Sexual Health: sexual knowledge, behavior and social determinants in the students of the University of Porto –a cross sectional study

Raquel Araujo Almeida (✉ raquel_araujo_almeida@hotmail.com)

Faculty of Medicine, University of Porto <https://orcid.org/0000-0003-4030-3391>

Paulo Santos

Faculty of Medicine of the University of Porto

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Abstract

Background: When considering sexual health, the youth is a particularly susceptible group. In Portugal, structured sexual education is available, however, 23.5% of new HIV cases in 2017 occurred in a population aged 15-29 years old. We attempt to understand the range of sexual health knowledge in youth, along with sexual behaviors and their influencing characteristics. Our main aim is to describe the relation between knowledge and sexual health-related behavior. **Methods:** This observational cross-sectional study involved an online questionnaire covering different areas of sexual health applied to students from the University of Porto, Portugal. This was used to create a knowledge and behavior score. Socio-demographic characteristics were used to examine associations with the scores. The relationship between the scores was assessed with Pearson's bivariate correlation. **Results:** Out of 1815 questionnaires, 988 (54%) were validated. The mean score for knowledge was 3.74 out of 5 (95% confidence intervals [CI]: 3.69-3.77) and 3.4 out of 5 (95% CI: 3.38-3.44) for the behavior score. The knowledge score was influenced significantly by age and whether students frequented degrees in health-related studies. Only gender influenced sexual behavior. The correlation between knowledge and behavior was statistically significant with $p < 0.01$ and a coefficient of +0.127. **Conclusion/Discussion:** Knowledge is an essential but insufficient determinant for health literacy. We urge the development of a sexual health prevention/education program which considers the interacting factors and motivates participants to integrate the assimilated information on a daily basis.

Background

Sexual health is defined as a state of physical, emotional, mental and social well-being concerning sexuality, not merely the absence of disease, dysfunction or infirmity. This is a broad topic which includes sexuality and relationships, the respect for sexual rights, pleasure and safeness of sexual experiences, and the freedom to choose without coercion, discrimination or violence. Sexuality is intrinsic to human beings, encompassing not only the reproductive processes, but also sex and relationship roles, sexual orientation and gender identities, eroticism, pleasure and intimacy. The interaction of biological, psychological, social, economic, political, cultural, legal, historical, religious and spiritual factors is fundamental in understanding human sexuality. [1]

[1] However, sexually transmitted infections (STI) and unwanted pregnancies are relevant restraints, functioning as threats that may limit the freedom of options regarding behaviors and lifestyles. The majority of risk factors are well-known and most of them are preventable: young age, recent change of sexual partner, increased number of sexual partners, young age at first sexual intercourse, previous history of STI, inconsistent use of condoms, and difficulty in accessing health services.[2]

Literacy is the key for an effective preventive approach. [3] Education using trained providers intends to improve knowledge and attitudes about sexual health, particularly in most vulnerable core groups, such as adolescents and emerging adults. [4] Nevertheless, education is only fully effective if it is complemented by the shaping of competences leading towards better health behaviors. The aim of

health education is an informed population, empowered to better decisions in their own lifestyle options [3, 5] and thus positively remodeling their own health. [6] Sexual education programs showed to have positive effects, leading to an increase in knowledge and a reduction of risk behaviors and STIs. [7] Furthermore, they also provide access to family planning and medical assistance, in an environment of trust and confidence. [8]

Young people are particularly vulnerable to both unwanted pregnancy and STIs: about one third of the 340 million yearly STI transmitted worldwide affect people under 25 years old. Indeed, over half of new infections by the Human Immunodeficiency Virus (HIV) occur between 15 and 25 years of age [9] and one-third of gonorrhea and chlamydia infections occur between 20 and 24 years. [10] College students are more likely to demonstrate high risk behaviors: 11% of sexually active college students do not use any form of effective birth control and 29% report not using condoms consistently. [10]

In Portugal, sexual education is inserted at all levels of school curricula since 2009 (1984 parliament law nº. 3/84 of the 24 of March). Assuming that all students were enrolled in these programs, it should be expected that this population would have better behaviors, fewer unwanted pregnancies, fewer abortions and fewer STIs. In the last decade in Portugal, there has been a 50% reduction of births to mothers below the age of 20 years, along with a 15% reduction in legal abortions, however, the total birth rate declined by roughly 25%. The incidence of new HIV infections reduced in the same time period, but the incidence and absolute number of syphilis and gonorrheal infections increased. In 2017, 23.5% out of the 886 new HIV cases occurred in the youth aged 15-29 years and about one third of the 15 959 abortions realized occurred in females under the age of 25 in Portugal. [11]

Although information and knowledge is provided, the acquisition of attitudes leading to sexual health competences is not guaranteed. Unfortunately, in this manner health literacy is not achieved, [8] and the actual impact of sexual educational programs is largely unknown. [12]

The aim of this study is to characterize the relationship between knowledge and behavior related to sexual health, while understanding the influence of individual characteristics on sexuality and its impact on behavior.

Methods

We conducted a cross-sectional study using students enrolled in the University of Porto in Portugal.

This university consists of 14 faculties, hosting over 20 000 students in a total of 34 bachelor's degrees and 18 integrated master's degrees, and about 10 000 students in postgraduate education.

All Portuguese speaking students aged over 16 years attending a pre-graduation course at the University of Porto were eligible for participation.

A minimum sample size of 1 492 participants was estimated, assuming an unknown distribution of the main outcome and a maximum error of 2.5%, for a 95% confidence interval.

The data collection occurred from March 2018 to May 2018. Invitations to participate were sent every three weeks via the institutional email system over four different occasions until the predicted sample size was reached.

The applied questionnaire was based on those used by Reis et al [13] and Nobre et al, [14] previously validated for Portuguese utilization. Questions intended to characterize the students' behaviors, knowledge, attitudes, intentions, comfort and competences about sexual health, as well as their interest and perceptions about sexual education. We also evaluated social and demographic variables including age, gender, studying in a health-related course, socioeconomic characterization by Graffar Index, residence type, sexual orientation, lifestyle habits and spirituality. Spirituality is a wide concept influencing participants' points of view regarding sexuality and sexual experiences. [1] Questions evaluating knowledge were classified as dichotomic true or false variables. A five-point Likert scale was used to characterize behavior. Spirituality was checked in four categories: atheist, believing in a personal God, belief in a living force/spirit and no formal opinion. All items with incomplete responses were treated as missing data.

Questions were categorized as knowledge-related and behavior-related, according to the characteristics of effective sexual health education programs described by Kirby et al for HIV/AIDS interventions. [15]

Knowledge about sexuality focused on four areas: general knowledge, oral contraception, condom use and HIV/AIDS, accounting for a total 30-item scale. Correct answers were worth 2 points, partially correct answers were awarded 1 point, while incorrect or unknown answers were not awarded any points. A maximum of 60 points was transformed into a 0-5 classification by simple division by 12, with 5 as the highest score and 0 as the lowest score.

Students' sexual behavior was assessed by 20 different questions considering the use of contraception, the frequency of occasional partners, sex under the influence of alcohol or drugs and an individual history of STI or unwanted pregnancy. Answers were classified between 0-4 points using the Likert scale with a maximum of 80 points, transformed by simple division by 16 into a scale classifying behavior between 0-5.

The study protocol was assessed and approved by Ethical Committee of Hospital de São João / Faculty of Medicine of University of Porto. The conduction of research followed the principles of Helsinki Declaration and the Oviedo Convention regarding the protection of human rights in the biomedical investigation, as per Portuguese Law. Although it was distributed by e-mail, the first page of the web-form included information for participants and asked for their explicit consent, allowing refusal with an automatic dropout from the study.

We used descriptive and inferential statistics. Knowledge and behavior scores were dichotomized in high or low, according to the median (3.83 and 3.75, respectively). Logistic regression was used to check the association with univariate analysis using both the knowledge and behavior scores. Other variables were dichotomized taking into account the primary representation in the population studied: heterosexuality vs

other, spirituality (believing in God or a living force/spirit) vs non-spirituality, mean age (younger or older than 21), and socioeconomic classification by Graffar Index where the first category corresponds to the upper class and the fifth category to the lower class. The test of Kolmogorov–Smirnov test was used to check for normal distribution. Multiple logistic regression was performed to analyze eventual confounding and interaction. The relationship between the scores of knowledge and behavior was assessed by Pearson's bivariate correlation. We accepted an alpha error of 0.05. Data were registered in a Microsoft Office Excel 2013 ® database and analyzed using IBM SPSS Statistics ®, version 25.0 (IBM Corp., Armonk, NY, USA ®).

Results

Overall, 1815 participants answered the questionnaire, of which 1131 responses were considered valid (62.3%). Incomplete questionnaires were the main reason for considering these invalid. As expected by the demography of University of Porto, participants were mainly Portuguese, living in an urban area, with a mean age of 21.6 (± 3.0) years old. Females represented 73.3% of the responses. Most students were attending a bachelor's degree (57.6%), 54.9% in health-related courses. Upper middle and upper socioeconomic class represented 76.5% of students. Less than half of the population declared some kind of spiritual commitment, such as believing in a personal God or in a living force/spirit (48.5%). Heterosexuality was the most prevalent sexual orientation (77.0%) in a population where 91.3% of students were sexually active and 74.3% had attended at least one sexual education program.

Table 1 shows the demographic characteristics of our sample.

Overall, 988 questionnaires (87.4%) were completely answered allowing to calculate knowledge and behavior scores.

The mean knowledge score was 3.74 out of 5.00 (95%CI: 3.69-3.77), varying from 1.00 to 4.83 points. In 880 valid answers, the average behavior score was 3.41 out of 5.00 (95%CI: 3.38-3.44), varying from 0.88 to 4.55 points.

Knowledge and behavior scores were dichotomized as high or low according to the median of distribution of each score. Figure 1 shows the association with age, gender, health-related course of studies, spirituality, socioeconomic classification, habitational zone and sexual orientation for both scores.

In univariate analysis, knowledge is lower in those under 21 years of age (OR=0.54; 95%CI:0.42-0.70) and higher in those attending health-related courses (OR=3.28; 95%CI:2.52-4.26). Only gender seems to play a significant role in the behavior adopted by the students, with males presenting higher risk behaviors than females (OR=1.62; 95%CI:1.23-2.32).

Multivariate analysis, after adjusting for the factors shown in Figure 1, confirmed the previous findings; age (namely students younger than 21 years) was associated with lower knowledge scores (OR=0.56;

95%CI:0.43-0.74; $p<0,001$), while attending a health-related course was associated to a higher knowledge score (OR=3.27; 95%CI:2.50-4.27; $p<0,001$), and females presented better behavior scores (OR=1.58; 95%CI:1.10-2.28; $p<0.05$).

Knowledge and behavior scores were intrinsically related (Figure 2): a higher knowledge score was associated with better behavior scores, although the correlation found was weak ($\rho=0.127$; $p<0.01$).

Discussion

The relationship found between knowledge regarding sexual issues and behavior in university students is significant, although weak. We found that students presented satisfactory knowledge scores (3.74 out of 5.00), meaning that sexual education programs succeeded in transmitting information, but these appear to fail at enabling students to apply this knowledge on a daily basis. Under the concept of health literacy, a stronger association between knowledge and behaviour in sexual health could be expected. Indeed, a higher knowledge rate should be translated itself in a practice of safer sex [16, 17], although this type of knowledge does not necessarily reflect a higher level of health literacy, as described by Nutbeam (2000) [18].

Our results are consistent with previous studies. Kirby (2010) showed that inconsistent use of condoms and contraceptives is not directly related to a scarcity of knowledge. [19] Weinstein (2008) even found that greater knowledge was associated with less consistent condom use. [20] This phenomenon could be justified by the fact that having sexual risk behaviors are related to feelings of threat. Threat here refers to an eventual behaviour perceived as risky or which may thus lead to an active demand for information. In this model, risky experiences are the motive for improving information, inverting the cause-effect relationship. Conversely, the practice of safe sex and the consequent low risk perception may justify some indifference to the need to keep informed, thus conditioning less knowledge. [21] This interactive pattern emphasizes that knowledge is an important, but insufficient, determinant to adequate health literacy. The link between knowledge and behavior relies on working on the intrinsic individual characteristics, including their personal beliefs as well as perceived benefits, barriers and efficacy of education. [22] Changing behaviors must not only depend on the general threat of an undesired pregnancy or contracting an infectious illness, but also through understanding these individual characteristics and their interactions. This may lead to a real possibility to integrate safer practices into a daily routine. [16] Training the youth to become peer educators is a feasible strategy to reach the desired goals through the creation of a confidential, informal and judgmental environment while allowing the shared exploration of the different dimensions of sexual health.

Additionally, we identified population characteristics influencing knowledge and behavior. Knowledge scores were higher in older students and in those attending a health-related course. Only female gender was shown to be associated with better behavior. The behavior of students undertaking health-related courses may be considered paradoxical, as the behavior demonstrated did not match the increased information available to these students. Frank et al (2008), in the USA, [23] demonstrated a similar level

of knowledge in medical students, however, Fayers (2003) [24] and Warner (2018) [25] found no relation between better information and better behavior patterns. As may be expected, older students collect more information through lifelong continuous learning, [26] which consequently leads to a greater knowledge base. In this specific context, the admission to college and the perception of autonomy and independence are potential conditioners of better behaviors. [9] Late adolescence and emerging adulthood is a phase of experimentation in several dimensions, including sexuality. [27, 28] Younger ages are generally related to higher rates of ISTs and to risky behaviors, such as multiple sexual partners, sexual intercourse under alcohol or drugs consumption, [29] and the perception of being free of disease regardless of the risks. [30] An apparent lack of improvement with age in college students may be justified as a functional feature related to financial dependence and student status, which may extend risk behaviors until graduation. Although not significant, we noticed a tendency for better behavior with higher socioeconomic status, in accordance with the literature. [30-33]

Gender is the only factor significantly associated with sexual behavior. As described in other studies, [7, 9, 13, 34-36] we found males to be more prone to engage in sexual risk-taking behaviors, based on a balance between evolutionary psychology and social role perspectives. Evolutionary theory defends that this difference is largely innate and biologically-based due to the different mating strategies of men and women. [37, 38] In contrast, social roles are mostly acquired and resultant from both formal and informal education. [39] More recently, a holistic approach for gender differences takes in account both of these dimensions. [7] It proposes that gender-typed behavior is a product of the respective reproductive activities and physical attributes in conjunction with the organizational demands of societies. [7] Although societies are evolving to be more permissive, a negative connotation towards sexuality is still enrooted in some women, perpetuating the social double-standards by which judgmental-free sexuality preferentially relates to men. [40] Women are expected to engage in long-lasting relationships, while men are expected to value sexual experiences. [41] Males are not prejudiced when engaging in sexual interactions and masturbation, while females may be conflicted about embodied sexual feelings. [42]

Religion and spirituality are usually significant factors in the experience of sexuality. [23, 30, 34] We assessed this by asking participants their spiritual affiliation. In Portugal, religious questions are restricted for research purposes, which limits the specific characterization of religious denominations. No relationship was found in our population. The impact of spirituality is seen mainly at the beginning of sexual life. Additionally, the strength of spiritual conviction is not equivalent to the concept of participation and religious affiliation, and this analysis should also be different. [43]

Unlike Laura Kann et al (2018), in United States, [44] we found no evidence of the influence of sexual orientation over both knowledge and sexual related behaviors. The Youth Risk Behavior Surveillance – United States, 2017 pointed riskier behaviors in lesbians, gays, bisexuals and transgenders in comparison with heterosexuals. The scholar context of our population, linked to safer practices, [12] may influence this outcome.

Our results must be interpreted while considering the limitations of this study. Firstly, the sample was limited to active students of the University of Porto. These students are part of a higher educated population and the results might be influenced through this social context. Dropping out of school appears to be associated with increased sexual risk-taking behavior [12] such as a lack of consistent use of contraception [45] or unwanted pregnancy. [46] Secondly, these students were asked to participate through dynamic emails. We cannot guarantee that all emails were updated, or that all students have access to institutional emails. Furthermore, the participation in the study was optional. It is likely that students who participated in this questionnaire may present different characteristics to those who did not participate. These students may have a special interest in sexual health, potentially overestimating their level of knowledge and behaviors. Additionally, the questions used, although based on validated and language-adapted questionnaires, may have been misunderstood or misinterpreted. Finally, even though the questions were reliable and verified [15], the composed comparison scores were not, which could insert an error in the statistical analysis. As far as we know, there is no gold standard to evaluate knowledge and sexual behaviors in this population, although numerous scales have been previously used. [20, 21, 47]

In conclusion, although we succeeded in transmitting information to a college population, we are still far from transforming this knowledge into attitudes and skills leading towards better behaviors. This urges us to change the paradigm and to implement strategies to empower emerging adults to put into practice the knowledge acquired, thereby creating a healthy sexual environment. Knowledge, although not sufficient, is a necessary condition for better literacy, and strategic goals must be adapted to the current situation for real improvement of sexual-related behaviors, favoring a sexuality which is healthy, safe, responsible and satisfactory.

Even though it is not possible to extrapolate our results to non-college students, we believe that similar patterns may be present in other populations. As health-care providers, we should reflect on what these results may mean not only for our patients, but also in our personal lives.

Indeed, do we practice what we preach?

Declarations

Ethics approval and consent to participate

The study protocol was assessed and approved by Ethical Committee of Hospital de São João/ Faculty of Medicine of University of Porto. The conduction of research followed the principles of Helsinki Declaration and the Oviedo Convention concerning the protection of human rights in biomedical research, as according to Portuguese Law.

Consent for publication

The first page of the web-form included information for participants and asked for their explicit consent, allowing refusal with an automatic dropout from the study.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests

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Authors contributions:

All authors, Raquel Almeida and Paulo Santos, made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND

- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Tables

Table 1 : Demographic characteristics				
Gender		Male 298 (26.3%)	Female 833 (73.7%)	Total 1131
Mean Age (SD)		21.8 (±3.0)	21.5 (± 3.0)	21.6 (±3.0)
Nationality	Portuguese	283 (95%)	790 (95.1%)	1073 (95%)
	CPLC *	13 (4.4%)	32 (3.9%)	45 (4%)
	Other	2 (0.6%)	9(1%)	10 (1%)
	No answer	0 (0%)	2 (0.2%)	2 (0.2%)
Habitationnal Zone	Rural	53 (17.8%)	193 (23.2%)	246 (21.7%)
	Suburban (<70 000 inhabitants)	115 (38.6%)	311 (37.4%)	426 (37.8%)
	Urban (>70 000 inhabitants)	130 (43.6%)	328 (39.4%)	458 (40.5%)
	No answer	0 (0%)	1 (0.1%)	1(0.09%)
Socioeconomic status **	Upper	132 (44.4%)	267 (32.1%)	399 (35.4%)
	Upper middle	93 (31.3%)	371 (44.7%)	464 (41.1%)
	Middle	67 (22.6%)	167 (20.1%)	234 (20.7%)
	Lower middle	4 (1.3%)	26 (3.1%)	30 (2.7%)
	Lower	1(0.3%)	0 (0%)	1 (0.09%)
	No answer	1 (0.3%)	2 (0.2%)	2 (0.2%)
Schooling	Bachelor	160 (53.9%)	490 (59%)	650 (57.6%)
	Integrated Master	127 (42.8%)	291 (35%)	418 (37,1%)
	Other	10 (3.3%)	50 (6%)	60 (5,4%)
	No answer	1 (0.3%)	2 (0.2%)	2 (0.2%)
Study course	Health-related degree	156 (52.3%)	466 (56%)	622 (55%)
	Other degree	142 (47.7%)	367 (44%)	509 (45%)
	No answer	0 (0%)	0 (0%)	0 (0%)
Spirituality	Atheist	92(31.3%)	152 (18.4%)	244 (21,8%)
	Personal God	59 (20.1%)	203 (24.5%)	262 (23,4)
	Living force/spirit	65 (22.1%)	217 (26.2%)	282 (25,1%)
	Without formal opinion	78 (26,5%)	255 (30.8%)	333 (29,7%)
	No answer	4 (1.3%)	6 (0.72%)	10 (0.9%)
Sexual orientation	Heterosexual	193 (68.7%)	639 (80%)	832 (77.0 %)
	Homosexual	67 (23.8%)	101 (12.6%)	168 (15,6%)
	Bisexual	21 (7.5%)	59 (7.4%)	80 (7,4%)
	No answer	17 (5.7%)	34 (4.1%)	51 (4.5%)
Sexual Activity	Yes	268 (90.2%)	761 (91.7%)	1029 (91.3 %)
	No	29 (9.8%)	69 (8.3%)	98 (8.7%)
	No answer	0 (0%)	0 (0%)	0(0%)
Sexual Education	Yes	217 (72.8%)	623 (74.8%)	840 (74,3%)
	No	81 (27.2%)	210 (25.2%)	291 (25,7%)
	No answer	0 (0%)	0 (0%)	0 (0%)

Figures

* Socioeconomic characterization is based on Graffar Index

Figure 1

Influence of sociodemographic factors in knowledge (A) and behaviors (B) about sexual issues in university students.

Figure 2

Relationship between knowledge and sexual behavior