Prevalence of syphilis cases and other sexually transmitted infections among university students

Prevalência de casos de sífilis e de outras infecções sexualmente transmissíveis entre estudantes universitários

Received: 2023-00-00 | Accepted: 2023-00-00 | Published: 2023-00-00

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ABSTRACT

Introduction: Syphilis, caused by Treponema pallidum, is considered one of the main causes of Sexually Transmitted Infections (STIs), due to its easy sexual and congenital transmission. Objective: Knowing the importance of syphilis, this study aimed to perform a rapid test to identify the prevalence of syphilis among university students, as well as to analyze their behavior, knowledge and perception regarding this and other STIs. Material and Methods: Therefore, a questionnaire was applied in person and also online to 266 students aged between 18 and 48 years old, most of whom were women (72.18%), white (71.43%), and single (84.96%). Results and Discussion: Of this total, 52 students agreed to perform the Immuno-Rápido Sífilis test (WAMA Diagnóstica), presenting a non-reactive result in all samples. It was observed in the survey that: 6.0% had already had an STI; 20.7% used illicit drugs; 1.9% shared needles and syringes; 78.8% did not use condoms frequently with their regular partners and 55.5 % with their occasional partners, with these sexual behaviors being considered risky. Students had an average of 66.7% correct answers when assessing knowledge about syphilis, sexual practices and other STIs. Conclusion: The results show that although the students do not have syphilis, the behavior considered risky and the insufficient knowledge on the subject do not exclude other STIs and reinforces the need to perform awareness campaigns.

Keywords: rapid test; Treponema pallidum; Sexually Transmitted Infections;

RESUMO

Introdução: A sífilis, causada pelo Treponema pallidum, é considerada uma das principais causas de Infecções Sexualmente Transmissíveis (IST), devido a sua fácil transmissão por via sexual e congênita. Objetivo: Sabendo da importância da sífilis, este trabalho teve o objetivo de realizar teste rápido para identificar a prevalência de sífilis entre estudantes universitários, bem como analisar o comportamento, conhecimento e a percepção que estes têm em relação a essa e a outras IST. Material e Métodos: Portanto, foi aplicado um questionário presencialmente e também online a 266 alunos com faixa etária de 18 a 48 anos, sendo maioria mulheres (72,18%), brancos (71,43%) e solteiros (84,96%). Resultados e Discussão: Deste total, 52 alunos aceitaram realizar o teste Imuno-Rápido Sífilis (WAMA Diagnóstica), apresentando resultado não reagente em todas as amostras. Foi observado na pesquisa que 6,0% já tiveram alguma IST, 20,7% fizeram uso de drogas ilícitas, 1,9% compartilharam agulhas e seringas e 78,8% não usam preservativo com frequência com seus parceiros fixos e 55,5% com seus parceiros eventuais, sendo estes comportamentos sexuals considerados de risco. Os estudantes apresentaram uma média de acertos de 66,7% quando avaliou-se o conhecimento sobre sífilis, práticas sexuais e de outras IST. Conclusão: Os resultados mostram que embora os estudantes não apresentem sífilis, o comportamento considerado de risco e o baixo conhecimento sobre o tema não excluem outras IST e reforça a necessidade de se realizar campanhas de conscientização.

Palavras-chave: teste rápido; Treponema pallidum; Infecções sexualmente transmissíveis;
INTRODUCTION

Adolescence comprises the period between 10 and 19 years of age, marked as the transition from childhood to adulthood and characterized by culturally related modifications, as well as physical, mental, emotional, and social changes (MACIEL et al., 2023). In the face of these transformations, adolescents tend to adopt health risk behaviors, such as sexual behaviors that contribute to unintended pregnancy and sexually transmitted infections (STI) (MACIEL et al., 2023).

According to the World Health Organization (WHO), it is estimated that more than one million people contract some STI per day worldwide. Annually, it is estimated that approximately 357 million new infections occur; among the main ones, we can mention chlamydia, gonorrhea, syphilis, and trichomoniasis. Consequently, the presence of these STIs increases the risk of acquiring or transmitting HIV infection (BRASIL, 2022a).

Syphilis is characterized as a systemic sexually contagious infection, known for over 500 years. It is caused by the bacterium *Treponema pallidum*, which belongs to the group of spirochetes due to its spiral shape (ARANDIA et al., 2023). It presents as a preeminent form of sexual and congenital transmission, and contact with the lesion (hard chancre and secondary lesions) in the genitals is responsible for 95% of syphilis cases, which makes it an important sexually transmitted infection and potentially infectious to fetuses during pregnancy, via the maternal-fetal route (TORTORA; FUNKE; CASE, 2016; PEREIRA et al., 2023). Other routes of contamination, in rare cases, are through blood transfusion, saliva (kissing and toothbrush replacement), contaminated objects, and tattooing (PEREIRA et al., 2023).

The pathology manifests itself in the primary, secondary, latent and tertiary stages, with the greatest possibility of transmission in the primary and secondary stages, where the disease presents more evident symptoms. Presented in an asymptomatic form, the latent stage is divided into recent, where the person presents up to one year of infection, and late latent, where it is represented with more than one year of infection. The most severe cases are represented by more severe complications such as cutaneous, bone, cardiovascular, and neurological lesions, which are observed in the tertiary phase, which occurs when there is no adequate treatment (BRASIL, 2022a).

In Brazil from 2011 to June 2022, a total of 1,115,529 cases of acquired syphilis were reported to the Brazilian Case Registry Information System (SINAN); In 2021, the total number of cases reported in Brazil was 167,523, of these, 74,095 cases of syphilis in pregnant women; 27,019 cases of congenital syphilis; and 192 deaths from congenital syphilis (BRASIL, 2022a). These data show that STIs and syphilis cause both social and economic impacts.
Modules from the National Health Survey (PNS) (2019) indicate that approximately 1 million people reported having a medical diagnosis of STI over the year 2019, which corresponds to 0.6% of the population aged 18 years and older (BRASIL, 2022b).

The diagnosis of syphilis, preferably early, is important for adequate treatment, aiming to prevent the transmission of this disease. The laboratory diagnosis can be made through direct research of the bacteria in lesion samples, as well as through immunological assays. Immunological tests are divided into non-treponemal (nonspecific) and treponemal (specific) tests. Both tests detect the antibodies that are produced by the organism when in contact with *T. pallidum* using flocculation techniques (VDRL and RPR), hemagglutination (TPHA), immunofluorescence (FTA-Abs), immunoenzymatic and immunochromatographic assays (SOUZA; GOMES, 2018; SANTOS; PEREIRA; SENA, 2020).

Considering the syphilis epidemic in Brazil and the sensitivity of the diagnostic flows, we recommend starting the investigation by treponemal test (rapid test, FTA-Abs, Elisa, among others) (BRASIL, 2021). To control the disease in Brazil, the Ministry of Health purchases and distributes rapid diagnostic tests and offers treatment with benzathine and crystalline penicillin (BRASIL, 2022b). These tests do not require laboratory infrastructure and are easy to perform, reading the result in no more than 30 minutes. They can be performed with whole blood samples collected by venipuncture or digital puncture, as well as serum and plasma (BRASIL, 2021).

Since ancient times, cases of syphilis have been reported in humans, with a constant increase in the number of cases of this infection in pregnant women in recent years in both congenital and acquired forms. This increase can be attributed, in part, to the increase in testing coverage, with the expansion of the use of rapid tests, reduced use of condoms, the resistance of health professionals to the administration of penicillin in Primary Care, among others. In addition, the increase in reported cases can be reflected due to the improvement of the surveillance system (BRASIL, 2022b).

Casual sex is a type of experience in which sexual encounters occur between people who do not know or know little about each other, and has been a common type of experience among young college students around the world. Much of the college crowd is in the emerging adulthood phase, a developmental period between the ages of 18 and 25 (SOSTER; SOUZA; CASTRO, 2021). Studies point out that this age group, including young college students, corresponds to an important group that is at a higher risk of contracting STDs due to some factors, such as: initiating sexual practices, often without adequate care, that is, without using condoms, besides having sex with multiple partners (CUNHA et al., 2016; SOSTER; SOUZA; CASTRO, 2021).

Therefore, we sought to determine the prevalence of syphilis among university students, in addition to surveying the behavior, knowledge and perception that this population has about
syphilis and other STIs, and thus identifying the main causes that may be related to the increase in the number of cases of STIs in recent years in this group.

MATERIALS AND METHODS

A cross-sectional, descriptive, and quantitative study was conducted that involved screening, diagnosis and determination of the prevalence of syphilis cases and behavioral factors, knowledge, and perception among university students over 18 years of age from a private institution in the municipality of Maringá-PR. This project was submitted to the Ethics and Research Committee of the Cesumar University Center (CEP/UniCesumar) and received a favorable opinion with the voucher number: 127.444/2018.

Individuals were invited in person to participate in the research and also through the institution's online learning environment; thus, a structured online form was prepared in Google Drive, a service storage and synchronization service, which allows creating a form to be made available on the internet to other people.

The individuals who agreed to participate in the research answered a questionnaire of their authorship that contained sociodemographic and behavioral information to be answered about the student's sexual life, aiming to identify exposure to risk factors that could be associated with syphilis. In addition, a second section of the questionnaire had affirmative phrases about sexual practices, syphilis, and other STIs that should be answered in true or false to determine the degree of knowledge of students in the face of such infections. Each questionnaire had its identification through a unique code, whose purpose was to ensure the confidentiality of the data and to guarantee the subjects' privacy and the protection of their image.

Subsequently, students who responded in person were invited to perform the Immuno-Rápido Sífilis test (WAMA Diagnóstica) using blood samples taken by finger prick, following the manufacturer's specifications. The result was reported to the patient immediately after reading the test. After performing the tests and applying the questionnaires, the data were grouped in spreadsheets using the Excel Program (Microsoft® Office Excel), and the statistical analysis performed using the Graphpad Prism®.

RESULTS AND DISCUSSION

Knowing and accompanying university students, especially those aged between 18 and 29, is considered important by health professionals, as it allows early diagnosis, adequate treatment, and awareness of syphilis and other STIs, which have increased in the population during the last years. Thus, considering the importance of this infection, this study determined
the prevalence of syphilis cases in students from a private university in the municipality of Maringá-PR and also analyzed behavioral, knowledge, and perception factors associated with syphilis and other STIs.

Of a total of 11 thousand students enrolled in the higher education institution, 266 students participated in the study, with ages ranging from 18 to 48 years (average of 23 years), of which 86 (32.33%) answered the questionnaire applied directly and 180 (67.66%) answered using an online form, with a margin of error of 5.94% and a confidence level of 95%.

Respondents in person were invited to perform the syphilis rapid test, with the participation of 52 students, generating a margin of error of 13.56% and a 95% confidence level in the total student population. The result of all samples was non-reactive, giving zero prevalence. According to the Epidemiological Bulletin of Syphilis in Brazil (October 2022), acquired syphilis showed an increasing increase in the detection rate until the year 2018, where the number of individuals aged 13 to 29 years with acquired syphilis was 55,615, corresponding to a prevalence of 0.12% in Brazil, with subsequent stability, except in 2020, when a decline in the rate was observed, due to the COVID-19 pandemic. In the historical series, most of the cases reported were male (60.6%) and in the age groups 20 to 29 years (35.6%) and 30 to 39 years (22.3%) (BRASIL, 2022a). It is noteworthy that, among adolescents (13 to 19 years), the cases of acquired syphilis increased 2.2 times, when comparing the years 2015 and 2021 (BRASIL, 2022a); thus, there is a possibility that university students within this age group may develop syphilis infection.

In order to know and characterize the population, some variables such as sex, age, ethnicity, and marital status were analyzed, and the data obtained are shown in Table 1.

Table 1: Profile distribution of university students from Maringá, Paraná, Brazil in 2018-2019, according to variables such as sex, age, ethnicity, and marital status.

<table>
<thead>
<tr>
<th>Variable (n = 266)</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74</td>
<td>27.82</td>
</tr>
<tr>
<td>Female</td>
<td>192</td>
<td>72.18</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-21</td>
<td>153</td>
<td>57.52</td>
</tr>
<tr>
<td>22-25</td>
<td>60</td>
<td>22.56</td>
</tr>
<tr>
<td>26-29</td>
<td>23</td>
<td>8.65</td>
</tr>
<tr>
<td>&gt;29</td>
<td>30</td>
<td>11.28</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
White | 190 | 71.43
Yellow | 9 | 3.38
Black | 18 | 6.77
Mixed | 43 | 16.17
Ignored | 6 | 2.26

**Marital Status**

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>63</td>
<td>72.12</td>
</tr>
<tr>
<td>Female</td>
<td>163</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10</td>
<td>28.57</td>
</tr>
<tr>
<td>Female</td>
<td>25</td>
<td>71.43</td>
</tr>
<tr>
<td>Separated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>20.00</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>80.00</td>
</tr>
</tbody>
</table>

Source: the authors (2023).

Women had higher participation compared to men (72.18% against 27.82%), being mostly white (71.43%) and single (84.96%). According to data from the Ministry of Health (2021), the number of syphilis cases in adolescent females was higher than among males, representing an M:F ratio of 0.7 (seven males for every ten females with syphilis). This is in agreement with the results found in the present study. On the other hand, in the age groups 20 to 29 years and 30 to 39 years, the M:F ratio was 1.9 (19 men for every ten women with syphilis) and 2.2 (22 men for every ten women with syphilis), respectively (BRASIL, 2022a).

In 2022 most of the reported cases of acquired syphilis are concentrated in males (60.6%) and in the age groups 20 to 29 years (35.6%) and 30 to 39 years (22.3%). The male-to-female (M:F) sex ratio has remained around 1.5 (15 men for every 10 women with syphilis); however, in 2020 and 2021, it increased to 1.7 (17 men for every 10 women with syphilis). Among adolescents (13 to 19 years old), cases of acquired syphilis increased 2.2 times when comparing the years 2015 and 2021 (BRASIL, 2022a).

According to Mendes et al. (2022) in studies developed of cases of acquired syphilis in Brazil, DataSUS platform, with 619,819 positive cases, showed that the prevalence of Syphilis cases was found in the age group of 15 to 39 years from 2017 to 2021, prevalent of the disease in males with 60.46% of cases compared to 39.54% in females between the years 2017 and 2021. Faced with the data computed for 2021, syphilis still shows to be more prevalent in males, making up 63% of reported cases in 2021.

In the study developed by Vieira (2020) in Ferraz de Vasconcelos-SP in the year 2017, with 148 positive cases, the results pointed out that among the notifications of syphilis in adults, 54.1% was male, justifying the possibility that many men do not seek medical assistance regarding syphilis and other STIs, mainly because they are asymptomatic, or oligosymptomatic,
with low adherence to preventive measures, which increases the possibility of syphilis transmission.

Mendes et al. (2022) reports that regarding the beginning of early sexual life, literature confirms that the first sexual activities among young people occur between 10 and 14 years of age, especially among males, in conditions of lower educational levels and low economic conditions. This fact shows that the age of the first sexual intercourse among young people (10-14 years) occurs during a time of life in which adolescents do not yet have insight regarding sexual education, which predisposes them to risky situations to their health.

The results above are contrary to the present research, however, it is worth noting that both sexes showed increased risk of contamination, however, males are the most affected today, in view of male cultural behavior, which usually opts to disregard the use of condoms. Regarding women, the increased risk of contamination may be associated with confidence in the partner and the stability of the relationship, which corroborates the non-use of male condoms (MENDES et al., 2022).

Several studies have analyzed the average age at which individuals usually initiate sexual practices, which according to the authors normally begins after age 17; thus, it often occurs in an insecure manner and with multiple partners (SOUZA et al., 2020a; SPINDOLA et al., 2020; MOREIRA et al., 2021; SOSTER; DE SOUZA; DE CASTRO, 2021). According to Table 2, we can confirm this fact, considering that 95.95% (n = 71) of men and 96.35% (n = 185) of women have already reported having started their sexual life. It was also found that both men and women had multiple partners in the past 12 months. It was also seen that among married people, 36.00% of women and 10.00% of men had casual partners during the marriage, and having multiple partners and having unsafe sexual intercourse is one of the factors that propitiate to have syphilis infection or other STIs, which is considered risky for not knowing the sexual history of its partners (AMARAL et al., 2017; NOGUEIRA et al., 2017; FILHO et al., 2018).

Table 2: Distribution of the type of partner according to marital status in the last 12 months of sexually active university students from Maringá, Paraná, Brazil.
In this study, the sexual orientation of sexually active students and the number of partners in the last 12 months were assessed. According to Table 3, most women (85.95%) declared themselves heterosexual, while for men, this percentage was lower (50.70%). It was observed that male students had higher rates of homosexual relations than female, a fact also noted by Gräf; Mesenburg; Fassa (2020). In addition, some studies indicate that homosexuals have a higher average number of partners compared to heterosexuals (AMARAL et al., 2017; Nogueira et al., 2017), confirming this information as observed in Table 3.

Table 3: Sexual orientation of sexually active university students from Maringá, Paraná, Brazil.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Heterosexual</th>
<th>Homosexual</th>
<th>Bisexual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Average of Partners ± SD</td>
<td>Frequency</td>
</tr>
<tr>
<td>Male</td>
<td>36 (50.70%)</td>
<td>3.42±3.17</td>
<td>30 (42.25%)</td>
</tr>
<tr>
<td>Female</td>
<td>159 (85.95%)</td>
<td>1.52±1.42</td>
<td>12 (6.49%)</td>
</tr>
</tbody>
</table>

Caption: SD: Standard Deviation; %: percentage. Source: the authors (2023).
the fixed and/or eventual partner. The main reason for not using condoms was trust in the steady partner (46.9%) and in the casual partner (14.2%). About 45.5% reported not using condoms in the last 12 months with their steady partner. As for condom use with the casual partner in the past 12 months, 22.9% reported not using, 23.4% reported using every time, 12.3% used more than half the time, and 34.1% reported no use.

Sousa et al. (2020b) in an epidemiological study in the capital Teresina in the year 2018, with 6,664 people who underwent rapid syphilis testing, of which 1,083 had the confirmatory diagnosis of the disease, 62% performed the test for the first time. As for sexual practice, 59% said they had one to five sexual partners in the last year, only 6% reported always using condoms, 27% said they did not use condoms because they trust their partner.

In Table 4, we can see that the use of condoms by university students with steady sexual partners is still low, with only 21.19% (22.38% men and 24.46% women) using it every time, and with casual partners, this number is higher (44.52%); however, they still have a very high risk of infection with syphilis, the sexual act being one of the primary forms of transmission.

**Table 4:** Condom use according to the type of sexual partnership in the last 12 months of sexually active university students from Maringá, Paraná.

<table>
<thead>
<tr>
<th>Sexual Partnership</th>
<th>Used it every time</th>
<th>Used it more than half the time</th>
<th>Used less than half the time</th>
<th>Did not use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16 (23.88%)</td>
<td>16 (23.88%)</td>
<td>14 (20.90%)</td>
<td>21 (31.34%)</td>
</tr>
<tr>
<td>Female</td>
<td>34 (24.46%)</td>
<td>32 (23.02%)</td>
<td>24 (17.27%)</td>
<td>79 (56.83%)</td>
</tr>
<tr>
<td>Casual Partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23 (51.11%)</td>
<td>12 (26.67%)</td>
<td>7 (15.56%)</td>
<td>3 (6.67%)</td>
</tr>
<tr>
<td>Female</td>
<td>46 (46.00%)</td>
<td>17 (17.00%)</td>
<td>7 (7.00%)</td>
<td>30 (30.00%)</td>
</tr>
</tbody>
</table>

**Source:** the authors (2023).

Given this information, it is necessary to carry out awareness campaigns on the importance of condom use for this population, mainly by the educational institution. The reasons given for not using condoms are described in Chart 1. It was observed that this fact is mainly due to the confidence that individuals have in their partners and also because they do not like to use this means of prevention. Some reasons such as, for example, the use of IUDs, contraceptives, and coitus interruptus, were indicated as justification; however, it is important to note that they are not methods of protection against syphilis.
Chart 1: Reasons pointed out by university students for not using condoms during sexual intercourse with regular and/or casual partners. Participants were able to name more than one reason.

Source: the authors (2023).

The prevalence rate of university students with sexually transmitted infections that occurred in the last 12 months was 0.15% (Table 5), not being reported as the type of STI. Among these participants, half (n = 8) were women (one married and seven single) and half (n = 8) men (all single), of which 37.5% have heterosexual relationships, 37.5% bisexual, and 25.00% homosexuals. In addition, it was found that 25.00% had only regular partners, 18.75% only casual partners, and 56.25% had as many regular and casual partners, with an average of 4.2 sexual partners per participant, with only 12.5% reported having always used a condom during relations with casual partners.

Table 5: Clinical data of university students in Maringá-PR.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sought blood bank to test in the last 12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>85 (31.95%)</td>
<td>0.77%</td>
</tr>
<tr>
<td>No</td>
<td>181 (68.05%)</td>
<td>1.65%</td>
</tr>
<tr>
<td>Had any STIs in the last 12 months</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If they had an STI in the last 12 months, how did they conduct treatment *

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not treat</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Self-medication</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Health services</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Used illicit drugs in the last 12 months

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>55 (20.68%)</td>
<td>211 (79.32%)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shared needles/syringes in the last 12 months

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5 (1.90%)</td>
<td>261 (98.12%)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* * Participants were able to answer more than one treatment option. Source: the authors (2023).

Sousa et al. (2020b) in an epidemiological study in the capital Teresina in the year 2018, with 6,664 people who underwent rapid syphilis testing, of which 1,083 had the confirmatory diagnosis of the disease, the majority of the population attended was homosexual (52%), sexual risk exposure was reported by 44%. In the study developed by Vieira (2020) in Ferraz de Vasconcelos-SP in 2017, with 148 positive cases, the results showed that regarding the sexual orientation of patients with acquired syphilis, 53 (62.4%) stated they were heterosexual, 07 (8.2%) homosexual, and 04 (4.7%) bisexual. The chances of homosexuals having syphilis as well as other STIs are the same as for heterosexual people.

According to the Ministry of Health, the increase in syphilis cases has followed a worldwide trend in recent years, being linked to the increase in relationships without the use of condoms among young people, worsening drug use, and the increase of pregnant women in a situation street (BRASIL, 2022a). The risk factors reported were: history of STI (6.02%), use of illicit drugs (20.68%), and sharing of needles and syringes (1.90%).

When assessing the students' knowledge about behavioral factors regarding syphilis and other STIs, eighteen affirmative questions were used to be judged as true or false. Students from 36 undergraduate courses participated in the research, divided by areas of knowledge, being Biological and Health Sciences (n = 182; 68.42%), Exact, Technological and Agrarian Sciences (n = 24; 9.02%) and Applied Human and Social Sciences (n = 60; 22.56%) (Chart 2), with a higher proportion of participants taking courses in Biomedicine (%), Nursing (%) and Medicine (%).
The students' level of knowledge was average, hitting an average of 66.67% of the affirmative sentences, with no difference in the level of knowledge of students from the 1st to the 5th year nor between the courses, showing an average of 12 correct answers, a total of 18. Compared with the results of other studies, a higher degree of knowledge was observed than other authors (ALMEIDA et al., 2017; COSTA; DO SANTOS NUNES, 2017; RIZZON et al., 2021). The percentage of correct answers in the affirmative sentences judged by the students is described in Table 6.

Table 6: Percentage of correct answers according to each answer from university students in Maringá-PR.

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Answers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The condom protects against all sexually transmitted infections.</td>
<td>37.52</td>
</tr>
<tr>
<td>The chances of contracting a sexually transmitted infection through oral sex are less than sex with penetration.</td>
<td>68.42</td>
</tr>
<tr>
<td>The vaginal/anal shower (&quot;chuca&quot;) is an efficient method of protecting</td>
<td>94.36</td>
</tr>
</tbody>
</table>
The female condom cannot be used at the same time as the male condom.

You should only have tests to check for a sexually transmitted infection when you show signs or symptoms.

The Pap Smear (performed on women) is not used exclusively to check if you have a sexually transmitted infection.

Hepatitis B and C viruses are more likely to become infected than HIV.

HIV virus infects only homosexuals and/or drug addicts.

The pill for continuous use and the day-after pill prevents the transmission of sexually transmitted infection.

Removing pubic hair can increase the risk of getting a sexually transmitted infection.

Lubricants can help prevent the transmission of sexually transmitted infections.

Avoiding ejaculation inside the vagina/anus prevents sexually transmitted infections.

Syphilis is only transmitted through sex.

Sores on sexual organs and groin lumps are symptoms of syphilis.

A person diagnosed with syphilis and previously treated will be protected against a new infection.

Kissing someone with syphilis can be a way of contracting the disease.

During the treatment of syphilis, the person can have sexual intercourse.

Active syphilis (a person infected with syphilis) increases the chance of becoming infected with the HIV virus.

**Source:** the authors (2023).

It is still worrying that not all students know about syphilis or factors associated with other STIs. We can notice that there is still prejudice against homosexuals and/or drug addicts, in which both are seen as the main groups that have sexually transmitted infections, however, it is observed that it is reducing prejudice against this group of people. It is now known that HIV, for example, infects anyone, regardless of age, ethnicity, religion, or even sexual orientation.

Although research participants are not as knowledgeable about syphilis and had sexual risk factors, such as not using condoms, using illicit drugs, sharing needles and syringes, and a history of STIs, we did not have any reagent samples for syphilis.

**CONCLUSION**
This study brought results on the prevalence of acquired syphilis in university students and factors associated with this and other sexually transmitted infections (STIs). With the data obtained, we see the need for campaigns and current data indicating the current STI situation in the country among students. Although the prevalence is nil, the review by other authors and epidemiological data reveals that syphilis has been increasing the number of cases in Brazil in recent years, especially in higher education students.

The results of this study indicate the importance of performing the rapid test for syphilis and other STIs in young people to have an early diagnosis, treatment, and control of the infection. The research pointed out significant risk factors for syphilis, such as sexual practice without the use of condoms and sharing of materials that exchange body fluids, showing that it is necessary to create awareness campaigns among this public about the importance of safe sex and early diagnosis. The screening tests can be used on a large scale in this group, as it allows a reliable result of 5 to 10 minutes. Thus, health professionals must embrace the subject and help to reduce sexual risk factors, and consequently, reduce syphilis and other STIs.

Author Contributions
All authors contributed to the design of the study, analysis, and interpretation of the results and conclusions. All authors critically revised the manuscript, gave final approval, and agreed to be accountable for all aspects of the work.

Acknowledgments
To University Paranaense (UNIPAR).

Source of Financing
University Paranaense (UNIPAR).

Conflict of Interest Statement
The authors declare no conflict of interest.

REFERENCES


