

Research Paper

Title: Sexually transmitted diseases: Knowledge and perceived prevalence of symptoms in university students

Abstract

The aim of this study is to evaluate the levels of knowledge about the perceived prevalence of STD and STD occurrence, in Portuguese university students. 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. The results indicate that students have inadequate knowledge about the STD's, the lifelong perceived prevalence of an STD was 9.9%, and the actual perceived prevalence of symptoms associated with an STD was 16.8%. Finally, a linear regression was performed, highlighting a significant effect between the degree of knowledge about STDs and the occurrence of a STD or symptoms, which indicates that the symptoms depend on the knowledge. These results reinforce the need for investment

20 in prevention programs in order to increase the information and reduce infection by a
21 STDs in college students.

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24 **Keywords**

25 Sexually transmitted diseases, knowledge, university students, Portugal

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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 of people at risk of infection by sexually transmitted diseases (STDs) (1, 2, 3). This leads to the need to pay special attention regarding the analysis of 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 STDs occur in people younger than 25 years (4, 5, 6). This vulnerability to infection by STDs 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 an STD; however, it is known that less than half the university students report using it in their sexual relations (10, 11, 12, 13, 14, 15), and individuals also tend not to perform any screening tests for STD's, including HIV (10). Several studies in the area of STD's and university students have tried to make more explicit what these barriers are. For example, 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, which implicit in its use (17). On the contrary, among the reasons given for not using condoms, are: the fear of spoiling involvement; concerns of a sexual nature; unexpected/impulsive sexual behaviours; embarrassment about asking to use a condom; or submission of women to man during the intercourse (17). Other aspects that may be associated with unsafe sex, and the consequent exposure to risk, may be: poor communication about sexual matters between parents and children (18), consumption of alcohol and other drugs (19, 20), the use of non-regular sexual partners, including sex workers (21), and history of pregnancy and of a previous STD (22).

Psychological aspects such as positive health beliefs and self-efficacy regarding the condom use were identified as primary predictors for the intention to use condoms or take a test for an STD, being that the high gravity perceived regarding HIV is an important obstacle (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 an

STD. In short, sexual health practices happen in a cultural context in constant change, where the meanings and vulnerabilities in the way young people contract a STD should be analysed and understood (28).

In Portugal, there is no research on STDs in university students. Besides this, the fact that there are no legal requirements to report most of these diseases to the health authorities, and that sex education practices are not always consistently implemented at various educational levels, research that allows for a better understanding of this reality is necessary. Thus, this study aims to assess knowledge of Portuguese university students about STDs, their sexual behaviours and perceived prevalence of STDs (present and past).

METHODS

Participants

The following inclusion criteria were used to select the participants for this study: (1) individuals of both sexes, (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 in the History are (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 finally Arts (3%) (see table 1).

Table 1. Sample Characterization

		<i>N=1018</i>	<i>Percentage</i>	<i>Mean (SD)</i>
			<i>(%)</i>	
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
Study Area	Another	48	4.7
	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

Instruments

The instruments used in this study were a "Sociodemographic Questionnaire", the "Sexually Transmitted Disease Knowledge Questionnaire" and "Sexual Risk Behaviours Questionnaire" (male and female versions).

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 items yielded a Cronbach's alpha of 0.86.

The Questionnaire on Sexual Risk Behaviours was built for the purpose of this study and aims at assessing whether a person has the possibility of having contracted a sexually transmitted disease during the last 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, 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. It was, therefore, a symptom checklist. Regarding

the other questions, 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.

Procedures

First, we developed the research protocol with two versions, a male version and a female version, consisting of three parts. The first part was composed by a socio-demographic questionnaire, the second by a questionnaire on the knowledge about STDs, 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 explain to the subject that the answers would only be used within the study and they were completely anonymous and confidential.

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 the universities, polytechnics and colleges of the entire country, presenting this research, and requesting the link was forwarded to the students' e-mails. The research protocol, including the questionnaire, was institutionally ratified by all the institutions involved and the participants were informed of the research objectives.

RESULTS

Sexual Characterization

We observed that 96.07% of respondents have already had sex, 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 say they use condoms in their sexual relationships and that the majority (76.3%) claims having only one stable sexual partner, 40.5% said they use condoms

during 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 say they do not have a regular partner.

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 sex of subjects. Through observation of Table 2 it can be concluded that there are significant differences between the sexes 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)

		<i>Men</i>	<i>Women</i>	<i>Total</i>	<i>p</i>
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%	

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 analyzing 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)

		<i>Men</i>	<i>Women</i>	<i>Total</i>	<i>p</i>
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%).

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)

<i>Perceived symptom</i>	<i>Frequency</i>	<i>Prevalence</i>
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%

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 STDs, 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 STDs. 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 STDs. 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 were given by 66.2% of women, compared to men 33.8%, 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.

		<i>Men</i>		<i>Women</i>	<i>Total</i>	<i>p</i>
Number of correct answers	Between 0 and 4	0	4.7%	6.9%	11.6%	0.004
	Between 5 and 10	5	8.7%	14.5%	23.2%	
	Between 11 and 15	11	17.6%	27.7%	45.3%	

	and 9			
	Between 10	10.4%	25.2%	35.6%
	and 14			
	Between 15	5.3%	17.0%	22.3%
	and 19			
	Between 20	2.5%	4.8%	7.3%
	and 25			

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215 **Knowledge about STDs as predictors of the symptoms' occurrence**

216 In order to predict if the level of knowledge about STDs determines the occurrence of
 217 STDs or symptoms, we proceeded to a linear regression analysis. The results show a
 218 significant effect between the degree of knowledge about STDs and the occurrence of
 219 STDs or symptoms (Table 6), indicating that the symptoms depend on the knowledge.

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

<i>Model</i>	<i>t</i>		<i>Sig.</i>
	B	Std. Error	

1	(Constant)	1.011	.031	32.258	.000
	Correct Knowledge	.033	.010	3.351	.001

DISCUSSION

This study is not without limitations. The students who participated are from different higher education institutions, as well as very different scientific areas. Moreover, taking into account how the data was collected, it is only possible to support the results on the basis of 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 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.

The results of this study have revealed that students have low levels of knowledge regarding STDs, although women show higher results, which is consistent with some studies (31, 32, 33). Given that many students may seek or obtain information about STDs 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 of STD, 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 studies that allow us to assess the exact proportion of STDs 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 an 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 large number considering the characteristics 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 STDs detection, because there is still insufficient information that, as observed by the establishment of the predictive relationship between having had an STD and knowledge about it, leads to the possibility of a 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 to claim the STDs testing as a routine practice by the family doctors.

Competing interests:

The Authors declare that there is no conflict of interest

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