillomavirus (HPV) can cause HIV.	47	18	35
A man can avoid getting genital warts by washing his genitals after sex.	56	16	28
There is a vaccine for hepatitis B.	67	9	23
Even if your partner doesn't have any lesions on their penis, anus, or vagina, they can pass syphilis on to you.	80	3	17
Syphilis can remain hidden in the body for years.	76	4	20

Modified from *Questionário sobre Conhecimento de Doenças Sexualmente Transmissíveis para o Português Brasileiro*.[11]

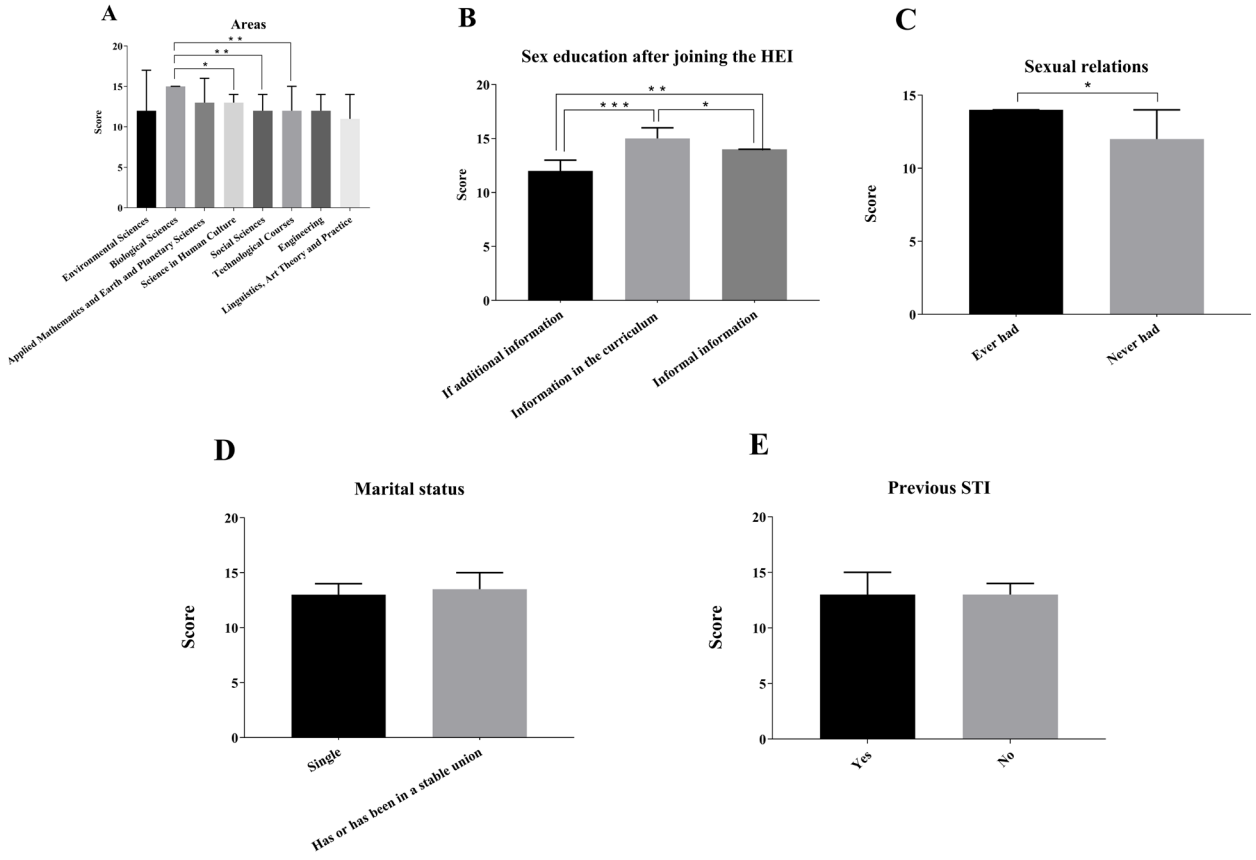
scores obtained by the participants, Fisher's exact tests were carried out to check whether the conditions corresponding to the different levels of knowledge could correlate with different incidences of previous STI development or not. To this end, the independent variable was "previous development of STIs" and the dependent variables were all the different areas of knowledge studied by the students, as well as how they obtained information on sex education after entering the HEI. The results indicate that university students studying Biological and Health Sciences have lower odds (0.391) of having already contracted an STI when compared to individuals from other areas. On the other hand, participants studying Applied Social Sciences or Engineering have higher odds (approximately 2.8 and 2.9, respectively) of having already contracted an STI, compared to individuals from other areas. In addition, students who received information about STIs after entering the HEI, regardless of the source, have lower odds (0.313) of having already contracted an STI, when compared to individuals who did not receive additional information. The odds ratios for the other associations were not accompanied by a p-value of less than 0.05 (Table 4).

DISCUSSION

The results obtained in this study made it possible to profile the population of an HEI in the Sorocaba/SP region in terms of sexual orientation, marital status, contraceptive methods, and age at first sexual intercourse. Our findings are in line with data obtained in other studies[12,13], providing useful information for understanding how knowledge about STIs can influence exposure and contamination among this population.

STI prevention is strongly linked to how the individual acquires knowledge about the subject[14]. Most of the students reported that they had been given guidance on sex education by their parents or guardians and/or at school, in agreement with the study carried out by Boff and Jucá[10]. However, a portion of the participants obtained their knowledge via the internet or friends, which can lead to poor quality information, since these sources can misinform and disseminate false information[15]. However, this fact shows that dialog between guardians and children is still very taboo, as reported in the study by Teixeira et al.[16], in which only 28% of participants reported living in a family that was open to talking about sex education. Another point to consider is the onset of sexual life in adolescence reported in this and other studies, which show the

Figure 1: Scores obtained in the questionnaire on knowledge about sexually transmitted infections (STIs).



Differences between the medians considering the stratifications described in the headings of (A), (B), (C), (D) and (E). *p value ≤ 0.05. **p value ≤ 0.01. ***p value ≤ 0.001. HEI: Higher Education Institution.

importance of sex education in this age group, whether at school, at the HEI, or within the family environment10,17. A study reported that obtaining information from friends is not associated with a positive variation in the level of knowledge, attitudes, and practices (KAP) scale[18] (*Conhecimentos, Atitudes e Práticas* - CAP); however, when this information is obtained from parents, teachers or health professionals, the levels are higher, regardless of gender, age, income or schooling[18].

Another relevant point was that 57.2% of the participants did not receive any information on sex education after entering the HEI, including health students, only 17% of whom received this information in the regular or formal curriculum[19]. A study by Castro et al.[8] showed that the knowledge of undergraduates and freshmen about sexuality was similar, possibly suggesting that they had not acquired any other information during their undergraduate studies. However, a study carried out at an HEI in Italy concluded that the level of knowledge of Biological Sciences students is higher when compared to other students[13]. Universities should therefore promote and intensify health extension activities for young people, addressing issues that promote sex education, so that their students obtain information from reliable sources and are made aware of the seriousness of this problem[20].

Vulnerability is described as the degree of susceptibility or risk that an individual or a population is exposed to[21]; it expresses the chances of getting sick or not, as well as how to deal with it[22]. Vulnerability is linked to a set of collective practices arranged in individual, programmatic, and social dimensions[22,23]. The individual dimension involves knowledge and risk behaviors that increase the chances of infection. In this sense, university students display a series of risk behaviors in this phase of relative freedom, with, for example, multiple partners, unprotected sexual relations, alcohol and/or illicit drug use, factors which, together, can facilitate the spread of STIs[6]. The programmatic dimension is characterized by access to health services and the way they are organized, the patient's relationship with the professional in the area, the preventive actions taken, the control of the condition, and the social resources exercised by the health service. Finally, the social dimension includes the social issue of illness, using indicators to identify the profile of a region's population in terms of access to information and spending on social and health services; this dimension includes the life cycle, mobility, and social identity[21].

It is known that low awareness and the adoption of various risk behaviors increase young people's vulnerability to STIs[18].

Table 4: Fisher's exact tests stratified by course area, whether additional information on sex education was obtained after entering the HEI, and how the information was obtained, according to university students' responses. Sorocaba, 2021 (variable n)*.

Dependent variable	No. of individuals (f)	%	Independent variable		Fisher's Exact		
			Have you ever contracted an STI?	Never contracted an STI	*p-value*	Odds-ratio	Confidence interval
Environmental Sciences	14	3.1	1	13	>0.999	1.041	[0.94; 5.96]
Other areas	436	96.9	30	406			
Biological Sciences	186	41.3	7	179	**0.036**	**0.391**	[0.15; 0.88]
Other areas	264	58.7	24	240			
Applied Mathematics and Earth and Planetary Sciences	16	3.6	0	16	0.616	0	[0.31; ∞]
Other areas	434	96.4	31	403			
Science In Human Culture	85	18.9	6	79	>0.999	1.033	[0.43; 2.54]
Other areas	365	81.1	25	340			
Social Sciences	61	61	9	52	**0.024**	**2.877**	[1.20; 6.46]
Other areas	389	86.4	22	367			
Technological Courses	16	3.6	0	16	0.616	0	[0.31; ∞]
Other areas	434	96.4	31	403			
Engineering	45	10	7	38	**0.025**	**2.924**	[1.11; 7.3]
Other areas	405	90	24	381			
Linguistics, Art Theory and Practice	27	6	1	26	>0.999	0.503	[0.04; 2.92]
Other areas	423	94	30	393			
Received information on sex education after entering HEI in the regular or formal curriculum	75	40.5	4	71	0.224	3.042	[0.68; 16.23]
Informally received information on sex education after entering HEI	110	59.5	2	108			
Received information on sex education after entering HEI	185	41.7	6	179	**0.008**	**0.313**	[0.13; 0.75]
Did not receive information on sex education after entering HEI	259	58.3	15	234			

**The absolute number of university students analyzed in Fisher's test depends on the variable used.*
HEI: Higher Education Institution.
p-values considered significant when ≤ 0.05.

One study analyzed the vulnerability of university students, showing that, in the individual dimension, students' knowledge of prevention is low and condom use is not as intense as it should be, as well as having a low perception of risk. In the social dimension, there was an inconsistency between schooling, the knowledge reported by the participants, and the practice of safe sex, since even with access to education and the media, knowledge was insufficient to adopt preventive behaviors and there was low access to free condoms, which led to the conclusion that there was some kind of difficulty in obtaining condoms. Finally, in the programmatic dimension, difficulty in accessing testing and counseling centers was reported, and the HEI did not prove to be a facilitator for obtaining information about prevention, because of the lack of programs for this population[24]. A similar vulnerability was also seen in studies carried out in Rio de Janeiro[25], Ethiopia[26], Colombia[27,] and Italy[28].

About the use of contraceptives, we found that 49.1% of students have used or always used the morning-after pill. These results are like those reported in a study conducted at an HEI in Rio Grande do Sul, Brazil, where 51% had already used the morning-after pill or emergency contraception[10]. Emergency contraception (EC) is recommended in cases of sexual abuse, known, or presumed contraceptive failure, or inadequate use of the contraceptive. The main problem with routine use of EC is the lack of condom use and the increased chance of STI transmission[29]. In this survey, the continuous use of condoms was reported by 49.9% of the students, like the results reported in a survey carried out at an HEI in Pará, where 39% reported continuous use[16].

The use of licit or illicit drugs has modulating effects on sexual behavior, making individuals more susceptible to unprotected sex, which increases the risk of infection by a sexually

transmitted pathogen[30]. Research carried out at four HEIs in the United States showed that one in four students had used alcohol before getting involved with someone[31]. Another study carried out at a university in Pelotas reported that 23.5% of students had used alcohol, illicit drugs, or both during their last sexual relationship[32]. In the present study, the use of licit and illicit drugs as a stimulus to engage in sexual intercourse was reported by 35% of the students.

14.3% of our audience said they had already acquired an STI, unlike the study carried out by Spindola et al.[9], in which 5.35% of the 768 participants reported having already contracted an STI. As far as knowledge on the subject is concerned, we found that the students are aware of it, especially on issues that don't require much theoretical knowledge. For example, most of the interviewees answered correctly about the fact that there is treatment for gonorrhea and chlamydia (87.6%) and that the same virus doesn't cause all STIs (80.9%), something that was found in the study by Orlandi et al.[12], in which the participants had a general knowledge of most of the questions. The question about whether a person with HIV would be more susceptible to contracting another STI obtained close percentages in the three available alternatives: 42.1% in "true", 31.4% in "false" and 26.4% in "don't know", which shows that, even though HIV is being covered more, there is still a large information deficit. These findings agree with the study carried out by Castro et al.[8], in which 73.7% of senior students did not know whether an STI carrier has a higher chance of contracting HIV. This phenomenon of students' lack of information was also seen in a survey carried out at an HEI only with students not related to Biological Sciences and Health, in which 83.2% had no knowledge of HPV and the notion that this virus is a risk factor for cervical cancer (76.1%)[33].

About whether they had any STIs, it can be analyzed that participants who had already contracted an infection did not obtain a higher score in the knowledge questionnaire when compared to those who had never contracted one, which indicates that, even with the infection, the subject was not discussed and/or did not arouse the individual's interest in acquiring more knowledge. This data differs from that reported in another study, in which students who had already contracted an STI had more knowledge about the infection[34]. Furthermore, the analysis of our results suggests that marital status does not influence the score obtained in the knowledge questionnaire, diverging from the research by Fonte et al.[35], in which it was reported that married students had greater knowledge when compared to single students.

An important fact highlighted in our study was the fact that students from the Biological and Health Sciences courses achieved a higher score in the knowledge questionnaire, possibly because the subject was covered during their undergraduate studies. This result is like that observed in a study carried out in Rio de Janeiro, in which students from the health area had 10% more knowledge[35].

Students from the Humanities, Social and Applied Sciences and Linguistics, Literature, and Arts courses achieved a lower score, as the majority reported that they did not receive more information after joining the HEI or obtained it informally, which agrees with another study[36]. Students from Engineering and Applied Social Sciences have a higher chance of contracting some type of STI, which may be related to the little information they receive during their undergraduate studies. This hypothesis is supported by the greater likelihood of individuals who did not receive more information after entering the HEI contracting an STI, when compared to students who received more information, regardless of the form. In a study carried out by Abdalla et al.[37], it was found that students who knew about HPV and its prevention were less likely to develop penile cancer. Therefore, studies like this are extremely important to map the level of knowledge of university students, so that personalized corrective measures can be developed and applied in the various areas in which these students are inserted.

According to the students, conversation circles would help to encourage the practice of safe sex, as would lectures and medical and psychological guidance. These interventions can help reduce risk behaviors, a fact confirmed in other studies, which point to a preventive effect after multidisciplinary actions aimed at sex education, which support students with information and guidance on the social, psychological, and biological impacts that STIs can cause. In addition, educational institutions are great places to implement programs that address the issue, as they have vulnerable populations that lack guidance[4,38].

Limitations of the study

One of the limitations was the lack of questions for students who have not yet started sexual activities so that we could assess their level of knowledge and perception of risk. In addition, the topic of vaccination against HPV and hepatitis B in unexposed individuals, which is an important way of preventing these infections, was not addressed.

Conclusion

The results of this and other studies show that although university students have partial knowledge of STIs, there are still several gaps and vulnerabilities. An important point identified was the fact that students who have had contact with information related to sex education are less likely to contract STIs when compared to those who have not had more information during their undergraduate studies. It is therefore essential that specific campaigns are developed and applied within the various environments in which they work, providing essential knowledge for the prevention and control of STIs in this population.

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