

# SEXUAL KNOWLEDGE AND ATTITUDES AND SEXUAL RISK BEHAVIOURS AMONG COLLEGE STUDENTS

CONHECIMENTOS, ATITUDES E COMPORTAMENTOS SEXUAIS  
DE RISCO ENTRE ESTUDANTES UNIVERSITÁRIOS/AS **PT**

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CONOCIMIENTOS, ACTITUDES Y COMPORTAMIENTOS SEXUALES  
DE RIESGO ENTRE ESTUDIANTES UNIVERSITARIOS **ES**

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## ABSTRACT

Several factors, including sexual knowledge and attitudes, influence sexual behaviours among college students. Scientific research suggests that positive information and attitudes regarding condom use and sexually transmitted infections (STI) have a strong association with protective behaviours. This study aimed to analyze knowledge and attitudes about STIs and attitudes towards condom use. This a cross-sectional study with a representative sample of college students ( $n = 840$ ) in one university in Portugal. A validated self-reported questionnaire was administered to a proportional stratified random sample of students. By analyzing the sexual risk behaviours of sexually active students in the last 12 months, it was found that 18.7% of respondents reported having two or more sexual partners, 60.1% did not always use or almost always a condom and 32.3% had sexual intercourse after ingesting alcohol or consuming illicit psychoactive substances. The level of knowledge about STI transmission is  $3.99 \pm 1.194$  (6 possible correct answers), and the level of attitudes towards STIs and condom use were moderate. University students present gaps in knowledge and attitudes about STIs and condom use that may condition the adoption of protective health behaviours. These results show the importance of promoting health in higher education, especially in the area of sexuality.

**Keywords:** *sexual knowledge, sexual attitudes, sexually transmitted infections, condom use, higher education.*

## RESUMO

Vários fatores, incluindo os conhecimentos e as atitudes sexuais, influenciam o comportamento sexual entre estudantes universitários/as. As investigações científicas sugerem que informações e atitudes positivas em relação ao uso de preservativos e infeções sexualmente transmissíveis (IST) têm uma forte associação com os comportamentos sexuais de risco. Este estudo teve como objetivo analisar o conhecimento e as atitudes sobre as IST e em relação ao uso do preservativo. Trata-se de um estudo transversal com uma amostra representativa de estudantes universitários ( $n = 840$ ) de uma universidade em Portugal. Um questionário de autorrelato validado foi administrado a uma amostra estratificada e proporcional de estudantes. Ao analisar os comportamentos sexuais de risco dos/as estudantes sexualmente ativos nos últimos 12 meses, constatou-se que 18,7% dos/as inquiridos/as relataram ter dois ou mais parceiros sexuais, 60,1% não usava sempre o preservativo e 32,3% teve relações sexuais após a ingestão de álcool ou do consumo de drogas ilícitas. O nível de conhecimento sobre a transmissão de IST foi de  $3,99 \pm 1,194$  (6 possíveis respostas corretas), e o nível de atitudes em relação ao IST e ao uso de preservativo foi moderado. Os/as estudantes universitários/as apresentam lacunas no conhecimento e nas atitudes sobre as IST e o uso do preservativo que podem condicionar a adoção de comportamentos de proteção. Esses resultados mostram a importância da promoção da saúde no ensino superior, principalmente na área da sexualidade.

**Palavras-chave:** *conhecimento sexual, atitudes sexuais, infeções sexualmente transmissíveis, uso de preservativo, ensino superior.*

## RESUMEN

Varios factores, incluidos los conocimientos y las actitudes sexuales, influyen en el comportamiento sexual entre los estudiantes universitarios. La investigación científica sugiere que la información y las actitudes positivas hacia el uso de condones y las infecciones de transmisión sexual (ITS) tienen una fuerte asociación con el comportamiento sexual de riesgo. Este estudio tuvo como objetivo analizar el conocimiento y las actitudes sobre las ITS y en relación con el uso del condón. Se trata de un estudio transversal con una muestra representativa de estudiantes universitarios ( $n = 840$ ) de una universidad de Portugal. Se administró un cuestionario de autoinforme validado a una muestra estratificada y proporcional de estudiantes. Al analizar las conductas sexuales de riesgo de estudiantes sexualmente activos en los últimos 12 meses, se encontró que el 18,7% de los encuestados reportaron tener dos o más parejas sexuales, el 60,1% no siempre usó condón y el 32,3% tuvo relaciones sexuales luego de beber alcohol o consumir drogas ilegales. El nivel de conocimiento sobre la transmisión de ITS fue de  $3,99 \pm 1,194$  (6 posibles respuestas correctas) y el nivel de actitudes hacia las ITS y el uso de condones fue moderado. Los estudiantes universitarios tienen lagunas en el conocimiento y las actitudes sobre las ITS y el uso de condones que pueden afectar la adopción de comportamientos protectores. Estos resultados muestran la importancia de la promoción de la salud en la educación superior, especialmente en el área de la sexualidad.

**Palabras clave:** conocimiento sexual, actitudes sexuales, infecciones de transmisión sexual, uso del condón, educación superior.

# INTRODUCTION

The stage of one's life that corresponds to the academic path (re)presents an era of quick changes in the psycho-social development of young people. In this stage, youngsters typically experiment reinforced sensations and emotions which are reinforced by the concept of invulnerability granted by youth (Dutt & Manjula, 2017; Shiferaw et al., 2014), which, when put and acting together along with the concentration of peers and with the absence of paternal supervision (Des Rosiers et al., 2013), exposes young adults to behaviors which constitute a danger and a risk for their health, including sexual ones.

The most recent international data estimates that young people with age ranges between 15 and 24 years are responsible for half of the new sexually transmissible diseases (Centers for Disease Control and Prevention, 2017) and account for almost or nearly/around 33% of new HIV infections (Joint United Nations Programme on HIV/AIDS, 2018). In Portugal, about 10% of all new infections, in 2017, occurred among young people of ages between 20 and 24, with sexual transmission being the most common way of contracting the disease (Direção-Geral da Saúde & Instituto Nacional de Saúde Doutor Ricardo Jorge, 2019). In this sense, the best way to substantially diminish the prevalence of Sexually Transmissible Illnesses (STIs) continues to be the reduction of risky sexual behaviors (Gebresilasie et al., 2017; Yang et al., 2019), which is why it is important to fully comprehend or achieve a higher and better understanding of the predictive factors for this type of behavior(s).

In accordance with the findings stemming and arising from scientific investigations, including the most recent ones, and, although it is considered that students attending higher education are fully aware of the risks and preventive mechanisms of/for STIs, the risky sexual behaviors are (still) highly prevalent (Abiodun et al., 2014; Díaz-Cárdenas et al., 2014; Merki-Feld et al., 2018; Oppong Asante, 2013; Sherab et al., 2019; Shiferaw et al., 2014; Yang et al., 2019). These behaviors encompass initiating sexual activity at an early age, having multiple sexual partners, having sexual relations under the influence of alcohol or drugs and unprotected sex due to failure to use the condom.

Early sexual relations appear in the available scientific literature associated to a higher tendency to having multiple sexual partners and thus higher probabilities of contracting STIs, including HIV (Ma et al., 2009). Sexual relations with multiple partners display a high prevalence among students belonging to higher education, especially when combined with sexual relations carried out after the ingestion of alcohol (Agardh et al., 2011). Although the scientific evidence indicate that the consistent usage of condom reduces up to 80% the risk of HIV infection (Weller & Davis-Beaty, 2002), unprotected sexual relations continue to be at the top in the list of risky sexual behaviors (Castro, 2016; Dolphin et al., 2018; Fairfortune et al., 2020; Folasayo et al., 2017; Golbasi & Kelleci, 2011; Hoffman et al., 2017; Kebede et al., 2018; Magalhães, 2016; Makgale & Plattner, 2017; Mavhandu-Mudzusi & Asgedom, 2016; Pastor & Rojas-Murcia, 2019; Perera & Abeysena, 2018; Santos et al., 2016; Saraçoğlu et al., 2014; Shapiro et al., 1999; Xu et al., 2019).

Risky sexual behaviors may be attributed to various factors, among which a low level of knowledge about sexuality in general or negative attitudes towards STIs, or the usage of condom. Although the cognitive factor may provide a basis for action (Abiodun et al., 2014; Oppong Asante, 2013), it will not by itself be enough, which means, a higher level of knowledge cannot necessarily guarantee a responsible and safe sexual behavior. Therefore, along with knowledge, attitudes are among the theoretical constructs that more accurately predict sexual behaviors (Fernández Rouco et al., 2018; Salam et al., 2016), functioning as facilitators for changes in sexual behavior.

Scientific research has shown that, in many societies, university students do not possess enough knowledge about sexuality, namely ways of transmitting or preventing STIs (Chen et al., 2016; Dutt & Manjula, 2017; Elias et al., 2017; Evcili & Golbasi, 2017; Fernández Rouco et al., 2018; Mukherjee et al., 2019; Olubola, 2014; Oppong Asante, 2013; Soleymani et al., 2015).

This study aimed to analyze the knowledge about STIs, the attitudes towards STIs and those towards the usage of condom and risky sexual behaviors among university students attending a University in Northern Portugal.

## 2. METHODS

### 2.1 SAMPLE

A total of 5447 students were registered in the 1st and 3rd year of integrated bachelors and master's degrees, in the 2018/2019 academic year. For this purpose, a stratified probabilistic sampling of university students was performed according to the year of study (1st and 3rd year) and the scientific area (Human and social sciences, Law and economic sciences, Exact and natural sciences and Engineering sciences).

In this study of transversal nature and scope with a representative sample of university students ( $n = 840$ ) of a university in Portugal, the data was collected by means of a validated self-report questionnaire, without biochemical confirmation.

### 2.2 INSTRUMENTS

Nowadays there are multiple scientific instruments duely validated in order to efficiently monitor the prevalence of risky sexual behaviors in university students, such as the National Youth Risk Behavior Survey (CDC, 2017). Similarly, we can also find in the scientific literature various scales developed to analyze the knowledge and attitudes about sexuality present in the Handbook of sexuality-related measures (Davis et al., 1998). Therefore, in order to satisfy the purposes of the present study, we developed a questionnaire, in accordance with the procedures defined by Bowling (1998): building on the scale (1<sup>st</sup> stage); validation of content (2<sup>nd</sup> stage); psychometric validation (3<sup>rd</sup> stage). The preliminary version of the questionnaire was applied to a sample of 32 students, which was not included in the final sample.

In the questionnaire, we included socio-demographic variables (sex, age, scientific area, academic year, weight and height (to calculate the BMI), romantic status, professional situation and current residence) and specific questions related to:

- Risky sexual behaviors: Having sexual relations; Age of the 1<sup>st</sup> sexual relation; Number of sexual partners in the last 12 months; Usage of condom in the last 12 months; Having sexual relations after the ingestion of alcohol in the last 12 months;
- Knowledge about the STIs: scale of 6 items with the following answering options — True, False, I Don't Know.
- Attitudes related to the knowledge about risky sexual behaviors: scale composed by 5 items (Perception of STIs - 3 items and Perception regarding usage of condom — 2 items) in a Likert scale of 5 points (1 — I totally disagree, 5 — I totally agree).

### 2.3 PROCEDURES AND STATISTICAL ANALYSIS

All students belonging to the courses selected for the stratified sampling were personally invited to take part in the study. At the end of a class, randomly selected, belonging to the respective courses, the objectives of the study were presented and after informed consent

(with information about confidentiality, anonymity and voluntary participation), the students filled a questionnaire in paper format, in the context of the classroom. The answer rate was of 96.2% (95% CI 94.8-97.6), 33 questionnaires were excluded because they had not been answered or were incorrectly filled. This way, a total of 873 university students were invited.

All ethical procedures regarding research with human beings referred to by Christensen, Johnson and Turner (2015) were complied with and the study was approved by the Ethics Commission of the University.

The data was analyzed by means of statistical software, namely IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, NY, USA). The results show the analysis of the frequencies and the contingency tables, as well as the execution of tests of statistical inference, such as Pearson's correlation, the Chi-Square test and independence tests such as t-student and single-directional unity (ANOVA).

The linear generalized model was developed including only the variables which showed to have a statistically significant effect in the probability of resulting in risky sexual behaviors. A significance level of 0.05 was given.

Risky sexual behaviors were defined as: having had sexual relations at 16 years of age or less; having two or more sexual partners in the last 12 months; failing to always use condom during the sexual relation in the last 12 months; having sexual relations after the ingestion of alcohol in the last 12 months. We classified and categorized the questions according to a binary method, attributing 1 point to those who reported had these risky sexual behavior.

For the knowledge scale, the number of correct answers was added in order to provide us with a general figure for knowledge, which means that the higher the number in the scale, the higher the level of knowledge is.

The scale regarding perceptions of STIs made up of 3 items varies between 3 and 15 and the scale of perceptions of condom usage is composed of 2 items, varying between 2 and 10, with the highest figure attributed to the sum of the items meaning the more negative the attitudes of university students will be regarding STIs and the usage of condom.

### 3. RESULTS

The sample is composed of 464 students attending the 1st year (55.2%) and 302 students (36.0%) are enrolled in engineering courses. 376 students in the 3rd year (44.8%). The majority of enquired students was female (55.4%), was not currently in a romantic affair (58.3%), had changed their residence after entering Higher Education (64.9%), was a full-time student (88.8%) and had an BMI corresponding to the normal weight (73.1%). The average age of the sample is 20.78 (SD = 4.221).

Results show that the majority of university students (65.6%) was sexually active, with a higher prevalence of sexually active students frequenting the 3rd year (73.4%) and in the group of older students (75.5%) when compared to students in the 1st year (59.3%) and younger ones (52.1%) ( $\chi^2(1) = 18.393, p = .000$ ;  $\chi^2(1) = 49.524, p = .000$ , respectively). Moreover, we noted that at the moment of data-gathering the students that had a romantic relationship (91.9%) were more sexually active and students who had no romantic partner (46.3%) ( $\chi^2(1) = 186.081, p = .000$ ). We also found that students who worked and studied (87.1%) were also more sexually active than full-time students (62.8%) ( $\chi^2(1) = 21.603, p = .000$ ). (Table 1).

		BEING SEXUALLY ACTIVE			EARLY SEXUAL RELATIONS			SEXUAL RELATIONS WITH MULTIPLE PARTNERS			UNPROTECTED SEXUAL RELATIONS			SEXUAL RELATIONS UNDER THE EFFECT OF ALCOHOL		
		f	%	p	f	%	p	f	%	p	f	%	p	f	%	p
Academic Year	1st year	275	59.3	***	109	41.1	ns	60	21.9	ns	166	60.8	ns	73	26.7	**
	3rd year	276	73.4		104	38.0		43	15.6		163	59.5		104	37.8	
Scientific Area	Engineering Sciences	191	63.2	ns	70	36.6	ns	25	13.0	ns	107	56.0	ns	66	34.7	ns
	Exact and Natural Sciences	80	58.8		31	40.8		15	18.8		45	56.3		19	23.8	
	Jurisdictional and Economic Sciences	94	71.2		43	46.7		22	23.7		64	68.8		30	32.3	
	Social and Human Sciences	186	68.9		69	38.3		41	22.2		113	61.7		62	33.5	
Sex	Male	259	69.1	ns	110	42.8	ns	52	20.2	ns	148	57.6	ns	94	36.7	*
	Female	292	62.8		103	36.5		51	17.5		181	62.4		83	28.4	
Age	< 20	185	52.1	***	77	42.5	ns	36	19.5	ns	102	55.4	ns	46	25.0	**
	>= 20	366	75.5		136	38.0		67	18.4		227	62.5		131	36.0	
Romantic relationship	Yes	319	91.9	***	126	40.5	ns	32	10.1	***	197	61.9	ns	92	28.9	*
	No	225	46.3		86	38.9		70	31.1		128	57.7		83	37.2	
Residence	Dislocated	202	69.4	ns	74	37.4	ns	52	25.7	***	119	59.2	ns	87	43.3	***
	Not dislocated	340	63.3		134	40.4		49	14.5		203	60.2		88	26.0	
BMI	Low weight	33	56.9	ns	13	41.9	ns	6	18.2	ns	20	60.6	ns	8	24.2	ns
	Normal weight	388	64.8		143	37.7		77	19.8		235	60.7		133	34.4	
	Excessive weight	117	72.2		53	45.7		20	17.2		68	59.1		33	28.7	
Professional situation	Full-time student	464	62.8	***	176	38.4	ns	87	18.8	ns	265	57.5	**	151	32.7	ns
	Working-student	81	87.1		35	46.1		16	20.0		61	76.3		25	31.3	
Total	551	65.6		213	39.5		103	18.7		329	60.1		177	32.3		

\* p < .05; \*\* p < .01; \*\*\* p < .001; ns – not significant

TABLE 1- PREVALENCE AND CHI-SQUARE TEST OF RISKY SEXUAL BEHAVIORS DEPENDING ON SOCIO-DEMOGRAPHIC CHARACTERISTICS

The students who initiated their sexual life at an early age corresponded to 39.5% of the sexually active students. No statistically significant differences were found between an early start of sexual relations and the socio-demographic characteristics of the enquired students.

Sexual relations with multiple partners was the risky sexual behavior with the lesser prevalence among sexually active students, even though 18.7% of university students had 2 or more sexual partners in the last 12 months. The students who were not in a romantic relationship (31.1%) and those who had changed residence after entering higher education (25.7%) were the ones who presented a higher proportion of multiple partners in comparison with the students who were in a romantic relationship ( $\chi^2(1) = 38.265, p = .000$ ) and were physically dislocated ( $\chi^2(1) = 10.623, p = .001$ ), respectively.



The unprotected sexual relations were carried out by the majority of sexually active students (60.1%). This unprotected practice was more relevant among working-students (76.3%) than among full-time students (57.5%) ( $\chi^2(1) = 10.025$ ,  $p = .002$ ).

About a third of the sexually active students revealed having already had sexual relations after the consumption of alcohol in the last 12 months (32.3%). The observation of table 1 showed that older students (36%) and those frequenting the 3rd year (37.8%) acknowledged this type of practice more frequently when compared with the students belonging to a younger age group ( $\chi^2(1) = 6.749$ ,  $p = .009$ ) and those attending 1st year ( $\chi^2(1) = 7.689$ ,  $p = .006$ ), respectively. Similarly, statistically significant differences were identified between sexual relations under the effect of alcohol and the variables sex, romantic partnership and residence. Therefore, boys (36.7%), those who were in a romantic relationship (37.2%) and the ones who were dislocated from their usual residence (43.3%) showed a higher percentage of this type of risky sexual behavior when compared to girls ( $\chi^2(1) = 4.291$ ,  $p = .038$ ), students not in a romantic relationship ( $\chi^2(1) = 4.115$ ,  $p = .042$ ) and students who did not change their residence after entering higher education ( $\chi^2(1) = 17.102$ ,  $p = .000$ ), respectively.

Calculating the bi-varied correlation between the different risky sexual behaviors demonstrated the following: early sexual relations with multiple partners ( $r_{sp} = .111$ ,  $p < .01$ ), unprotected sexual relations ( $r_{sp} = .103$ ,  $p < .05$ ) and sexual relations under the effect of alcohol ( $r_{sp} = .124$ ,  $p < .01$ ). Moreover, sexual relations with multiple partners are positively correlated with sexual relations under the effect of alcohol ( $r_{sp} = .307$ ,  $p < .01$ ). Generally, university students displayed, on average,  $1.50 \pm 1.071$  risky sexual behaviors, with 57.1% of sexually active students referring 2 or more behaviors of this type and 17.8% of students referring engaging in no risky sexual behavior.

The level of knowledge about sexuality was of  $3.99 \pm 1.194$  correct answers, varying between 0 and 6 correct answers, allowing us to conclude that university students display a moderate level of knowledge.

An analysis of table 2 indicated the existence of statistically significant difference between the level of knowledge and the scientific area of study, the professional situation and the practice of sexual relations under the effect of alcohol. In this sense, students attending courses in the area of exact and natural sciences possess a level of knowledge higher than that of students belonging to engineering sciences courses ( $Z(3,824) = 3.590$ ,  $p = .013$ ). Working-students responded, on average, correctly to more questions than full-time students ( $t(818) = -2.046$ ,  $p = .041$ ). Finally, students who had sexual relations after ingesting alcohol displayed more knowledge than those who reported not having engaged in that type of behavior ( $t(539) = -2.159$ ,  $p = .031$ ).

		LEVEL OF KNOWLEDGE ABOUT STIS			PERCEPTION OF STIS			PERCEPTION OF THE USAGE OF CONDOM		
		M	DP	p	M	DP	p	M	DP	p
Academic Year	1st year	4.03	.056	ns	6.53	2.119	ns	5.28	1.767	**
	3rd year	3.94	.061		6.55	2.216		5.64	1.823	
Scientific Area	Engineering Sciences	3.82	.076	*	6.59	2.237	ns	5.75	1.672	***
	Exact and Natural Sciences	4.18	.089		6.27	1.989		5.23	1.710	
	Jurisdictional and Economic Sciences	4.07	.102		6.57	2.165		5.44	1.930	
	Social and Human Sciences	4.04	.070		6.60	2.159		5.19	1.871	
Sex	Male	3.91	.065	ns	6.72	2.268	*	5.76	1.721	***
	Female	4.05	.053		6.39	2.062		5.18	1.822	
Age	< 20	4.01	.063	ns	6.52	2.063	ns	5.13	1.752	***
	>= 20	3.97	.055		6.56	2.234		5.67	1.802	
Romantic Relationship	Yes	4.09	.062	ns	6.49	2.214	ns	5.72	1.939	***
	No	3.93	.055		6.57	2.138		5.23	1.675	
Residence	Dislocated	3.98	.069	ns	6.43	2.067	ns	5.45	1.770	ns
	Not dislocated	4.01	.052		6.57	2.190		5.42	1.824	
BMI	Low weight	4.10	.147	ns	6.23	1.832	ns	5.53	1.670	ns
	Normal weight	3.98	.048		6.53	2.112		5.43	1.818	
	Excessive weight	4.01	.099		6.76	2.418		5.56	1.769	
Professional situation	Full/time student	3.96	.045	*	6.54	2.140	ns	5.41	1.781	ns
	Working student	4.23	.105		6.57	2.312		5.73	1.973	
Being sexually active	Yes	4.04	.051	ns	6.53	2.203	ns	5.75	1.892	***
	No	3.89	.071		6.56	2.085		4.84	1.432	
Early sexual relations	No	4.05	.063	ns	6.55	2.084	ns	5.62	1.787	ns
	Yes	4.02	.089		6.55	2.381		5.94	2.000	
Sexual relations with multiple partners	No	4.04	.055	ns	6.44	2.204	ns	5.69	1.871	ns
	Yes	4.08	.124		6.90	2.182		6.04	1.970	
Unprotected sexual relations	No	4.12	.076	ns	6.55	1.997	ns	5.11	1.657	***
	Yes	4.00	.068		6.54	2.329		6.19	1.917	
Sexual relations under the effect of alcohol	No	3.97	.065	*	6.54	2.321	ns	5.63	1.806	*
	Yes	4.21	.079		6.49	1.936		6.01	2.050	
	Total	3.99	1.194		6.54	2.162		5.44	1.800	

\* p < .05; \*\* p < .01; \*\*\* p < .001; ns – not significant

TABLE 2- AVERAGE, PATTERN DEVIATION AND INDEPENDENCE TESTS (ANOVA AND T-STUDENT) FOR THE SOCIO-DEMOGRAPHIC CHARACTERISTICS AND THE RISKY SEXUAL BEHAVIORS DEPENDING ON THE KNOWLEDGE ABOUT STIS AND THE PERCEPTION OF STIS AND CONDOM USAGE

The perceptions of university students regarding STIs and the usage of condom showed themselves to be moderate, with the average of scales being  $6.54 \pm 2.162$  and  $5.44 \pm 1.800$ , respectively. However, we did not identify any statistically significant correlation between the variables previously referred to.

Regarding the perceptions of STIs, we verified the existence of differences in the perception of boys and girls. Which means, boys displayed a more negative level of perception regarding STIs when compared to girls ( $t(823) = 2.156, p = .031$ ) (Table 2).

In what concerns the scale of perceptions towards usage of condom, we identified differences depending on certain socio-demographic characteristics. The students who were attending the 3rd academic year and older students displayed a higher average when compared to students in the 1st year ( $t(829) = -2.844, p = .005$ ) and younger students ( $t(829) = -4.280, p = .000$ ), respectively. This means that the first possess more unfavorable perceptions towards the usage of condom. In the same sense, students attending courses in the area of scientific sciences present more negative attitudes regarding condom usage, when compared to students of the social and human sciences and exact and natural sciences areas ( $Z(3,827) = 5.454, p = .001$ ). Regarding boys and students who were in a romantic partnership, a higher average is shown in the scale of perceptions of when compared to girls ( $t(829) = 4.676, p = .000$ ) and to the students who were not in a romantic partnership ( $t(822) = 3.850, p = .000$ ).

Regarding sexual behaviors, sexually active students who, in the last 12 months, had unprotected sexual relations and engaged in sex after consuming alcoholic beverages displayed more unfavorable perceptions towards the usage of condom when compared to students who never had sexual relations ( $t(829) = 7.171, p = .000$ ), those who did not have unprotected sexual relations ( $t(539) = -6.767, p = .000$ ) nor under the effect of alcohol ( $t(540) = -2.203, p = .028$ ).

In the model, the variables which had a statistically significant effect in the model were: Perceptions regarding the usage of condom ( $G2(1) = 30.541, p = .000$ ); being in a romantic partnership ( $G2(1) = 6.135, p = .013$ ) and current residence ( $G2(1) = 7.102, p = .008$ ) (Table 3).

		B	ERROR	X2 WALD	DF	P	EXP(B)	95% CI	
Intercept		.795	.1592	24.936	1	.000	2.214	1.621	3.024
Romantic relationship	Yes	-.229	.0924	6.135	1	.013	.795	.664	.953
	No	0a					1		
Current residence	Yes	.251	.0941	7.102	1	.008	1.285	1.069	1.545
	Not dislocated	0a					1		
Perception of Condom Usage		.132	.0239	30.541	1	.000	1.141	1.089	1.196

a Reference category

OR: odds ratio; 95 CI: 95 confidence interval

TABLE 3 - ADJUSTED ODDS RATIO (OR) AND CONFIDENCE INTERVALS OF 95 (CI) OF THE LINEAR GENERALIZED MODEL FOR PREDICTING RISKY SEXUAL BEHAVIORS

The model accurately predicted that university students who had a romantic partnership and had changed their residence after entering higher education had a lesser propensity towards engaging in risky sexual behaviors. Moreover, the more negative the perceptions regarding condom usage, the greater the probability will be of students engaging in risky sexual behaviors.

## 4. DISCUSSION

This study evaluated the knowledge, perceptions and risky sexual behaviors of students attending a university in Northern Portugal, demonstrating, based on the results and the discussion presented later on, the need for higher education institutions to develop socio-educational programs with education in sexuality content.

The results of this study corroborate the results of the national study done about the same topic (Santos et al., 2016) and, in the same way as in international studies, the majority of university students was sexually active (Fernández-Silva & Sánchez-Martínez, 2018; Kebede et al., 2018; Leon-Larios & Macías-Seda, 2017; Mavhandu-Mudzusi & Asgedom, 2016; Shapiro et al., 1999; Spindola et al., 2019; Villafañe-Ferrer & González-Navarro, 2017).

Generally, potentially risky sexual behaviors were reported by 82.2% of sexually active university students. This high level of prevalence of risky sexual behaviors is corroborated by the findings of recent studies carried out with students of Higher Education (Sherab et al., 2019; Yang et al., 2019), although a systematic review of the literature with Ethiopian university students estimates a prevalence ranged from 23.3% to 60.9% (Amare et al., 2019). However, this review only considered risky sexual behavior the unprotected vaginal, oral, or anal intercourse.

The inconsistent usage of condom during sexual relations was the analyzed risky behavior with the highest prevalence among university students. The ones enquired in this study, just like the university students recently enquired in the context and scope of studies carried out by others, reported an inconsistent usage of condom in the majority of sexual relations (Castro, 2016; Dolphin et al., 2018; Fairfortune et al., 2020; Folasayo et al., 2017; Golbasi & Kelleci, 2011; Hoffman et al., 2017; Kebede et al., 2018; Magalhães, 2016; Makgale & Plattner, 2017; Mavhandu-Mudzusi & Asgedom, 2016; Pastor & Rojas-Murcia, 2019; Perera & Abeysena, 2018; Santos et al., 2016; Saraçoğlu et al., 2014; Shapiro et al., 1999; Xu et al., 2019).

Factors increasing young people's vulnerability to infection include poverty (Amare et al., 2019), characteristic of developing countries. However, the practice of unprotected sexual relations seems to be transverse to all university students, regardless of the country and its culture.

The majority of enquired individuals had started their sexual lives at 17 years of age or less, as in other investigations (Shapiro et al., 1999; Spindola et al., 2019; Villafañe-Ferrer & González-Navarro, 2017), showing that entering higher education tends to co-occur with the age of the first sexual experience or occurs during the academic path (Ma et al., 2009; Mavhandu-Mudzusi & Asgedom, 2016). On another note, it is necessary to point out that a minimum of about 40% university students reported already having had sexual relations before enrolling in university (Magalhães, 2016; Rodríguez Carrión & Isabel Traverso Blanco, 2012).

Although some studies (Askun & Ataca, 2007; Mukherjee et al., 2019) demonstrate a tendency for boys to become sexually active at an earlier age than girls, the results obtained did not produce evidence of these differences (Mavhandu-Mudzusi & Asgedom, 2016; Saraçoğlu et al., 2014).

Sexual relations under the effect of alcohol in the last year were reported by 32.3% of university students, which, although comprising what can easily be considered a high prevalence, is lower than the majority of analyzed studies (18.9% - Makgale & Plattner, 2017; 25.20% - Mavhandu-Mudzusi & Asgedom, 2016; 27.1% - Gebresllasie et al., 2017; 39.9% - Magalhães et al., 2016; 33.0% - Santos et al., 2016; 55% - Villafañe-Ferrer & González-Navarro, 2017; 56.3% - Á. Castro, 2016; 56.8% - Leon-Larios & Macías-Seda, 2017; 64.2% - Golbasi & Kelleci, 2011).

Sexual relations with multiple partners is one of the most important factors associated to STIs (Chen et al., 2016), however, in the last 12 months, this risky behavior was reported by 18.7% of university students. Analogous results were shown in international studies (Ma et al., 2009; Mavhandu-Mudzusi & Asgedom, 2016; Peltzer et al., 2016; Yi et al., 2018), in which, for example, 12.9% of students reported having had more than one sexual partner in the last six months (Magalhães, 2016), 26.2% of the enquired ones reported having had two or more sexual partners in the three months prior to the study (Makgale & Plattner, 2017) and the majority had already had more than one sexual partner in their lives (Spindola et al., 2019). Other international studies showed higher percentages of sexual relations with multiple partners (59.3% - Golbasi & Kelleci, 2011; 64.4% - Kebede et al., 2018; 66.7% - A. T. Folasayo et al., 2017). Although in the present study we did not specify the type of sexual partners, a national study showed that a considerable proportion of students reported having had sexual relations with occasional partners (32.0%) (Santos et al., 2016).

Although globally the gender of the enquired individuals does not predict the risky sexual behaviors (Makgale & Plattner, 2017), when they are analyzed separately, boys reported the practice of sexual relations after the ingestion of alcohol more frequently when compared to girls, and we found existing studies which provide similar data and evidence or results (Hoffman et al., 2017). In the same sense, contrary to what was to be expected, due to the fact that it was verified in various studies (Amare et al., 2019; Chi et al., 2012; Gebresllasie et al., 2017; Hoffman et al., 2017; Leon-Larios & Macías-Seda, 2017; Magalhães, 2016; Mavhandu-Mudzusi & Asgedom, 2016; Perera & Abeysena, 2018; Sherab et al., 2019; Yi et al., 2018), no statistically significant differences were identified in the usage of condom and the number of sexual partners between girls and boys.

The current scientific investigations revealed other correlations, namely between unprotected sexual relations and sexual relations under the effect of alcohol (Castro, 2016; Chanakira et al., 2014; Magalhães, 2016; Ssewanyana et al., 2015) and between unprotected sexual relations and having multiple sexual partners (Makgale & Plattner, 2017; Sherab et al., 2019), although the data arising from the present study does not corroborate these findings (Leon-Larios & Macías-Seda, 2017; Peltzer & Pengpid, 2015).

Students attending Higher Education displayed a moderate level of knowledge of STIs (Folasayo et al., 2017; Santos et al., 2016; Sohbet & Geçici, 2014; Soleymani et al., 2015; Villafañe-Ferrer & González-Navarro, 2017), showing a higher level of knowledge than the one registered in other studies (Chen et al., 2016; Dutt & Manjula, 2017; Elias et al., 2017; Evcili & Golbasi, 2017; Fernández Rouco et al., 2018; Mukherjee et al.,

2019; Olubola, 2014; Soleymani et al., 2015). Even so, the results showed that a lot of that knowledge remains superficial and full of myths (Dutt & Manjula, 2017; Spindola et al., 2019; Xu et al., 2019). Mukherjee and colleagues (2019) refer that the fact that the main source of information is the group of peers could in part account for high indexes of wrong information transmitted.

Previous studies had already demonstrated that women had better knowledge (Folasayo et al., 2017; Fonte et al., 2018; Leon-Larios & Macías-Seda, 2017; Oppong Asante, 2013; Santos et al., 2016; Saraçoğlu et al., 2014; Shu et al., 2016; Sohbət & Geçici, 2014), however, in the present study, we did not identify those differences, with the average of correct answers given by boys and girls being identical.

Unlike what was verified in other researches in this area (Evcili & Golbasi, 2017; Folasayo et al., 2017; Fonte et al., 2018; Oppong Asante, 2013; Reis et al., 2013; Sohbət & Geçici, 2014; Soleymani et al., 2015), in which it was determined that the level of knowledge increases with age, this associated was not identified (Leon-Larios & Macías-Seda, 2017).

Similarly to what was verified in the study by Santos, Ferreira and Santos (2016), the scientific area of study also influence the knowledge of students. In accordance with these authors, those who have an education in the areas of life and health sciences displayed a higher level of knowledge. In the present study, however, the students belonging to exact and natural sciences were the ones who displayed more knowledge about STIs.

The perceptions of STIs were moderate, as is consistently reported in the literature (Santos et al., 2016; Sohbət & Geçici, 2014). In this context, international scientific research and investigations reported that youngsters, in a general way, consider it unlikely to contract STIs or HIV (Amare et al., 2019; Haile et al., 2017; Olubola, 2014; Rojas-Murcia et al., 2015), which means that they indicated a low level of perception of the susceptibility to risk. Therefore, the programs for prevention of STIs in the academic context must continue to address STIs and their ways of transmission (Haile et al., 2017).

The average scores attributed to the perception of STIs among male students was higher than those attributed to female ones (Evcili & Golbasi, 2017; Fernández-Silva & Sánchez-Martínez, 2018; Leon-Larios & Macías-Seda, 2017), showing perceptions considered to be more unfavorable towards these infections.

The perceptions regarding the usage of condom, although also moderate, with an obtained average which was only slightly higher than the average point of the scale, implies unfavorable perceptions. As can be verified in the study carried out by Shapiro and colleagues (1999), university students tend to agree that the usage of condom makes sexual relations less pleasant and that those who are in a stable and long-lasting relationship does not need to use a condom. In the same sense, more recent investigations report that many university students believed that condoms reduced pleasure during the sexual relation(s) (Mukherjee et al., 2019) and that the trust put on sexual partners and the stability of romantic relationships justified the absence of the usage of condom (Pastor & Rojas-Murcia, 2019).

In accordance with a systematic review of the existing literature carried out by Kabwama and Berg-Beckhoff (2015), inconsistent results can be observed regarding the correlation between knowledge about HIV and the perception of risk among university students. And the other studies which explicit a lesser degree of knowledge concluded that this fact was directly associated to a higher prevalence of risky sexual behaviors (Li et al., 2017; Perera & Abeysena, 2018; Shapiro et al., 1999). This way, although knowledge is obviously essential for young people to make informed and responsible decisions, one cannot

ignore their inability to understand the risk even when they possess a good or fair level of knowledge. And for that reason, in a general way, this study demonstrated that the level of knowledge is not directly correlated with the perceptions and risky behaviors (Dutt & Manjula, 2017; Xu et al., 2019).

As happened in previous studies (Santos et al., 2016; Yang et al., 2019), the perceptions regarding the usage of condom were a prominent predictor of risky sexual behaviors. Moreover, it is necessary to consider and take into serious account the students who changed their residence at the time of enrolling in higher education and the students who are not in a romantic partnership or relationship, due to the fact that these groups of students have a higher probability of engaging in risky sexual behaviors.

## CONCLUSIONS

This present study evaluated the knowledge and the perceptions of STIs and the risky sexual behaviors in the context of Higher Education. University students displayed a high prevalence of risky behaviors, such as unprotected sexual relations, those engaged upon under the effect of alcohol or with multiple sexual partners. The level of knowledge and the perceptions about STIs and the usage of condom was moderate, although we did not detect any correlation between these variables.

Among the predictors, or predictive factors, variables such as the perceptions regarding the usage of condom, having a romantic relationship or the current residence were statistically significant and directly correlated with the inconsistency of condom usage, multiple sexual partners, practicing sexual relations after the ingestion of alcohol and early sexual relations.

This study made it possible to further understand the factors that constitute an influence towards risky sexual behaviors among higher education students, and to conclude that understanding those factors is indeed of invaluable importance, not only for their predictive character, but also because the development of educational programs on sexuality may significantly improve when these interactions are subject to scientific study and known. In this sense, the data gathered in this investigation reinforces the need for higher education institutions — also due to the fact that the beginning of sexual activity usually occurs during the academic period — to incorporate debates on sexuality, to include in their curricular component actual educational content dealing specifically with the subject of sexuality and the prevention of STIs, in order to enable youngsters and young university students in general to make conscious and responsible decisions.

Two limitations should be taken into account. Firstly, it should be noted that the data-gathering was carried out in only one university, and for that reason transversal data make it more difficult to generalize the data provided by other Portuguese universities. And, secondly, the data-gathering was carried out by resorting to the appliance of a self-report questionnaire and taking into account the sensible character of the topic, students may have over or under-reported their sexual behaviors in their accounts or answers.

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