Knowledge of sexually transmitted infections and risky behaviours: a survey among high school and university students

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Summary

Introduction. *STIs are a serious public health problem. Worldwide, 500 million people a year acquire a STI, and young are the most affected.*

Methods. *This study was conducted administering an anonymous questionnaire to 1228 Sicilian students of high school and university.*

Results. *The students had variable understanding of STIs and their complications. The results demonstrate an extreme variability in the knowledge of STIs. Multiple linear regression showed that sexual health knowledge was associated with age and sexual orientation.*

Conclusions. *Our results show that knowledge of STIs is poor and inadequate. This finding can put students at risk of STIs.*

Introduction

Sexually transmitted infections (STIs) are one of the most serious public health problems around the world, both in industrialized and in developing countries. According to WHO estimates, STIs have an annual incidence of 357 million cases among which chlamydia (131 million), gonorrhoea (78 million), syphilis (5.6 million) and trichomoniasis (143 million) [1]. Worldwide, almost one million people contract an STI every day, and most of them are unaware of their infection status, representing thus a source of infection for others [1]. From these data should be ruled out HIV, the incidence and effects of which on the health and socio-economic status of entire countries [2-4] especially African those, have been considered, since long time, a real emergency [5]. Since the mid-1990s, an increase in the frequency of diagnosed sexually transmitted infections, including syphilis, gonorrhoea and chlamydia, has been reported in several European countries, especially among adolescents between 16 and 19 years of age [6].

The most at-risk age group is adolescents, as they represent half of newly acquired STIs cases; in Italy, 19.5% of all new cases of STIs are diagnosed in young people (15–24 years old) [7, 8]. The risk is high in this age group because young people have a low level of awareness of the risks related to their sexual behaviour [9]. The reduction of age at first sexual intercourse is a possible explanation for the increase in the number of sexually transmitted diseases [10]. Many studies have shown that adolescents who begin sexual activity before the age 16 are more likely to take risks [11] as most of these sexual encounters are not adequately protected by the use of condoms [12-14]. Also Italian adolescents have their first sexual experience at a very early age (15.6 ± 1.6 years old), often without protection against STIs [15]. Furthermore, a large percentage has multiple partners [16].

The reluctance of adolescents to use condoms is another possible explanation. Some surveys showed that, among youth, the idea that using condoms greatly reduces sexual pleasure is widespread [17, 18].

Furthermore, among adolescents, condom use is not considered as protection from sexually transmitted infections, but rather as a way to avoid a possible unwanted pregnancy [19]; therefore, condom use becomes irregular when other contraceptives are used [20, 21].

Among the sexually transmitted infections, HIV is certainly the best known; nevertheless, on this subject, the degree of awareness about modes of transmission is still poor [19]. Because the sexual transmission of infections continues to represent a serious public health problem, there is a strong need to minimize behaviours that place people at risk of contracting STIs by promoting safe sexual behaviours through consistent and correct use of condoms and by advising people to avoid promiscuous relationships [22].

Based on these considerations, we administered to adolescents and young people attening their last year of high school and the first courses of university in the city of Messina, a questionnaire on their sexual behaviour and on the adoption of prevention methods, in order to as-

sess their risk perception. The questionnaire also served to understand their level of general knowledge on STIs and, in particular, that related to HIV/AIDS.

Methods

The study was conducted in Messina between January and June 2017, to analyse sexual behaviour among students and their knowledge about STIs. Particularly, we used a questionnaire reporting some questions about this topic that was specifically designed by us for this study and it was perfected and refined after having tested it on a small sample of students (20 subjects). After obtaining authorization from the headmasters, we organized a first meeting to explain the study and distribute the informed consent forms to 1,261 students. In a further meeting, a member of the research team distributed the questionnaires to students presenting the filled informed consent form accounted for 1,228 (participation rate = 98.3%). For students under 18 years of age, parental consent was obtained. Participation was voluntary, all questionnaires were anonymous, and the confidentiality of the information provided was strictly maintained. The only considered exclusion criterion was the absence of the parental informed consent for underage students.

Of 1,228 enrolled students, 832 were in their last year of high school while the university students who attended the first year of humanistic and scientific courses were 128 and 268 respectively.

Overall, the questionnaire comprised 22 questions divided into three sections concerning personal information of each student (personal details, nationality, sexual orientation) (Section 1), their knowledge about STIs, involving also questions to evaluate a highly specific scientific knowledge (Section 2), and the socio-educational aspects (adolescent's behaviours) (Section 3). Section 2 included questions with multiple answers of which only one was correct except for the question 12 that could have 6 possible correct answers. Then, for each correct answer, one point was awarded, while zero points were awarded for incorrect or missing answers. Total knowledge scores ranged between 0 and 18. Particular-

ly, knowledge scores ranging between 0 to 6 were considered as low knowledge, 7 to 12 as mean knowledge, and > 12 as high knowledge.

STATISTICAL ANALYSIS

Pearson correlation test were used to determine the predictors of sexual health knowledge. Moreover, multivariate analysis was conducted to estimate the proportion of variance in sexual health knowledge that can be accounted for by socio-demographic factors and current educational status. Analysis was performed by using the a priori model (i.e. considering as covariates all variables, regardless of P values to Pearson test) of multiple regression. The level of significance was set at 0.05. All analyses were performed using StatSoft software (StatSoft®, version 10).

Results

Table I shows the composition of the students who participated in the study by gender, age, national origin and sexual orientation, divided by field of study.

Considering sexual orientation, the number of individuals who claimed to be homosexual or bisexual increased in universities compared with high school (χ^2 28.76, $P < 0.01$). In fact, while in high schools the percentage was 8.2%, in scientific and humanistic university courses it reached 17.9% and 25%, respectively.

The Section 2 of the questionnaire investigated the actual knowledge of the students about STIs, prevention, transmission and clinical disease, in particular, on HIV/AIDS. All results obtained in the second section are shown in Table II.

The percentages of correct answers for each question demonstrate an extreme variability in the knowledge of STIs in terms of prevention, transmission and clinical disease. The average percentages of correct answers were 51.8% in high schools, while in humanities and scientific university courses, they reached 55.7% and 60.8%, respectively. Answers to the question about the methods of STIs prevention showed a good understanding of the methods to have be used; indeed, the majority of students answered

Tab. I. Socio-demographic characteristics of respondents (%).

	Secondary school	Humanistic university	Scientific university	Totals
N. students	832 (67.8)	128 (10.4)	268 (21.8)	1228
Gender				
Women	418 (50.2)	58 (45.3)	116 (43.3)	592 (48.2)
Men	414 (49.8)	70 (54.7)	152 (56.7)	636 (51.8)
Age groups				
17-19	743 (89.3)	50 (39.1)	61 (22.8)	854 (69.6)
20-22	89 (10.7)	62 (48.4)	171 (63.8)	322 (26.2)
> 22	0 (0.0)	16 (12.5)	36 (13.4)	52 (4.2)
Nationality				
Italian	816 (98.1)	122 (95.3)	265 (98.9)	1203 (98.0)
Foreigners	16 (1.9)	6 (4.7)	3 (1.1)	25 (2.0)
Sexual orientation				
Heterosexual	752 (90.4)	94 (73.4)	218 (81.3)	1064 (86.6)
Homosexual	31 (3.7)	10 (7.8)	26 (9.7)	67 (5.5)
Bisexual	37 (4.5)	22 (17.2)	22 (8.2)	81 (6.6)
Not declared	12 (1.4)	2 (1.6)	2 (0.8)	16 (1.3)

'condom'. Nevertheless, it must be emphasized that around 26% of students believe that the contraceptive pill is a means of prevention of STIs.

The most important result in this section concerns correct knowledge of the infections that could be sexually transmitted. The students were asked to select from

Tab. II. STIs knowledge of respondents (bolded the correct answers).

Question		Answers (%)				
			SS	HU	SU	Mean
Q1	Which of the following means are used to prevent sexually transmitted infections?	Birth control pill	2.2	0	3.2	
		Condom	73.2	64.1	74.3	**70.5**
		Both condom and birth control pill	22.6	31.4	20.6	
		None of the above means	2.0	4.3	1.1	
Q2	By what way you do not transmit HIV?	Blood and body fluids	9.2	5.2	7.4	
		Blood and contaminated needles	6.3	10.6	16.3	
		Saliva, urine	61.7	57.8	63.8	**61.1**
		Vertical (mother-child)	22.4	26.2	12.0	
Q3	What is the genetic material present in HIV?	DNA	28.7	31.4	22.2	
		DNA and RNA	29.3	28.1	13.5	
		RNA	30.7	34.4	57.1	**40.7**
Q4	Locate the correct timeline	Dangerous behaviour → AIDS → HIV → antiretroviral therapy	46.3	59.1	25.8	
		Dangerous behaviour → antiretroviral therapy → HIV → AIDS	15.1	14.3	11.0	
		Dangerous behaviour → HIV → antiretroviral therapy → AIDS	25.4	20.3	41.4	**29.0**
		HIV → AIDS → antiretroviral therapy → Dangerous behaviour	5.0	2.2	9.4	
Q5	What are, in your opinion, the major risk factors for transmission of HIV?	Poor hygiene of the classrooms desk	3.4	6.0	6.3	
		Blood and objects (sharp objects, needles etc.) contaminated with blood derivatives	79.6	84.4	80.6	**81.5**
		Through tears, sweat, saliva, urine, faeces, nasal secretions	11.6	7.8	7.7	
		Mosquito bites	4.2	0	3.3	
Q6	Can a person with AIDS heal?	Yes	9.1	5.1	10.1	
		No	52.8	48.4	58.2	**53.1**
		Yes, with right therapy	27.6	37.9	22.4	
		Yes, with stamina cells	7.8	8.5	6.8	
Q7	Do you think there might be a vaccine against HIV?	It exists, but I am not informed	25.4	27.0	19.0	
		It exists, but I'm afraid of the side effects of the vaccine	7.9	26.5	9.3	
		No, there is not	23.9	37.5	40.3	**33.9**
		I don't know, I was never interested	42.4	8.5	24.8	
Q8	A person seropositive for HIV who is treated, can completely eliminate the virus from his body?	Yes	10.3	2.4	13.9	
		Sometimes	31.4	27.6	14.4	
		No	30.8	32.8	48.9	**37.5**
		It depends on the person's immune response	26.1	35.8	17.6	
Q9	The HIV virus is transmitted through kissing, shaking hands or sharing public places with a HIV positive subject:	True	8.5	3.3	5.9	
		False	64.4	45.3	65.3	**58.3**
		Sometimes	19.2	23.3	16.7	
		It depends on the person's immune response	7.0	28.1	10.0	
Q10	Do you know what "seropositivity" means?	In the blood are found eosinophils that attack the virus	26.1	22.4	23.8	
		In the blood, there are not found antibodies	24.7	23.1	21.3	
		In the blood are found antibodies against the virus	21.5	37.5	36.2	**31.7**
		In the blood are found increased platelets	19.7	16.4	8.7	
Q11	Do you know which system hits the HIV virus?	Nervous system (e.g. neurons)	6.1	6.3	12.1	
		Endocrine system (e.g. thyroid follicular cells)	8.8	4.9	11.3	
		Hematopoietic system (e.g. Red blood cells and platelets)	42.3	47.8	22.7	
		Immune system (e.g. CD4 + lymphocytes)	38.8	39.1	51.5	**43.1**

continues

Tab. II. *follows.*

Question		Answers (%)				
			SS	HU	SU	Mean
Q12	Which of the following infectious diseases are transmitted primarily by sexual intercourse?	**HIV/AIDS**	99.3	100	97.4	**98.9**
		Syphilis	67.9	60.9	76.1	**68.3**
		Hepatitis A	52.8	70.3	62.7	**61.9**
		Hepatitis C	55.9	67.2	63.8	**62.3**
		HPV	23.0	40.6	41.4	**35.0**
		Meningitis	70.8	89.1	79.1	**79.6**
Q13	Which of these infectious diseases can be prevented by vaccination?	AIDS	4.1	2.0	10.3	
		Syphilis	12.3	9.4	8.9	
		Hepatitis B	41.2	46.9	54.5	**47.5**
		Scabies	24.6	35.8	17.6	
	Mean of correct answers		**51.8**	**55.7**	**60.8**	

SS: secondary school; HU: humanistic university; SU: scientific university.

Tab. III. Relationship between socio-demographic characteristics, current educational status and sexual health knowledge expressed as "Mean Score" (dependent variable).

Variable	Group	Mean score	Test	P value
Gender	Women Men	10.2 10.3	r: 0.016	0.594
Age	17-19 20-22 > 22	9.4 10.3 11.5	r: 0.129	< 0.001*
Sexual orientation	Heterosexual Homosexual Bisexual	10.6 8.5 8.1	r: -0.212	< 0.001*
Current educational status	Secondary school Humanistic university Scientific university	9.8 10.6 11.5	r: 0.209	< 0.001*

* Level of significance (p < 0.05).

Tab. IV. Multiple regression analysis showing factors associated with sexual health knowledge (Adjusted R^2 = 0.1006).

Covariates	B value	P value
Age	0.058	0.038
Gender	-0.003	0.896
Sexual orientation	-0.243	< 0.001
Current educational status	0.216	< 0.001

among a list of infections (including HIV, syphilis, hepatitis A, hepatitis C, HPV infection and meningitis) the ones they believed to be sexually transmitted. HIV/AIDS was the best known among the STIs proposed, while HPV was the less known. In particular, HIV/AIDS was correctly recognized as an STI by 98.9% of students (95% CI: 95.5-102.2), while 68.3% (95% CI: 49.5-87.2) of the respondents correctly recognized syphilis. Only 35% (95%CI: 9.1-60.9) of the students identified HPV infection as an STI.

The mean total score for knowledge, which could range from 0 to 18, was 10.3 ± 3.4 (95% CI: 10.1-10.5).

Table III shows the mean score by field of study, highlighting a growing trend in university students, especially scientific university students. The same table shows the correlations between knowledge scores versus biological variables and current educational status.

The knowledge score was positively correlated with age ($P < 0.001$); moreover, it was higher among heterosexuals compared with homosexual and bisexual subjects ($P < 0.001$). The score was also higher among Italians than foreign students ($P = 0.0048$). Moreover, university students, especially those with scientific orientation, have better knowledge of STIs ($P < 0.001$). Only 22.1% of high school students reached a knowledge score > 12, whereas the percentages increased to 28.1% and 40.7% among university humanities and scientific students, respectively.

Multivariate analysis using the a priori model of multiple regression was conducted to estimate the prediction of knowledge by socio-demographic factors and current educational status. Multiple linear regression analysis was performed by using as reference groups for each variable the younger subjects, males, and heterosexual respectively. In particular, the age was categorized in three groups and, regarding sexual orientation, we considered only heterosexual, homosexual and bisexual, ruling out the subjects that did not declare their behaviour. The results showed that sexual health knowledge was very significantly related to current educational status and, above all, to sexual orientation, while the role of age was more negligible (P < 0.05) and the one of gender was absent. As reported in Table IV, overall nearly 46% of the observed variability in sexual health knowledge was due to these factors.

The Section 3 of the questionnaire was related to questions on sexual behaviour and the sources of information received on the subject of STIs (Tab. V).

Many students have sex with casual partners and very often without protection. Thirty-two percent of high

**Tab. V.** Socio-educational aspects: sexual risk behaviour.

Question	Answers (%)				
		SS	HU	SU	Mean
Over the last 12 months, did you happen to have a sexual intercourse with a casual partner?	Yes	32.1	46.9	57.5	45.5
	No	67.0	51.6	40.7	53.1
If yes, did you use a condom?	Never	26.1	12.9	20.0	19.7
	Always	27.3	50.1	48.7	42.0
	Less than half the time	44.4	33.7	26.2	34.8
	I don't know the right way to use one	2.2	3.3	5.1	3.5
If you knew you were HIV positive	You would not tell anyone	15.9	29.7	41.8	29.1
	You would tell only your best friend	12.5	9.4	9.7	10.5
	You would tell only your partner	44.0	46.9	30.2	40.4
	You would tell everyone	24.0	12.5	14.2	16.9
From which of the following sources did you get more information about sexually transmitted infections?	Internet	34.3	39.1	25.4	32.9
	Friends, relatives	17.6	25.0	11.6	18.1
	TV, documentaries	38.6	20.3	19.0	26.0
	Physicians	7.9	12.5	41.1	20.5
Do you think that the informations on sexually transmitted infections are more reliable if provided	By school educators	26.6	7.8	16.4	16.9
	By mass-media (tv, internet)	7.6	4.7	7.5	6.6
	With information projects implemented by physicians	62.0	79.7	67.5	69.7
	With books and information brochure	2.5	4.7	6.0	4.5

SS: secondary school; HU: humanistic university; SU scientific university

school students claim to have had sexual intercourses with a casual partner, and of these, 27% said they had used a condom. The situation improves slightly among university students. In fact, among the 52% of students who said they had had sexual intercourse with a casual partner, about 50% had used a condom. In addition, an inverse relationship was observed between knowledge scores and sexual behaviour since students who reported engaging in high-risk behaviour have a lower score than those who did not. Particularly, students who had sex with casual partners without condom had a knowledge score of 8.7 (95% CI: 7.9-9.5) whereas students who do not have sex with casual partners had a knowledge score of 10.8 (95% CI: 10.5-11.0) (P < 0.001).

Figure 1 shows the main source of information on STIs and it demonstrates that the most frequent were Internet and TV for high school students, while university students claimed to have received more information from physician. On average, only approximately 18% of students declared that they had been informed about STIs by family or friends. Moreover, we found an awareness of the lack of knowledge about STIs among the young surveyed people. In fact, 62%, 80% and 68% of high school, humanities university and scientific university students, respectively, complained about the need to receive more information by qualified staff, i.e. through information projects implemented by physicians and/or health personnel.

Fig. 1. Results obtained from the Section 3 of the questionnaire. Sexual information sources and communication with parents, reported by high school students and humanistic or scientific university students.
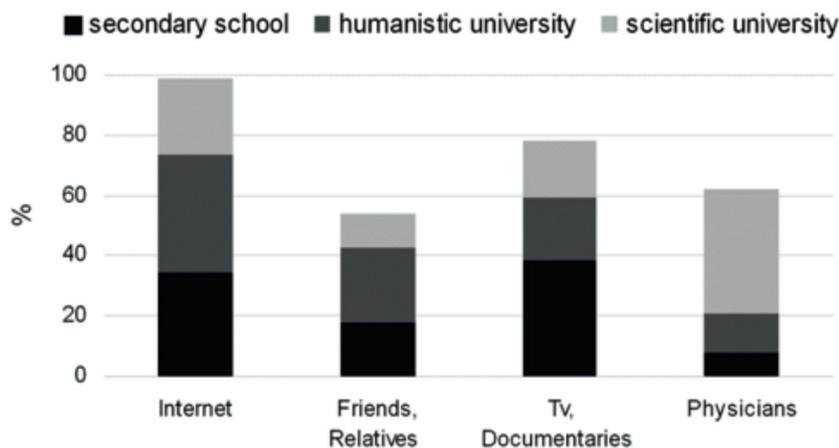
Discussion

Increasing the awareness of sexually transmitted infections starting from school age may help young people to understand the correct behaviours to adopt for living a healthier life in their own interests and that of the entire society.

Our study showed a lack of accurate knowledge and misconceptions about sexually transmitted diseases, especially in younger students. In fact, older students had higher mean knowledge scores than their younger counterparts. As individuals grow older, their sexual curiosity and development lead them to seek for more information relating to sexual issues. These findings were consistent with those of other similar studies on university students [23, 24]. Furthermore, the results of the present study showed that students in science faculties had higher levels of sexual knowledge than other students; this can be explained by the fact that these university courses cover subjects on this topic. The obtained data show that not only older students have a better knowledge, but they also have a better understanding of their own sexuality and, at the same time, less difficulties in declaring it, as evidenced by the highest percentage of homosexual and bisexual individuals being found among university students.

The highest score obtained by heterosexual compared with homosexual and bisexual students emphasizes a critical point because it shows that the most vulnerable categories are the least informed about STIs. The highest vulnerability is linked to multiple reasons: the act of unprotected anal intercourse is associated with a higher risk of transmission of STIs than vaginal and oral intercourse [25-27]. Other high-risk sexual behaviours, such as multiple sexual partnerships and rougher sex, are all linked to increased rates of transmission [28, 29].

Secondly, homosexuality remains highly stigmatized in many countries; this often means that sexual behaviour is hidden, and the homosexuals often feel uncomfortable or unable to access the sexual health services they need or to disclose their behaviour to healthcare workers for fear of discrimination [30]. All these factors stress the importance of carrying out innovative and effective communication strategies to promote a lower risk behaviour culture to hard-to-reach group such as homosexuals and bisexuals.

Only 7.9% of students were able to correctly identify all STIs from a list of diseases. In this list we included also Hepatitis A that, listing only the STIs for which sexual way is the most "known" and the principal transmission route, we did not consider it as a "true" STI despite, in recent times, there was a spread of outbreaks due to fecal-oral pathogens following sexual contacts [31-34] This is particularly troubling because it indicates how unconscious are the young about STIs and that the latter can have serious consequences to their health and the health of others. The concern is also supported by the fact that 30% of the interviewed students were not able to properly distinguish between preventive methods and contraceptive methods; indeed, among the preventive measures against STIs, the students incorrectly indicated the birth control pill.

HIV/AIDS was the best-known STI among those listed; nevertheless, the question with the highest percentage of wrong answers regarded HIV/AIDS and, in particular, it emerges from our survey that they do not know the difference between HIV and AIDS and consequently, do not know the term seropositive (correlating the two questions, Q4 and Q10, the trend is statistically significant, data not shown).

The current results are in agreement with those of a previous study, which underlined the lack of knowledge of the difference between the term HIV infection and the meaning of the acronym AIDS [19]. This rather superficial knowledge of students on the subject is very alarming, considering that in Italy, there have been thousands of new cases of HIV infection since 1982, and the annual incidence is still approximately equal to 6 cases per 100,000 inhabitants. In addition, in 2015, of 3444 new cases, 85.5% were attributable to unprotected sex [35]. Therefore, it is important to give young people more information and teach them that there is currently no cure for AIDS. Despite the remarkable goals achieved by the management of HIV infection, the awareness and the risk perception is not improved compared to the past. Indeed, in the 90's, Buysse demonstrated that young people were particularly confused about issues concerning how HIV is not transmitted [36]. Moreover, Memon also found that although young people knew the main routes of transmission of HIV they also showed some uncertainty regarding the actual mechanisms and prevention of the virus [37]. In terms of perceived educational needs, the majority of respondents in 1990 agreed that they should be taught how to protect themselves from HIV/AIDS [38] More recently, Prati et al. showed that a greater knowledge and lower risk perception are associated with a higher socioeconomic status and, in addition, in contexts where effective antiretroviral treatments have led to longer survival rates, it seems plausible that people underestimate the risk of HIV/AIDS [39].

The students we interviewed had inferior knowledge of HPV compared with their knowledge of other sexual infections. It is very important for young people to be aware of the risks of HPV infection [40-42] given that they represent the age group most at risk. Panatto et al. demonstrated that in cervical swabs with normal cytology, positivity for at least one HPV type was found in 48.1% of women aged 16-17 years, in 15.4% of women aged 18-20 years, in 21.9% of women aged 21-23 years and in 15.5% of women aged 24 to 26 years [43]. For all these reasons, it is appropriate to encourage information campaigns about this important public health issue focusing mainly on vaccinations in general and anti-HPV in particular in order to improve coverages and avoid epidemics of vaccination-preventable infections that have recently affected our territory [44, 45].

Our results showed that the most frequently referred sources of sexual health information were the internet and TV or medical and paramedical staff; these results are in line with those of two similar studies among uni-

versity students [46, 47]. Is important to emphasize that parents are important sources of information on sexual matters but were not recognized by most students as a source of information; indeed, in our study, the least frequent sources were parents and friends. This finding is consistent with the results of a previous study on awareness of school students related to sexually transmitted infections, in which families were found to be the least common sources of information on sexual matters [48]; a good relationship between parents and children is associated with lower levels of unprotected sex, unwanted pregnancies and STIs in adolescents [49, 50]. Different studies from other Mediterranean Catholic countries have indicated that parent-adolescent communication is crucial for adolescent health indicators [51-53].

In our survey, we highlight the lack of parent-child communication. A possible explanation could be the fact that talking about sex in a family is considered as a taboo. Probably, students speak little with their parents about sexual issues because of the fear that their parents may think that they are engaging in sexual activity [49].

Our investigation, in agreement with other Italian studies [54, 55], has shown that many students have casual sexual relationships, even without condoms, a risk behaviour that underscores a superficiality among students, probably attributable to poor sexual health knowledge as evidenced by the significant correlation between risk behaviour and the score, and to current sexual habits that, overtime, have become easier than the past [56, 57]. Because the knowledge about diseases and their complications are poor and students are vulnerable to unprotected sex, there is an urgent need to introduce sex education as a proper subject in Italian schools in order to promote sexual relationships practiced in a safe and responsible manner and to implement the awareness of the risk of contracting and transmitting STIs.

The European Union stressed that sex education in Italy has been and is still lacking, putting emphasis on political and religious constraints. The European Union hopes that sex education is introduced soon in Italian schools, as it has been for many years in countries such as Denmark, Sweden, France and Germany [58], countries where there has been a decrease in teenage pregnancies, abortions and sexually transmitted infections. Italian authorities have long neglected this need, the first legislative proposal for the introduction of sex education in schools began in the early 1900s, but it was not successful. The latest legislative proposal in Italy dates to November 1992. Since then, the debate continues, but not much has been done in practice [54].

Conclusions

The finding of the current study that, due to the high participation rate (98.3%), would exclude bias due to the lack of participation of the students less motivated and/or with less knowledge, showed that the level of sexual health knowledge is quite poor and there are still some misconceptions about sexual issues. Inadequate knowl-

edge may place students at risk of sexually transmitted infections, therefore, we believe that all high schools should introduce a course of sex education in the curriculum. Medical staff specialized in sexually transmitted infections, having both theoretical knowledge and practical experience in these topics, would be the most appropriate to instruct teachers and students. An exam at the end of the course would be useful to verify that students have acquired adequate knowledge, as is done in other subjects.

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Conflict of interest statement

None declared.

Authors' contributions

IP, AD and GV conceived, designed and coordinated the research; BC, FM and MPB administered questionnaires and collected data; GV, AF, MC, GFP, PS and GN contributed to the acquisition, interpretation of data, identified the endpoints analysed and prepared the figures and tables; AD, IP and GV wrote the paper.

All Authors revised the manuscript and gave their contribution to improve the paper. All authors read and approved the final manuscript.

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