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Sexually Transmitted Diseases: Knowledge and Perceived Prevalence of Symptoms in University Students

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Authors' contributions

This work was carried out in collaboration between all authors. Author HP designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author AC managed the literature searches and data analyses. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

Background: Research addressing knowledge on sexual health, particularly of STDs risk and perceived symptoms' prevalence, among university students around the world, and particularly in Portugal, is scarce.
Aims: The aim of this study was to evaluate the levels of knowledge about the perceived prevalence of STD's and their occurrence in Portuguese university students.
Study Design: An internet based cross sectional and retrospective study was conducted.
Methodology: A total 1018 students participated (68.57% women), with a mean age of 23.57 years (SD=5.82). The instruments used were a Sociodemographic Questionnaire, the "Sexually Transmitted Disease Knowledge Questionnaire" and "Sexual Risk Behaviours Questionnaire" (male and female versions), which were disseminated on the Internet, on a page specifically created for this research, after pre-test was done and the necessary changes implemented.
Results: The results indicated that students have inadequate knowledge about the STD's, the lifelong perceived prevalence of a STD was 9.9%, and the actual perceived prevalence of symptoms associated with a STD was 16.8%. Finally, a linear regression was performed, highlighting a significant effect between the degree of knowledge about

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STD's and the occurrence of a STD or symptoms, which indicates that the symptoms depend on the knowledge.
Conclusion: These results reinforce the need for investment in prevention programs, in order to increase the information and reduce infection by STDs in college students.

Keywords: Sexually transmitted diseases; knowledge; university students; Portugal.

1. INTRODUCTION

The sexual health of young people is undoubtedly a major concern in the physical and psychological domains, and the university population, in particular, is one of the main groups at risk of infection by sexually transmitted diseases (STD's) [1,2,3]. This leads to the need to pay special attention regarding their knowledge and exposure to risk behaviours, in order to estimate possible predictors of preventive behaviours. In the United States, for example, two-thirds of the 12 million cases of STD's occur in people younger than 25 years old [4,5, 6]. This vulnerability to infection by STD's is probably related to the developmental period of early adulthood, where sexual experimentation tends to increase [7,8,9], but also due to the presence of some obstacles, such as lack of information about the STD's and difficulties in access to treatment [16,17,18].

The practice of 'safe sex' with the use of condoms, is an effective method of preventing infection with STD's; however, less than half the university students report using condoms during sexual intercourse [10,11,12,13,14,15]; moreover, individuals tend not to perform screening tests for STDs, including HIV (10). Several studies in the area of STDs and with samples of university students have tried explicit what are the barriers present in the use of condoms. Students seem to use condoms more frequently when they have a better understanding of the benefits of their use, as protecting against diseases and preventing unwanted pregnancies, added to a sense of respect for women [17]. On the contrary, among the reasons given for not using condoms, include the fear of spoiling involvement; concerns of a sexual nature; unexpected/impulsive sexual behaviours; embarrassment; or submission of women to men during intercourse [17]. Other aspects that may be associated with unsafe sexual practices, and the consequent exposure to risk, may be a poor communication about sexual matters between parents and children [18], consumption of alcohol and other drugs [19,20], non-regular sexual partners, including 'sex workers' [21], and history of pregnancy and previous STD [22].

Psychological aspects, such as positive health beliefs and self-efficacy regarding condom use, have been identified as primary predictors of the intention to use condoms or take a screening test for STD's, being that the high perceived severity regarding HIV is an important obstacle regarding practicing safe sex [23]. On the other hand, having personality traits such as active sensation seeking, impulsive decision-making [24], impulsive anti-sociality [25], or high arousal and low sexual inhibition [19], seem to influence negatively the intention to adopt a safer sexual behaviour.

Aspects of a social nature, such as having friends who use drugs or knowing someone over the Internet [26], living in communities where there is ethnic and racial disparity, segregation, difficulties in accessing health care, and having had experiences with the prison system [27], increase the likelihood of exposure to an infection by STD's. In short, sexual health practices take place in a specific cultural context, which is in constant change; thus, the meanings and

vulnerabilities of young people that contract a STD should be analysed and understood in light of this context [28].

In Portugal, there is no research on STDs in university students. Furthermore, there are no legal requirements to report the majority of STDs diseases to the health authorities, alongside a lack of consistency regarding the implementation of sexual education throughout several educational levels. Thus, research that allows for a better understanding of this reality is necessary. In this way, this study aimed at assessing knowledge of Portuguese university students about STDs, their sexual behaviours and perceived prevalence of STDs (present and past).

2. METHODS

2.1 Participants

The sampling of the participants was non-probabilistic, since the questionnaires were sent to the students via e-mail, purposively, and the majority of participants were female, reflecting the fact that in Portugal, female students are in greater number than male students.

The following inclusion criteria were used to select the participants for this study: [1] individuals from both genders, [2] being older than 17 years, and [3] attending a higher education course (University, College or Polytechnic Institute).

The sample consists of 1018 participants (317 male, 698 female), with the female population assuming a greater expression (68.57%). The participant's ages vary between 17 and 47 years, with a high percentage of respondents aged between 17 and 22 years (57.6%). Only 1.4% of respondents are aged above 40. The average age is 23.57 years (Standard Deviation = 5.82). As for religion, most subjects (61%) report being Catholic, while 29% claim to have no religious ideology. With regard to the economic status, 60.12% of individuals belong to the lower middle class, 28.2% to the upper middle class, 7.1% to the lower class, and less than 1% of the subjects have a high economic status. It was found that most of the subjects studied History (54.6%), followed by Health (18.3%), Education (15.7%), Exact Sciences (14.8%), and Management (13.7%). The courses with lower representation in this sample are Human Sciences (13.6%), Communication (8.5%) and Arts (3%) (see Table 1).

2.2 Instruments

The instruments used in this study were a Sociodemographic Questionnaire, the "Sexually Transmitted Disease Knowledge Questionnaire", and the "Sexual Risk Behaviours Questionnaire" (male and female versions). Pre-test was done and the necessary changes were implemented to the questionnaire before the actual study.

The "Sexually Transmitted Disease Knowledge Questionnaire" (STD-KQ), was developed by Jaworsky and Carey [29], and measures the knowledge of young adults on six sexually transmitted diseases, including chlamydia, the genital herpes, gonorrhoea, hepatitis B, AIDS and the human papilloma virus, organized into two main factors: cause/cure and general knowledge about STD's. Items of the "Brief HIV knowledge questionnaire", by Carey & Schroder [30], were also included, totalizing 27 items with 3 response options (true, false or

do not know). The internal consistency analysis of the STD-KQ's items yielded a Cronbach's alpha of 0.86.

Table 1. Sample Characterization

		N=1018	Percentage (%)	Mean (SD)
Gender	Male	317	31.1	
	Female	698	68.6	
Age	17-22 years old	585	57.5	23.57 years
	23-28 years old	270	26.5	(SD = 5.82)
	29-34 years old	77	7.6	
	35-40 years old	37	3.6	
	41-47 years old	14	1.4	
Economic Status	High	3	0.3	
	Medium high	287	28.2	
	Medium low	612	60.1	
	Low	72	7.1	
Religion	Catholic	622	61.1	
	Protestant	10	1	
	Buddhism	5	0.5	
	None	296	29.1	
	Another	48	4.7	
Study Area	History	56	5.9	
	Education	160	16.9	
	Human Sciences	138	14.6	
	Management	139	14.7	
	Arts	31	3.3	
	Health	186	19.6	
	Exact Sciences	151	15.9	
	Communication	87	9.2	

The "Questionnaire on Sexual Risk Behaviours" was built for this study, and aims at assessing whether a person has the possibility of having contracted a sexually transmitted disease during the previous month. It comes in two versions, a male and a female. The questionnaire consists of 14 questions, and assesses the existence of various symptoms associated with the occurrence of a sexually transmitted infection, in the format of a symptom checklist, for example: a) vaginal/penile discharge; b) burning sensation in the genitals; c) anal discharge or pain; d) mucus or blood in the faeces; e) pain or burning throat; f) rashes; g) burning sensation while urinating. Another 6 questions, regarding the following variables were used to measure risk behaviours: 1) if they had sex with men and/or women; 2) the number of partners in the last month; 3) if they gave or received oral and/or anal sex, without using a condom, in the last month (with a response option for homosexual individuals from both sexes); 4) whether they had vaginal sex without a condom in the last month; 5) if they had sex (oral, anal or vaginal) while under the influence of alcohol or drugs in the past month; and, 6) in the last year, how often did they tell a new partner about their situation regarding HIV-AIDS.

2.3 Procedures

Our research was an Internet based cross-sectional, retrospective study. First, we developed the research protocol with the two versions, a male version and a female version, consisting of three parts each. The first part was composed by a socio-demographic questionnaire, the second by a questionnaire on the knowledge about STD's, and the last part by a questionnaire on risk sexual behaviours. The two versions are identical in structure, except the last part that is composed by the Questionnaire on Sexual Risk Behaviours, which has a version for women and another for men. Both versions of the questionnaire had an introduction, in order to clarify the purpose of the questionnaire, the nature of the study and to explain that the answers would only be used within the study, ensuring the anonymity and confidentiality of the data.

The questionnaire was disseminated on the Internet, on a webpage specifically created for the purpose of this research. The survey responses were automatically sent to a database. The dissemination of the survey's link was made through mailing lists, indicating the informed consent and ensuring confidentiality and anonymity of the collected data. We approached universities, polytechnics and colleges from the entire country, presenting this research, and requesting the link was forwarded to the students' e-mails. The research protocol, was institutionally ratified by all the institutions involved and the participants were informed of the research objectives.

The statistical package used was SPSS (version 19) and analytic methods used were univariate descriptive statistics, two-sample t-tests, analysis of variance, and linear-regression analyses.

3. RESULTS AND DISCUSSION

3.1 Sexual Characterization

We observed that 96.07% of respondents have already had sexual intercourse, while boys had higher percentages in the sexual experience, given that 91.25% have been with at least one partner, while 10.74% of girls have not had intimate contacts. The average age for first sexual intercourse was 17.31 years (standard deviation=2.59). It was found that 67.5% of respondents reported using condoms during the first sexual intercourse and that the majority (76.3%) claims having only one stable sexual partner, 40.5% report using condoms during every sexual intercourse, however, 40.4% said they not to use condoms. On the other hand, 97.0% of individuals who do not use condoms have regular partner, while 33.2% of students who use condoms report not having a regular partner.

3.2 Sexual Practices

Regarding sexual practices, we observed that among the three types of practices we asked about, vaginal sex is the most practiced (83.9%), followed by oral sex (75.6%) and finally anal sex (24.7%). By examining the data, we can see that there are some differences between sexual practices and the subjects' gender. Through observation of Table 2, it can be concluded that there are significant differences between genders in the practice of anal and oral sex, but not in relation to the practice of vaginal sex.

Table 2. Results for the frequency of sexual practices by sex (n=1018)

		Men	Women	Total	p
Anal sex practice	No	17.5%	56.2%	73.7%	0.000
	Yes	14.3%	12.0%	26.3%	
Vaginal sex practice	No	2.8%	7.2%	10%	0.467
	Yes	28.9%	61.1%	90%	
Oral sex practice	No	4.6%	15.1%	19.7%	0.005
	Yes	27.2%	53.1%	80.3%	

3.3 Sexually Transmitted Diseases (perceived prevalence)

When asked whether they had contracted a sexually transmitted disease, 11.1% of the students answered “yes” and 88.9% answered “no” (Table 3). When analysing the data, there was a STD prevalence rate of 9.9% since the beginning of their sex life.

Table 3. Results for the perception of having or having had an STD, between genders and estimated prevalence (n=1018)

		Men	Women	Total	p
Had or has a STD	No	30.1%	58.8%	88.9%	0.010
	Yes	2.4%	8.6%	11.1%	
Estimated prevalence		2.2%	7.7%	9.9%	

The most mentioned STD, by respondents who said they had contracted one of these diseases at some point in their life, was candidiasis (6.4%), followed by the Human Papilloma Virus (HPV) with 1.5% prevalence in this sample, and followed by Genital Herpes (0.7%).

3.4 Current symptoms

The results obtained allow us to say that 16.8% of the respondents have symptoms that may be indicative of a possible STD. From the total sample, we found that the symptoms most frequently reported were "penile or vaginal discharge" (5%), "pain or burning in the throat" (3.63%), "burning sensation while urinating" (2.95%) and "burning sensation in the genitals" (2.36%). Table 4 shows the percentages of each symptom as well as the estimated prevalence.

Table 4. Results for the symptoms’ frequency and estimated prevalence (n=1018*)*

Perceived symptom	Frequency	Prevalence
presents vaginal or penile discharge	51	5%
has burning sensation in the genitals	24	2.36%
presents anal discharge or pain in the anus	5	0.49%
presents mucus or blood in the faeces	11	1.08%
has pain or burning throat	37	3.63%
presents itching or rashes	13	1.28%
has burning sensation while urinating	30	2.95%
Total	171	16.8%

3.5 Knowledge of Sexually Transmitted Diseases

Analysing the responses given regarding knowledge on STD's, we found that 42.6% of participants responded correctly to questions about STD's, 13.2% answered the questions incorrectly, 38.7% said they did not know the correct answer, and 5.4% of respondents left the question blank (not answered). Thus, we can say that 51.9% of students did not respond correctly to questions by having insufficient knowledge concerning STD's. Through the observation of Table 5, one can see that there are differences between the sex of individuals and the number of right answers in the scale of knowledge on STD's. It was noted that women have a higher percentage of correct responses than men. This difference can be confirmed by observing that from 20 to 25 correct answers on STD's were given by 66.2% of women, compared to 33.8% of men, these differences being statistically significant (p = 0.004).

Table 5. Results for the number of correct answers on the knowledge about STD's between genders

		Men	Women	Total	p
Number of correct answers	Between 0 and 4	4.7%	6.9%	11.6%	0.004
	Between 5 and 9	8.7%	14.5%	23.2%	
	Between 10 and 14	10.4%	25.2%	35.6%	
	Between 15 and 19	5.3%	17.0%	22.3%	
	Between 20 and 25	2.5%	4.8%	7.3%	

3.6 Knowledge about STDs as Predictors of the Symptoms' Occurrence

In order to predict if the level of knowledge about STD's determines the occurrence of STDs or symptoms, a linear regression analysis was performed. The results show a significant effect between the degree of knowledge about STD's and the occurrence of STD's or symptoms (Table 6), indicating that the symptoms depend on the knowledge.

Table 6. Results for the linear regression for the dependent variable (having had an STD) and knowledge about STDs (n=1018)

Model		B	Std. Error	t	Sig.
1	(Constant)	1.011	.031	32.258	.000
	Correct Knowledge	.033	.010	3.351	.001

4. DISCUSSION

The results of this study have revealed that students have low levels of knowledge regarding STD's (as assessed by the number of correct answers), although women show higher results, which is consistent with previous studies [31,32,33]. Also, these differences may have to do with the women's role within society and their biological vulnerability to STD's (that leads them to seek out more information), and not only to the disproportioned prevalence within our sample.. Given that many students may seek or obtain information about STD's through informal sources [34], these results may be reflecting more the contact peers or internet than with the formal public health information sources.

A high proportion of participants reported sexual activity and low awareness of the occurrence of infection by an STD. These results may differ from other studies that indicate that young people have poor perceptions regarding STD's, perhaps because of the nature of the sexual activity that may be associated with unwanted pregnancies or trust established within a committed relationship.

In Portugal, there are no epidemiological on the exact proportion of STD's in the general population, via direct diagnosis, being this particularly true in the population of university students. However, we know that the health consequences are high, especially infertility problems, pregnancy complications, increased risk of HIV infection, HPV associated with the occurrence of cervical or anal cancer, not to mention the economic consequences of the treatments associated with a STD.

As seen in other studies [35], the prevalence of an STD among students was 9.9% over a lifetime, and 16.8% in the current moment, which is a high number especially considering the consequences of this type of diseases. In fact, the incidence of diseases such as syphilis or HPV continues to increase, while other diseases such as gonorrhoea or chlamydia remain very high. [36,37]. In Portugal, it is still necessary to expand and improve the service network of STD's detection, because there is still insufficient information that, as observed by the establishment of the predictive relationship between having had a STD and knowledge about it, leads to a possible non-recognition of the risk.

These results also reinforce the need for prevention programs aimed at reducing infection with an STD in university students, as well as the need for STD's testing as a routine practice by the family doctors.

5. LIMITATIONS

This study is not without limitations. The students who participated are from different higher education institutions, as well as very different scientific areas (e.g., for instance, students from health sciences may be more informed than students from other scientific areas). Moreover, taking into account how the data was collected, it is only possible to support the results on the basis of the based on the indicated perceptions regarding self-evaluation of symptoms, making it impossible to confirm the diagnosis. Nevertheless, given the sample size, though somewhat heterogeneous with regard to the proportion of women, we can say that it is a cohort that contributes with important insights for research in this area.

Given the characteristics of the sample (university students), it is possible that the results regarding information reflect some qualitative differences, due to possible increased exposure to formal and informal information, to which they are subjected in the academic environment, although the training areas are very varied.

6. CONCLUSION

While the majority of university students had heard about STD's, their knowledge was inadequate. Our results showed that the lack of knowledge about STD's was a significant predictor of perceived symptoms, emphasizing that sexual education and information on this level, targeting young people in general and university students in particular, should be made available. Young people continue to place themselves and their partners at risk, therefore, it is very important that Universities take part in the prevention efforts that aim at

reducing the transmission of STD's/HIV and unwanted pregnancies in Portugal. Since education until high school is compulsory in Portugal, and sexual education programs that reach all adolescents were only compulsory after 2011, further studies to test whether junior high school-based programs might be effective should be implemented in the future. Nevertheless, the need to introduce sexual education at the university level is urgent in order to increase students' awareness about the problem and prevention of STD's including HIV/AIDS.

CONSENT

All authors declare that informed consent was obtained from the participants for publication of this study.

ETHICAL APPROVAL

All authors hereby declare that this research has been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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COMPETING INTERESTS

The authors have declared that no competing interests exist.

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