

Original Article

Knowledge of sexually transmitted infections among health sciences students and teachers in southeastern Brazil

Diego P Scotini¹, Pedro HC Tomazelli², Michael S Miranda¹, Luiz G Elisei³, Ehideé IG La-Rotta⁴, Leonardo A dos Reis⁵, Policardo G da Silva¹

¹ State University of Minas Gerais, Passos, Brazil

² Centro Universitário Aparício de Carvalho, Porto Velho, Brazil

³ Atenas College, Passos, Brazil

⁴ Federal University of Latin American Integration, Foz do Iguaçu, Brazil

⁵ Federal University of Alfenas, Alfenas, Brazil

Abstract

Introduction: A cross-sectional study on the knowledge of sexually transmitted infections (STIs) was conducted. The objective was to assess the knowledge of STIs among health sciences students and teachers in a city in the southwest of Minas Gerais, Brazil.

Methodology: The data were collected through interviews of students enrolled in undergraduate health-related courses in two higher education institutions in Passos-MG. The questionnaire included questions about the demographics of the participants, as well as questions to assess knowledge about STIs.

Results: The sample consisted of 690 individuals, including 470 women, 218 men, and 2 who identified themselves as the 'other gender'. Of these, 94.3% were students and 5.7% were teachers. Among the students, 284 were from private universities and 367 were from public universities. Of the teachers, 89.7% were from public universities. The mean (standard deviation) knowledge score (on a scale of 0 to 10) of the participants was 5.44 (1.59), with a median of 5. Males had a higher mean (5.77 ± 1.61), with a median of 6; compared to females (5.27 ± 1.56), with a median of 5 ($p < 0.001$). In addition, teachers had a higher mean (6.26 ± 1.61), with a median of 6; compared to students (5.39 ± 1.58) with a median of 5 ($p < 0.002$).

Conclusions: There were gaps in the knowledge of students and teachers. This is a worrying situation, and it is necessary to improve academic training on STIs and promote protected sexual relations.

Key words: health; knowledge; infections; university.

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Introduction

Sexually transmitted infections (STIs) are a range of clinical syndromes and infections caused by pathogens, including viruses, fungi, protozoa, and bacteria. These can be acquired and transmitted through sexual activity with previously infected partners. It is important to use protection to reduce the risk of contracting an STI. It is worth noting that the term 'sexually transmitted infections (STIs)' has replaced the term 'sexually transmitted diseases (STDs)' due to the possibility of an individual having and transmitting an infection, even in the absence of signs and symptoms [1].

STIs pose a significant challenge to public health in Brazil and worldwide. Lack of knowledge about these infections along with high rates of prevalence and incidence can lead to delayed diagnoses, uncontrolled pathogen spread, and negative impacts on individuals'

health and quality of life. Furthermore, the impact of STIs extends beyond psychosocial harm, as it also affects the economy since they are among the top 5 causes of demand for healthcare services, with a significant portion of the affected population being economically active [2].

The 2022 HIV/AIDS epidemiological report by the Ministry of Health highlighted over 52,000 cases of acquired immune deficiency syndrome (AIDS) developed by young people aged 15–24 years with HIV during the previous decade. The report also confirmed that 40,800 cases of HIV and 35,200 cases of AIDS were reported in Brazil in 2021. Despite the availability of various methods of combined prevention, including condom use, rapid testing, immunization (e.g., for human papillomavirus, HPV; and hepatitis B), and pre- and post-exposure prophylaxis for HIV, among others; new cases continue to emerge within the population [3].

Chlamydia, caused by the bacterium *Chlamydia trachomatis*, is one of the most common STIs in Brazil and worldwide. It can be asymptomatic in many cases, making diagnosis difficult and transmission easier. For example, in Pará, in northern Brazil, the rate of chlamydia infection among women was reported to be 11%, and it was most prevalent among women between the ages of 16 and 20 years [4].

De Avila and Ferreira reported that an extremely important condition in sexual intercourse that increases the risk of STI infection is the lack of condom use during oral sex. In their study, 89.17% of participants reported not using condoms during oral sex, and 92.78% expressed willingness to engage in the activity without protection. This situation is culturally prevalent among the population due to the lack of information and neglect in adopting risk-reducing methods [5].

Additionally, it can be argued that the consumption of both legal and illegal substances is a risk factor for engaging in unsafe sex. Drug use was a determining factor in the lack of adherence to condom use. A study conducted by Bertoni *et al.* compared condom usage in two groups from the same educational institution; one consisting of individuals who used illicit drugs and the other of individuals who did not. Only 42.7% of those who had previously used or were currently using any drugs reported consistent condom use, compared to 64.1% among those who had never used such substances. The study also found that alcohol and smoking interfere with safe sex practices [6].

It is important to emphasize that a comprehensive and integrated education approach is necessary. The importance of health education and the significance of promoting preventative behaviors related to STIs and practicing safe sex should be highlighted in university curriculums and in the daily lives of the general public. Moreover, it is crucial to invest in teacher training, and making updated pedagogical approaches and knowledge an essential part of this strategy in addressing the issue of STIs.

Methodology

The aim of this cross-sectional study was to describe and assess the comprehension of students and teachers of health sciences; in a city in Southwest Minas Gerais, Brazil; regarding the prevention of STIs, and their associated illnesses and complications. The study included students and health professionals from two higher education institutions; one public (University of the State of Minas Gerais, UEMG), and one private university (Atenas College, ATENAS); both located in the city. The study was conducted in Passos-MG, a city

with approximately 120,000 inhabitants. Students and teachers of biomedicine, biological sciences, nursing, medicine, and nutrition departments in UEMG; and of dentistry and medicine at ATENAS were included. It was not possible to compare participants from the same course, but from different institutions, due to the difference in courses offered at UEMG and Medicine; except for the medicine course which was offered in both the higher education institutions. Additionally, although teachers from all health courses responded to the survey, there was a small sample of participating teachers, which made it difficult to conduct comparative analyses between teachers from different courses and institutions and between teachers and students.

Sample

The research sample comprised 690 participants who were approached in person in classrooms, and consisted of both students and teachers. Those who agreed to participate were given a questionnaire containing 23 questions (Supplementary Document 1) to be completed within approximately 20 minutes, after which the completed forms were collected by members of the research team. The inclusion criteria were: students or educators over the age of 18 years, who were free to attend classes (i.e. without a medical certificate), regularly enrolled or employed as educators in courses related to healthcare at public or private universities located in the city where the research was conducted, and who agreed to participate in the study after reading and signing the informed consent form (ICF).

The interviews were conducted by four interviewers at the time and location specified by the participant on the day of their appointment, without the presence of others to reduce discomfort from intrusive questions. All participants completed the questionnaire consisting of 23 items.

We calculated the proportions for categorical variables, and measures of central tendency and dispersion for continuous variables. In the case of categorical variables, we used Chi square and Fisher's exact tests to compare between groups, and we used the independent samples t-test for means and the Kruskal-Wallis test for medians.

We conducted a Poisson-Tweedee regression to evaluate the association between the level of knowledge and the covariates (independent variables). We started with a univariate analysis, which allowed us to select the variables that had a p value < 0.20 for building the multiple model. The variables that remained in the final multiple model were those that had a p value < 0.05 in

the backwards procedure.

The database was populated using the "Google Drive" feature to maintain privacy and minimize errors. Subsequently, it was transferred and analyzed with the SPSS program version 21.0. (SPSS, IBM Corp, Chicago, IL, USA).

This study was approved by the Research Ethics Committee under the opinion 5,175,275; and CAAE number 52039121.7.0000.5112.

Results

Sociodemographic characteristics

The sample consisted of 470 (69.1%) female participants, 218 (31.6%) male participants, and 2 (0.2%) participants who identified as ‘another gender’ and were students. The lowest proportion age group was 26–30 years with 56 (8.1%) individuals; followed by those who were > 30 years old, with a total of 77 (11.2%) individuals. The highest proportion age groups were 21–25 years old, with 310 (44.9%) individuals; and 18–20 years old, with 247 (35.8%) individuals.

The majority of the participants, 651 (94.3%), were pursuing undergraduate degree; while only 39 of them (5.7%) were teachers. In terms of university, 402 (58.3%) were from UEMG and 288 (41.7%) from ATENAS. Tables 1 and 2 summarize the distribution of students and teachers, respectively.

There were variations in age and academic programs among the students. The students at UEMG had a higher proportion of individuals aged 21–25 years, compared to those at ATENAS. Additionally, ATENAS solely offered medicine and dentistry courses; while UEMG had other courses, but not dentistry.

Variations in the courses were also observed among the faculty, and dentistry was the only course absent in UEMG.

Knowledge about sexually transmitted infections

The mean (standard deviation, SD) knowledge score among participants was 5.44 (1.59) points, with a median of 5 and range 1–10 points. There were

Table 1. Sociodemographic variables of students from two universities in Passos-MG, Brazil.

Variables	N	ATENAS (Private) N (%)	UEMG (Public) N (%)	p
Gender				
Female	444	191 (43.0%)	253 (57.0%)	0.601
Male	205	93 (45.4%)	112 (54.6%)	
Transgender/Other	2	0 (0.0%)	2 (0.6%)	
Age				
18–20 years	247	120 (18.4%)	127 (19.5%)	0.039
21–25 years	310	120 (18.4%)	190 (29.2%)	
26–30 years	54	29 (4.5%)	25 (3.8%)	
≥ 30 years	40	15 (2.3%)	25 (3.8%)	
Course				
Medicine	363	256 (39.3%)	107 (16.4%)	0.001
Dentistry	28	28 (4.3%)	0 (0.0%)	
Nursing	65	0 (0.0%)	65 (10.0%)	
Biomedicine	63	0 (0.0%)	63 (9.7%)	
Biological Sciences	74	0 (0.0%)	74 (11.4%)	
Nutrition	58	0 (0.0%)	58 (8.9%)	

Bold signifies $p < 0.05$.

Table 2. Sociodemographic variables of teachers from two universities in Passos-MG, Brazil.

Variables	N	ATENAS (Private) N (%)	UEMG (Public) N (%)	p
Gender				
Female	26	3 (7.7%)	23 (59.0%)	0.709
Male	13	1 (2.6%)	12 (30.8%)	
Age				
18–20 years	0	0 (0.0%)	0 (0.0%)	0.057
21–25 years	0	0 (0.0%)	0 (0.0%)	
26–30 years	2	1 (2.6%)	1 (2.6%)	
≥ 30 years	37	3 (7.7%)	34 (87.2%)	
Course				
Medicine	16	2 (5.1%)	14 (25.8%)	0.005
Dentistry	2	2 (5.1%)	0 (0.00%)	
Nursing	12	0 (0.0%)	12 (30.8%)	
Biomedicine	6	0 (0.0%)	6 (7.7%)	
Biological Sciences	2	0 (0.0%)	2 (5.1%)	
Nutrition	1	0 (0.0%)	1 (2.55%)	

Bold signifies $p < 0.05$.

differences in knowledge score based on gender and status (teacher or student). Men had a higher mean knowledge score (5.77 ± 1.61), with a median of 6 and range 2–10 points; compared to women who had mean knowledge score of 5.27 ± 1.56 , with a median of 5 ($p < 0.001$). Additionally, when knowledge was categorized by levels, a higher percentage (33.9%) of men had a higher level of knowledge, compared to women (21.5%). The teachers exhibited a higher level of knowledge with a mean of 6.26 ± 1.61 points (median: 6, range: 3–9 points), compared to the students (mean: 5.39 ± 1.58 , median: 5; $p < 0.002$). Table 3 summarizes the level of knowledge of students and teachers of two universities.

Factors associated with knowledge of STI among students

There were associations between sociodemographic and educational variables among the students (Table 4). The male students demonstrated greater knowledge of

STIs than female students, and students in terms 8–11 had better knowledge than those in earlier terms. Specifically, gender and the term of study were found to be correlated.

Discussion

Studies involving survey of higher education personnel have typically included a higher proportion of women. For example, Moghaddam *et al.* interviewed 590 Iranian higher education students, 71.4% of whom were women [7]. Likewise, the study conducted by Barbosa *et al.* included 888 higher education students, 650 (75.3%) of whom were women. Our study included 69.01% women studying or teaching health science courses; thus, indicating a predominance of female population in higher education studies [8].

The participants in our study had a mean (SD) knowledge score of 5.44 (1.59), with a median of 5, and a range of 1–10, indicating a moderate level of knowledge regarding STIs. Other studies support the

Table 3. Level of knowledge of students and teachers of two universities in Passos-MG, Brazil.

Variables	N	ATENAS (Private) N (%)	UEMG (Public) N (%)	<i>p</i>
Knowledge level (1–10)				
Low level (0–3)	78	36 (5.5%)	42 (6.5%)	0.884
Medium level (4–6)	412	179 (27.5%)	233 (35.8%)	
High level (≥ 7)	161	69 (10.6%)	92 (14.1%)	
General knowledge about STIs				
None	1	1 (0.2%)	0 (0.0%)	0.745
Little	32	15 (2.3%)	17 (2.6%)	
Medium	353	157 (24.1%)	196 (30.1%)	
Very much	221	93 (14.3%)	128 (19.7%)	
Total	44	18 (2.8%)	26 (4.0%)	
Knowledge about prevention methods				
None	4	0 (0.0%)	4 (0.6%)	0.111
Little	39	17 (2.6%)	22 (3.4%)	
Medium	254	116 (17.8%)	138 (21.2%)	
Very much	267	106 (16.3%)	161 (24.7%)	
Total	87	45 (6.9%)	42 (6.5%)	
Has the topic of STIs been addressed in your school at secondary or primary level?				
No, the content was not addressed	38	15 (2.3%)	23 (3.5%)	0.356
Yes, but superficially	376	157 (24.1%)	219 (33.6%)	
Yes, but I have not studied much about it	114	58 (8.9%)	56 (8.6%)	
Yes, all content was covered	123	54 (8.3%)	69 (10.6%)	
Has the subject of STIs been addressed by your college or extracurricular activities?				
No, the content was not addressed	220	82 (12.6%)	138 (21.2%)	0.003
Yes, but superficially	176	70 (10.8%)	106 (16.3%)	
Yes, but I have not studied much about it	99	45 (6.9%)	54 (8.3%)	
Yes, all content was covered	156	87 (13.4%)	69 (10.6%)	
How often do you use condoms during sexual intercourse?				
Never	106	45 (6.9%)	61 (9.4%)	0.107
Rarely	92	68 (5.8%)	54 (8.3%)	
Sometimes	130	64 (9.8%)	66 (10.1%)	
Often	111	57 (8.8%)	54 (8.3%)	
Always	212	80 (12.3%)	132 (20.3%)	
How often do you use condoms during oral sex?				
Never	449	201 (30.9%)	248 (38.1%)	0.492
Rarely	111	47 (7.2%)	64 (9.8%)	
Sometimes	45	20 (3.1%)	25 (3.8%)	
Often	11	2 (0.3%)	9 (1.4%)	
Always	35	14 (2.2%)	21 (3.2%)	

STI: sexually transmitted infection. Bold signifies $p < 0.05$.

Table 4. Linear regression model for variables associated with knowledge of sexually transmitted infections among students, Brazil.

Variables	n	Univariate analysis			n	Multivariate analysis		
		β (exp)	IC 95%	p value		β_{ajud} *	IC 95%	p value
Gender								
Female	444	0			444	0		
Male	206	0.093	0.044–0.141	0.001	206	0.092	0.043–0.140	0.001
Age								
18–20 years	247	0						
21–25 years	309	0.041	– 0.009–0.091	0.106				
26–30 years	53	0.077	– 0.010–0.165	0.084				
≥ 30 years	40	0.007	– 0.093–0.107	0.893				
University								
ATENAS	284	0						
UEMG	365	0.007	0.054–0.039	0.765				
Term								
1 ^o –3 ^o term	521	– 0.196	– 0.317 a–0.075	0.001	521	– 0.194	– 0.314 a– 0.075	0.001
4 ^o –7 ^o term	106	– 0.241	– 0.373 a–0.110	0.000	106	– 0.239		0.000
8 ^o –11 ^o term	22	0			22	0	– 0.369 a– 0.109	

Bold signifies $p < 0.05$.

findings of our investigation, revealing a lack of understanding of STIs among university students. Fonte *et al.* reported below-average knowledge about STIs among participants with a mean score of 1.66. Additionally, no participant achieved a perfect score [9]. The age range of the participants in this study was 21–25 years, consistent with the Barbosa *et al* study that reported a mean age of 24.2 years [8]. Other studies on the topic included participants with a mean age of 20.8 years [7] and 14.8 years [10].

In our study, men demonstrated greater knowledge (33.9%) than women (21.5%). This finding is consistent with research conducted by Sychareun *et al.* who surveyed 483 students and reported that men (60.2%) had a statistically significant higher knowledge of STIs, compared to women [11].

A survey by Sales *et al.* included 819 university students of healthcare-related studies from a private institution. Among them 19.3% reported always using a condom during sexual activity [12]. However, in our study, 32.2% always used condoms, (excluding oral sex). When considering only oral sex, the percentage decreased to 5.2%. In addition, Junior *et al.* reported that 44.6% of health academics at the Federal University of Ceará in Brazil who were surveyed used condoms, without including oral sex. However, when analyzing only oral sex, this percentage dropped to 1.9%, emphasizing the increased risk and lack of awareness among university students [13].

The study conducted by De Avila *et al.* highlighted that unprotected oral sex is a key factor in sexual activity that significantly increases the risk of STIs. Among the study participants, 89.17% reported not using a condom during oral sex, while 92.78% expressed a willingness to engage in unprotected oral sex. [14].

Regarding the prevention methods for STIs, the

findings align with the study by Rodrigues *et al.* on 15–17-year-old adolescents who were enrolled in a public school in Sao Paul, Brazil. These adolescents reported knowing some type of STI prevention method [15].

A comparative analysis of data from the Department of Homeland Security's Survey of Demographics and Health in Brazil concluded that while the vast majority of interviewed adolescents claimed familiarity with at least one contraceptive method; its usage remained sporadic and limited. This aligns with other findings from the national survey indicating that the use of contraceptives is not necessarily directly linked to adolescents' knowledge, but other factors are involved [16].

Carvalho *et al.* surveyed 195 high school adolescents; 51.8% reported receiving information about STIs in school [17]. In our study, 93.5% reported that the topic of STIs had been addressed during high school or middle school; but among them, 57.5% indicated that the coverage was superficial. Fonte *et al.* conducted a study with 758 university students and concluded that factors such as being a student in the healthcare field, being female, having children, and being married were associated with higher levels of knowledge [18].

Our study did not analyze the relationship between knowledge about sexuality, and safe and conscious sexual behavior. However, several studies indicate that people with sufficient levels of knowledge about sexuality do not always adhere to safe prevention methods [19–26].

Some difficulties arose during our study. Some eligible candidates declined to participate in the research. Possible reasons include the face-to-face approach used, and the fact that STI is considered a taboo subject in certain segments of the society. The topic of STIs can elicit discomfort, and even fear, in

disclosing intimate and highly personal matters; despite researchers clarifying the confidentiality of the data and the absence of any means of participant identification. Furthermore, locating educators to participate in the research was a challenge due to the smaller number of educators and restricted access to them. Finally, there was limited involvement of senior students in health-related courses. Typically, these students are undertaking placements outside of the university, making it exceptionally difficult to approach them personally.

Conclusions

There were gaps in knowledge of STI among students and teachers. This is a concerning situation, as these groups may contribute to healthcare services, especially for STIs. It is necessary to organize awareness programs on sexual education, and to encourage protected sexual relationships through preventive actions. Academic curricula, including continuing education for teachers, should be organized with an emphasis on promoting health for the entire academic community.

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Authors' contributions

DPS and MSM, designed the study and conducted the interviews; PHCT and LGE, collected the data and co-wrote the manuscript; EIGL and LAR, were responsible for statistical analysis and supervision; PGS, designed the questionnaire, co-wrote the manuscript, and supervised.

Corresponding author

Professor Leonardo Amaral dos Reis, MD, PhD.
Department of Oral Medicine, Federal University of Alfenas
Gabriel Monteiro Da Silva, 700 Alfenas, Brazil.
Tel: +5519996305291
Fax: 553537019416
Email: leonardo.reis@unifal-mg.edu.br

Conflict of interests

No conflict of interests is declared.

References

1. Workowski KA, Bolan GA (2015) Sexually transmitted diseases treatment guidelines. *Morb Mortal Wkly Rep.* 64: 1–137.
2. Khandwalla HE, Luby S, Rahman S (2000) Knowledge, attitudes, and practices regarding sexually transmitted infections among general practitioners and medical specialists in Karachi, Pakistan. *Sex Transm Infect* 76: 383–385. doi: 10.1136/sti.76.5.383.
3. Ministério da saúde. Infecções Sexualmente Transmissíveis (2023) Brazilian Ministry of Health — Brazil, October, 2023. Available: <https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/i/ist>. Accessed: 13 March 2025.
4. Danielle MB, Bárbara NB, Wallax ASF (2016) Genotyping and prevalence of *Chlamydia trachomatis* infection among women in Belém, Pará, northern Brazil. *J Infect Dev Ctries* 10: 134–137. doi: 10.3855/jidc.6474.
5. Avila LCS, Ferreira DG. (2020) Condom use during oral sex: a descriptive analysis in STI prevention. *Univag Digital Repository* 1: 1–14. [Article in Portuguese].
6. Bertoni N, Bastos FI, Mello MB, Makuch MY, Sousa MH, Osis MJ, Faúndes (2009) Alcohol and drug use and their influence on the sexual practices of adolescents in Minas Gerais, Brazil. *Cadernos de Saúde Pública* 25: 1350–1360. [Article in Portuguese]. doi: 10.1590/S0102-311X2009000600017.
7. Hedayati-Moghaddam MR, Eftekhazadeh-Mashhadi I, Fathimoghdam F, Pourafzali SJ (2015) Sexual and reproductive behaviors among undergraduate university students in Mashhad, a city in Northeast of Iran. *J Reprod Infertil* 16: 43–48.
8. Barbosa RG, Garcia FC, Manzato AJ, Martins RA (2006) Knowledge about STDs/AIDS, hepatitis, and sexual behavior of university students in São José do Rio Preto, SP. *Brazilian Journal of Sexually Transmitted Diseases.* 18: 224–230. [Article in Portuguese].
9. Da Fonte VRF, Spindola T, Lemos A, Francico MTR, Oliveira CSR (2018) Knowledge and risk perception regarding sexually transmitted infections among young university students. *Cogitare Enfermagem:* 23. [Article in Portuguese]. doi: 10.5380/ce.v23i3.55903.
10. Campo-Arias A, Ceballo GA, Herazo E (2010) Prevalence of pattern of risky behaviors for reproductive and sexual health among middle-and high-school students. *Revista Latino-Americana de Enfermagem;* 18: 170–174. doi: 10.1590/S0104-11692010000200005.
11. Sychareun V, Thomsen S, Chaleunvong K, Faxelid E (2013) Risk perceptions of STIs/HIV and sexual risk behaviours among sexually experienced adolescents in the Northern part of Lao PDR. *BMC Public Health;* 13: 1–13. doi: 10.1186/1471-2458-13-1126.
12. Sales WB, Caveião C, Visentin A, Mocelin D, da Costa PM, Simm EB (2016) Risky sexual behavior and knowledge of STIs/AIDS among university health students. *Revista de Enfermagem Referência;* 4: 19–27. [Article in Portuguese]. doi: 10.12707/RIV16019.
13. Júnior JSPF, Lopes EM, Freitas LVD, Rabelo STDO, Pinheiro AKB, Ximenes LB (2007) Profile and sexual practical of college students from health area. *Escola Anna Nery;* 11: 58–65. [Article in Portuguese]. doi: 10.1590/S1414-81452007000100008.

14. De Avila LCS, Ferreira DG (2021) Condom use during oral sex - a descriptive analysis in STI prevention. *Biomedicina* 6: 235–243. [Article in Portuguese].
15. Rodrigues MO, Onofre PS de C, Oliveira PP, Amaral JL (2014) Knowledge of adolescents from a public school in Vailaca about the main sexually transmitted diseases. *Revista de Enfermagem do Centro-Oeste Mineiro* 4: 1–13. [Article in Portuguese].
16. Torres LCB, da Costa MB, Machado RAB, Ribeiro LC, Péret ISA, Carneiro DLV, Bartolomeu GFP (2022) Is theoretical knowledge about STI enough to reflect the actions of young people and adolescents? *Brazilian Journal of Health Review*; 5: 6971–6991. [Article in Portuguese]. doi: 10.34119/bjhrv5n2-263.
17. Carvalho O, Grailea R, Pinto S, Santos MS (2018) Knowledge about the sexually transmitted infections among adolescent students of public schools. *Rev Adolesc Saúde* 2018: 7–17. [Article in Portuguese].
18. Da Fonte VRF, Spindola T, Lemos A, Francico MTR, Oliveira CSR (2018) Knowledge and risk perception regarding sexually transmitted infections among young university students. *Cogitare Enfermagem* 23: 3–23. [Article in Portuguese]. doi: 10.5380/ce.v23i3.55903.
19. Kirby D, Coyle K, Alton F, Rolleri L, Robin L (2011) Reducing adolescent sexual risk. Theoretical guide for developing and adapting curriculum-based programs. 1st ed. California: ETR Associates. Available: <https://www.etr.org/healthsmart/assets/File/resources/Reducin gAdolescentSexualRisk.pdf>. Accessed: 27 February 2024.
20. Reis M, Ramiro L, Matos MG, Diniz JA (2013) Determinants influencing male condom use among university students in Portugal. *International Journal of Sexual Health*; 25: 115–127. doi: 10.1080/19317611.2012.728554.
21. Santos MJ, Ferreira E, Duarte J, Ferreira M (2017) Risk factors that influence sexual and reproductive health in Portuguese university students. *Int Nurs Rev* 65: 225–233. doi: 10.1111/inr.12387.
22. Borges MR, da Silveira RE, Santos AS, Lippi UG (2015) Sexual behaviour among initial academic students. *Revista de Pesquisa Cuidado é Fundamental Online* 7: 2505–2515. [Article in Portuguese]. doi: 10.9789/2175-5361.2015.v7i2.2505-2515.
23. Costa MFL, Barreto SM (2003) Types of epidemiologic studies: basic concepts and uses in the area of aging. *Epidemiologia e Serviços de Saúde* 12: 189–201. [Article in Portuguese].
24. Domingues CSB, Duarte G, Passos MRL, Sztajnbok DCDN, Menezes MLB (2020) Brazilian protocol for sexually transmitted infections 2020: congenital syphilis and child exposed to syphilis. *Epidemiologia e Serviços de Saúde* 30: e2020597. [Article in Portuguese]. doi: 10.1590/0037-8682-597-2020.
25. Ministério da saúde. Departamento de Vigilância, Prevenção e Controle das IST, do HIV/AIDS e das Hepatites Virais (2023) Brazil. Available: <https://www.aids.gov.br/pt-br/publico-geral/o-que-sao-ist/sintomas-das-ist>. Accessed: 17 February 2024.
26. Silva JWF, Bezerra MCF, Dantas AAG, Kramer DG (2021) Knowledge about sexually transmitted infections by students from the city of Tangará. *RN UNESC em Revista*: 5: 66–76. [Article in Portuguese].

Annex – Supplementary Items

Supplementary Document 1. Data collection instrument.

Section 1 of 3

General Questionnaire on sexually transmitted infections (STIs).

Answer according to your perception.

In your perception, what is your general level of knowledge about STIs on a scale from 1 to 5?

1 – No knowledge 2 – Little knowledge 3 – Average knowledge 4 – A lot of knowledge 5 – Total knowledge

In your perception, what is your level of knowledge about STI prevention methods on a scale from 1 to 5?

1 – No knowledge 2 – Little knowledge 3 – Average knowledge 4 – A lot of knowledge 5 – Total knowledge

Has the topic of STIs been covered in your elementary or high school education?

Yes, the entire content was covered Yes, but I did not study the topic much Yes, but in a superficial or partial way No, the content was not covered

Has the topic of STIs been addressed in your college or through extracurricular activities during your undergraduate studies?

Yes, the entire content was covered Yes, but I did not study the topic much Yes, but in a superficial or partial way No, the content has not been covered so far

How often do you have sexual intercourse using a condom, on a scale from 1 to 5? (Excluding oral sex)

1 – Never 2 – Rarely 3 – Sometimes 4 – Often 5 – Always

How often do you practice oral sex using a condom, on a scale from 1 to 5?

1 – Never 2 – Rarely 3 – Sometimes 4 – Often 5 – Always

Section 2 of 3

Assessment of knowledge about STIs.

Please answer without consulting or researching sources outside this form. If you do not know the answer to a particular item, leave it blank.

Can syphilis be transmitted through kissing?

Yes No

Is hepatitis A considered an STI?

Yes No

Does human papillomavirus (HPV) occur in women, men, or both genders?

Women Men Both genders

Trichomoniasis is caused by what type of microorganism?

Virus Bacteria Fungus Protozoan Helminth

In the context of HIV, the acronym PEP refers to a type of:

Early treatment before HIV diagnosis Early treatment after sexual intercourse, occupational accident, or sexual violence Immunotherapy after sexual intercourse, occupational accident, or sexual violence Prevention method before sexual intercourse Prevention method after sexual intercourse, occupational accident, or sexual violence

"Gonorrhoea generally does not cause symptoms in males but does in females." Is the previous statement correct or incorrect?

Correct Incorrect

Is it necessary to use a condom during oral sex to prevent STIs?

Yes No

Candidiasis is treated with what type of medication?

Antiviral Antibiotic Antifungal Antiparasitic Antiemetic

Is a condom 100% effective in preventing STIs when used correctly?

Yes No

Is there any type of lubricant, used in conjunction with condoms, that can enhance STI prevention?

Yes, all lubricants are recommended Yes, water-based lubricants Yes, oil-based lubricants No, the use of any lubricant is not recommended for STI prevention No, because lubricants facilitate the condom slipping out of the correct position

Section 3 of 3

Participant Data

Your full name and email will not be used in the results of this research.

Full name: _____

Email: _____

Gender

Male Female Transgender Prefer not to answer Other

Age group

18 to 20 years 21 to 25 years 26 to 30 years Over 30 years

Abbreviation of your university: _____

City where your course(s) is/are located: _____

Course enrolled as a student or course(s) taught as a professor

Biomedicine Biological Sciences Physical Education Nursing Dentistry Medicine Nutrition

Current period as a student or period(s) in which you teach as a professor

1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th

Are you a student or a professor?

Student Professor