Knowledge of sexually transmitted infections and sex-at-risk among Italian students of health professions. Data from a one-month survey

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Abstract

Aim. The aim of the study was to evaluate the knowledge and behavioral risks associated with sexually transmitted infections (STIs) among the students of health professions at the University of Palermo divided into two age groups (18-22 years and 23-27 years). *Materials and methods.* A self-administered questionnaire was distributed. The questionnaire is structured in three parts in addition to an introduction to socio-demographic information. The first part investigates the quality of information provided by public institutions on the subject, the second part the knowledge of contraceptive methods used to reduce the risk of contagion and the third part the knowledge of STIs and HPV vaccination. A multivariable logistic regression model was used and adjusted Odds Ratios (aOR) are presented.

Results. The sample was represented by 1022 respondents (70.8% females, 61.5% aged 18-22 years). In multivariate analyses males have a greater risk of not knowing HPV vaccine (aOR 3.52, 95% CI 2.26-5.49). The 18-22 age group has a higher risk than the 23-27 age group to think of being not sufficiently informed to avoid contagion (aOR 3.92, 95% CI 2.18-7.06), never having STIs specific tests (aOR 2.90, 95% CI 2.21-3.80), not knowing HPV vaccine (aOR 1.86, 95% CI 1.13-3.07) and not knowing that it can be administered to males (aOR 2.63, 95% CI 1.96-3.53).

Conclusions. Based on our findings, it is necessary to implement sexual education programs for the improvement of knowledge in terms of STIs and the promotion of health. Future studies are needed to assess the effectiveness and cost of education programs that should also be addressed to young adults who do not attend university.

INTRODUCTION

Sexually transmitted infections (STIs) constitute a large group of infectious diseases that pose a serious threat to public health because they can be the cause of acute and chronic diseases with severe long-term complications whose care absorbs considerable financial resources. It is estimated that a million people develop new STIs every day [1], half of which affect the young population [2, 3]. There are about 47 million new cases per year in Europe [1]. Declining age at first sexual intercourse and inconsistent condom use have been proposed as possible explanations for the increase in STIs [4]. The magnitude of the STIs phenomenon is still unknown due to the underreporting of diseases and asymptomatic manifestation of these [5]. It emerges from scientific literature that very often young adults do not have the necessary knowledge to correctly assess the risks of unprotected sexual intercourse [6, 7], and in many cases have little knowledge of STIs and their prevention methods [8, 9]. There was also an investigation into the use of the main contraceptive methods and knowledge of anti-papillomavirus vaccination (HPV). Sicily has been one of the first Regions in Italy that since 2007 offered free vaccination to girls who were 11 years of age and has extended the vaccine offer from 2015 to 11-15 years; from 2015, HPV vaccination even for males aged 11-13 years old is offered free of charge and it is extended in copayment with Sicilian Region for males up to 26 years old and for women up to 45 years old [10]. There are many reasons why humans have sexual intercourse, many pathologies are sexually transmitted and the chance increases if you are not in-

Key words

- surveys and questionnaires
- sexually transmitted infections
- sexual behavior
- university students
- Sicily

formed or do not use appropriate barrier devices such as condoms. The expression of sexuality is closely linked to socio-cultural environment, and benefits from guidance in its development [11]. The aim of the study was to evaluate the knowledge and behavioral risks associated with the STIs of the students of health professions at the University of Palermo (Italy, Sicily) aged 18-27.

MATERIALS AND METHODS

The study employed a cross-sectional study design. The questionnaires were administered in May 2017 to students of health professions at the University of Palermo, aged between 18 and 27. Simple random stratified sampling without replacement was performed. A selfadministered, anonymous and voluntary questionnaire was distributed. The questionnaire was created by the authors for this study and consists of 17 questions, it is structured in three parts in addition to an introduction to socio-demographic information (gender, age class 18-22 or 23-27, attended degree course). The first part investigates the quality of information provided by public institutions on the subject, the second part the knowledge of contraceptive methods used to reduce the risk of contagion and the third part the knowledge of STIs and HPV vaccination. The possible answers to the question: "Do you think that the quality of information provided by institutions (such as schools, health structures, etc.) is: good, sufficient, insufficient, non-existent", were dichotomized as either "sufficiently informed" (good, sufficient) or "insufficiently informed" (insufficient, nonexistent). Categorical variables were summarized as proportions and analyzed by Pearson's chi-square test. A multivariable logistic regression model was used. For each dependent variable selected adjusted odds ratios (aOR) are presented, considering the female gender as a reference category, net of the effect attributable to the age class and the quality of information provided by Institutions; considering the age class 23-27 year-olds as the reference category, net of the effect attributable to the gender and the quality of information provided by Institutions; considering the "sufficient" quality of information provided by Institutions as the reference category, net of the effect attributable to the gender and the age class. The level of significance chosen for statistical analysis was 0.05. The data was analyzed using statistical software STATA® version 14[12].

RESULTS

The questionnaire was offered to 1100 students, among these, 100% has accepted to complete the questionnaire but of the 1100 questionnaires administered 78 were excluded by authors because or had not been completed or had been compiled incorrectly (92.9% was the rate of evaluable questionnaires among those who agreed). The final sample was represented by 1022 students (females: 724, 70.8%; age 18-22: 629, 61.5%). *Table 1* shows the distribution of students with evaluable questionnaires according to the attended degree course.

Figure 1 shows data on knowledge (Figure 1A) and use (Figure 1B) of contraceptive methods, and Figure 2 shows level of knowledge on STI (Figure 2A) and on populations perceived as at risk (Figure 2B). From the

Table 1

Frequency and percentage of respondents for attended degree course

Attended degree course	Ν	%
Nursing degree	434	42.5
Physiotherapy	100	9.8
Speech therapy	96	9.4
Biomedical laboratory techniques	78	7.6
Medical radiology techniques for imaging and radiotherapy	73	7.1
Techniques for the prevention of the environment and the workplace	59	5.8
Health care	58	5.7
Psychiatric rehabilitation techniques	56	5.5
Obstetrics	40	3.9
Orthoptic and ophthalmologic assistance	28	2.7

analysis of data emerges that the most known contraceptive methods are the male condom (*Figure 1A*), which is also the most commonly used (*Figure 1B*). The most well-known STIs is HIV/AIDS, only 5% referred Hepatitis C and 4% Hepatitis B (*Figure 2A*). To the question (possibility of multiple choice): "In your opinion, who are the most at risk?" The most frequent response was "prostitutes" (65% of the answers) (*Figure 2B*).

Table 2 shows the results of the bivariate analyzes, therefore association between selected responses in relation to sex (Table 2A), age group (Table 2B) and information quality provided by Institutions (Table 2C); in relation to gender (Table 2A), from the analysis of data emerges that the males reported to use condom more than women, the female respondents declare in the majority that the information provided by the institutions is inadequate, they know more about vaccination against HPV, and those who know about this latest vaccination claim to be vaccinated to a greater extent. More differences in response emerge if comparisons between the ages of 18-22 and 23-27 are considered (Table 2B); the age group 23-27 more often thinks that the quality of information provided by the institutions is insufficient but claims to be more knowledgeable about avoiding the risk of contagion compared to the 18-22 age group. In addition, the age group 23-27 reports more frequently having unprotected occasional sexual intercourse, having contracted an STI, having undergone at least one specific STIs tests over the course of their life, and knows about the HPV vaccination with a larger frequency compared to the age group 18-22 who reported being more frequently vaccinated in accordance with vaccination policies in force in Italy. Depending on the quality of information provided by the Institution on STIs, from dividing the population into two groups ("insufficiently informed" vs "at least sufficiently informed", see Table 2C) emerges a lower perception of information on the subject which can be associated with a greater chance of specific medical tests being performed for STIs. Also, even those who report being inadequately informed about the subject, have greater knowledge on HPV vac-





Figure 1

Questions in the questionnaire administered to students concerning contraceptive methods.

cination, because they are aware that the same can be had by males as well as by females.

Table 3 shows adjusted odds ratios (aOR). A multivariable logistic regression model was used. The analysis shows that males have a greater risk of not knowing about HPV vaccination (aOR 3.52, 95% CI 2.26-5.49) and in the event that they know it, a high risk of not having done HPV vaccination (aOR 14.24, 95% CI 8.32-24.38). In addition, 18 to 22 year-olds have a higher risk than the 23 to 27 age group thinking that they are not sufficiently informed with regards to avoiding the risk of contagion (aOR 3.92, 95% CI 2.18-7.06), that they

have never had specific tests for STIs (aOR 2.90, 95% CI 2.21-3.80), not knowing HPV vaccination (aOR 1.86, 95% CI 1.13-3.07) and not knowing that it can be administered to males (aOR 2.63, 95% CI 1.96-3.53); but has a lower risk of having unprotected occasional sexual intercourse (aOR 0.71, 95% CI 0.54-0.93), having at least one STIs (aOR 0.53, 95% CI 0.36-0.87) and knowing about HPV vaccination but not being vaccinated (aOR 0.29, 95% CI 0.21-0.39). There are no statistically significant differences in risk of non-use of condom for oral sex. Finally, those who think that they are "insufficiently informed" by the institution com-



Figure 2

Questions in the questionnaire administered to students concerning sexually transmitted disease.

pared to those who are considered "at least sufficiently informed" generally have a lower risk of never having a specific STIs tests (aOR 0.72, 95% CI 0.52-0.98) and not knowing HPV vaccination (aOR 0.63, 95% CI 0.39-0.99), there are no statistically significant differences of risk with regard to having unprotected sex or the none use of condoms for oral sex.

DISCUSSION

This study describes the knowledge, attitudes, risky behaviors, and preventative practices of students in

health professions at the University of Palermo in relation to STIs.

It is necessary to underline that the population in study is represented by students of Health Professions, therefore in the field of Medicine, and probably better informed compared to students in other courses of the same age [13, 14] and in comparison with the population who do not attend university [1]. It is concerning that only a small percentage of respondents recognized Hepatitis B and Hepatitis C as STIs, considering that the population of the same age not belonging to the

Table 2

Frequency, percentage, and association between selected responses, sex (A), age classes (B) and information quality provided by institutions (sufficiently informed/insufficiently informed) (C). Used the Pearson's Chi square test

Α		Male N (%)	Female N (%)	Total N	p-value
Quality of information provided by the institutions.	Sufficient Insufficient	91 (30.5) 207 (69.4)	172 (23.8) 552 (76.2)	263 759	0.024
Age group	18-22 year 23-27 year	190 (30.21) 108 (27.48)	439 (69.79) 285 (75.52)	629 393	0.351
What contraceptive method do you currently use? Male condom	Yes No	233 (78.19) 65 (21.81)	458 (63.26) 266 (36.74)	691 331	<0.001
Do you think you are sufficiently informed to avoid the risk of contagion?	Yes No	275 (92.3) 23 (7.7)	657 (90.7) 67 (9.3)	932 90	0.431
Have you ever had occasional unprotected sexual intercourse?	Yes No	96 (32.2) 202 (67.8)	234 (32.3) 490 (67.7)	330 692	0.974
Do you use condom for oral sex?	Yes No	19 (6.4) 279 (93.6)	54 (7.5) 670 (92.5)	73 949	0.541
Have you ever contracted STIs?	Yes No	17 (5.7) 281 (94.3)	52 (7.2) 672 (92.8)	69 953	0.392
Would you undergo HIV-test if it is asked by your partner?	Yes No	295 (99.0) 3 (1.0)	710 (98.1) 14 (1.9)	1005 17	0.292
Have you ever made specific tests for STIs?	Yes No	98 (32.9) 200 (67.1)	246 (34.0) 478 (66.0)	344 678	0.737
Do you know vaccination for HPV?	Yes No	247 (82.9) 51 (17.1)	685 (94.6) 39 (5.4)	932 90	<0.001
If you know HPV vaccination, are you already vaccinated?	Yes No	16 (6.5) 231 (93.5)	317 (46.3) 368 (53.7)	333 599	<0.001
Do you know that men can also be vaccinated against HPV?	Yes No	210 (70.5) 88 (29.5)	478 (66.0) 246 (34.0)	688 334	0.168
В		18-22 years N (%)	23-27 years N (%)	Total N	p-value
Quality of information provided by the institutions	Sufficient Insufficient	176 (28.0) 453 (72.0)	87(22.1) 306 (77.9)	263 759	0.038
Sex	Male Female	190 (30.21) 439 (69.79)	108 (27.48) 285 (72.52)	298 724	0.351
What contraceptive method do you currently use? Male condom	Yes No	438 (69.63) 191 (30.37)	253 (64.38) 140 (35.62)	691 331	0.081
Do you think you are sufficiently informed to avoid the risk of contagion?	Yes No	553 (87.9) 76 (12.1)	379 (96.4) 14 (3.6)	932 90	<0.001
Have you ever had occasional unprotected sexual intercourse?	Yes No	185 (29.4) 444 (70.6)	145 (36.9) 248 (63.1)	330 692	0.013
Do you use condom for oral sex?	Yes No	41(6.5) 588 (93.5)	32 (8.1) 361 (91.9)	73 949	0.327
Have you ever contracted STIs?	Yes No	32 (5.1) 597 (94.9)	37(9.4) 356 (90.6)	69 953	0.007
Would you undergo HIV-test if it is asked by your partner?	Yes No	616 (97.9) 13 (2.1)	389 (99.0) 4 (1.0)	1005 17	0.202
Have you ever made specific tests for STIs?	Yes No	153 (24.3) 476 (75.7)	191 (48.6) 202 (51.4)	344 678	<0.001

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Continues

Table 2

Continued

В		18-22 years N (%)	23-27 years N (%)	Total N	p-value
Do you know vaccination for HPV?	Yes No	562 (89.4) 67(10.6)	370 (94.2) 23 (5.9)	932 90	0.008
If you know HPV vaccination, are you already vaccinated?	Yes No	253 (45.0) 309 (55.0)	80 (21.6) 290 (78.4)	333 599	<0.001
Do you know that men can also be vaccinated against HPV?	Yes No	375 (59.6) 254 (40.4)	313(79.6) 80 (20.4)	688 334	<0.001

		Quality of information provided by the institutions			
c		Sufficient N (%)	Insufficient N (%)	Total N	p-value
Sex	Male Female	91 (34.6) 172 (65.4)	207 (27.3) 552 (72.7)	298 724	0.024
Age group	18-22 year 23-27 year	176 (66.9) 87 (33.1)	453 (59.7) 306 (40.3)	629 393	0.038
What contraceptive method do you currently use? Male condom	Yes No	181 (68.82) 82 (31.18)	510 (67.19) 249 (32.81)	691 331	0.627
Do you think you are sufficiently informed to avoid the risk of contagion?	Yes No	249 (94.7) 14 (5.3)	683(90.0) 76 (10.0)	932 90	0.021
Have you ever had occasional unprotected sexual intercourse?	Yes No	87 (33.1) 176 (66.9)	243 (32.0) 516 (68.0)	330 692	0.750
Do you use condom for oral sex?	Yes No	15 (5.7) 248 (94.3)	58 (7.6) 701 (92.4)	73 949	0.293
Have you ever contracted STIs?	Yes No	11(4.2) 252 (95.8)	58 (7.6) 701(92.4)	69 953	0.054
Would you undergo HIV-test if it is asked by your partner?	Yes No	258 (98.1) 5 (1.9)	747 (98.4) 12(1.6)	1005 17	0.726
Have you ever made specific tests for STIs?	Yes No	72 (27.4) 191 (72.6)	272 (35.8) 487 (64.2)	344 678	0.012
Do you know vaccination for HPV?	Yes No	230 (87.5) 33 (12.5)	702 (92.5) 57 (7.5)	932 90	0.013
If you know HPV vaccination, are you already vaccinated?	Yes No	85 (37.0) 145 (63.0)	248 (35.3) 454 (64.7)	333 599	0.655
Do you know that men can also be vaccinated against HPV?	Yes No	162 (61.6) 101 (38.4)	526 (69.3) 233 (30.7)	688 334	0.022

medical field, be they university students or not, will be even less informed and therefore less able to calculate the risks of having unprotected sexual intercourse with individuals with Hepatitis C or Hepatitis B. Probably thanks to the prevention and information campaigns carried out in recent years, HIV is the most well-known STIs [15]. Similar results emerge in the literature from a study on the population of students of medicine and surgery at the University of Palermo [16], but also in studies carried out in other countries [2, 5, 17]. The most popular and used contraceptive method is the condom, this is the main "barrier method" and the most widely used as has been shown by other studies [18, 8], the age group 23-27 has a higher risk of having had at least one STIs and the 18-22 age group has a greater risk of never having had STIs tests, this is in line with what has been shown in literature [18], males have a greater risk of not knowing HPV vaccinnation and in the event that they know HPV vaccination, a higher risk of not having done it, this result is likely to be attributable to the fact that until only a few years ago the anti-HPV vaccination in Sicily was only obligatory for females, and only from 2015 has become obligatory for males aged 11-13 years old and offered in copayment with Sicilian Region for the others males up to 26 years old. In our study, 68% of the interviewed students reported using condom but 7% of responders referred no use of a contraceptive method and a large

Table 3

Multivariable logistic regression. Adjusted odds ratio for male vs female, age group and insufficient vs sufficient information provided by Institutions (female is reference, age class 23-27 years old is reference, sufficient is reference). Based on 1022 observation

	Adjusted Odds Ratio ¹ (aOR)					
Dependent variable	Male vs Female		18-22 years vs 23-27 years		Insufficient vs Sufficient	
	Adjusted OR	95% CI for aOR	Adjusted OR	95% CI for aOR	Adjusted OR	95% CI for aOR
l do not think I am sufficiently informed to avoid the risk of contagion	0.81	0.49-1.34	3.92*	2.18-7.06	2.15***	1.19-3.90
I had occasional unprotected sexual intercourse	1.00	0.75-1.34	0.71***	0.54-0.93	0.93	0.68-1.25
I do not use condom for oral sex	1.15	0.67-1.98	1.25	0.77-2.02	0.75	0.42-1.35
I had at least one STIs	0.83	0.47-1.47	0.53***	0.36-0.87	1.78	0.92-3.47
I would do HIV-test if my partner asked me	0.50	0.14-1.76	2.06	0.66-6.39	0.84	0.29-2.42
I have never done specific tests for STIs	0.99	0.74-1.33	2.90*	2.21-3.80	0.72***	0.52-0.98
I do not know the HPV vaccine	3.52*	2.26-5.49	1.86***	1.13-3.07	0.63***	0.39-0.99
l know HPV vaccination but l am not vaccinated	14.24*	8.32-24.38	0.29*	0.21-0.39	1.08	0.76-1.53
l do not know that men can undergo anti-HPV vaccination	0.77	0.57-1.04	2.63*	1.96-3.53	0.74***	0.55-0.99

¹adjusted Odds Ratios (aOR) by age class, gender and quality of information provided.

*p-value <0.001; **p-value <0.01; ***p-value <0.05.

part of the interviewed referred the use of only pills or the vagina ring that are ineffective against STIs, these results did not emerge in a survey conducted in other European Countries [19]. 18 to 22 year olds have a higher risk than those aged 23 to 27 of: thinking that they are not sufficiently informed to avoid the risk of contagion, having never had specific tests for STIs, not knowing HPV vaccination and not knowing that it can be administered to males. This, according to us, of the two categories, primarily represents the area where the next Public Health Programs regarding sexual health and the prevention of STIs must be directed. The vounger population could represent a reservoir considering that STIs could be more easily underestimated seeing that the interviewed students in the lower age group are less likely to have specific STIs tests [18]. As a matter of fact, STIs can remain asymptomatic and therefore favour the spreading to any eventual future partner. Finally, an expected result is represented by the fact that those who considered themselves to be "insufficiently informed" by institutions feel they have not been sufficiently informed so as to avoid the risk of catching STIs, to their knowledge, or on how to avoid contagion; furthermore, the less informed subjects have been more commonly tested for STIs, this could be due to a higher occurrence of this group of previous STIs (OR 1.78, almost significant as indicated by a lower 95% CI limit of 0.92, see Table 3). Unfortunately, this has not been found in similar scientific literature reporting on results or studies, so comparisons with the latter result cannot be made.

The study has limitations: It is a cross-sectional study, several independent variables could not be evaluated for the cause and effect associations. Moreover, the results cannot be generalized to all undergraduate students in the health professions of the Sicilian Region since the survey was carried out at the University of Palermo, which merely absorbs students from Western Sicily.

Certainly, good preventative practices, in terms of the use of contraceptive devices and HPV vaccination can actively contribute to the reduction of health problems closely related to STIs.

CONCLUSIONS

Based on our findings, it is necessary to implement sexual education programs for the improvement of knowledge in terms of STIs and the promotion of health. This data will help the providers of health services and those responsible for policy to make the most logical and accurate choices for the prevention of STIs. Institutions should invest more time and money on promotion of sexual health, in order to reduce occurrence of STIs in young people and public spending. A more important role must be given to sexual education for the young by Institutions, schools and universities, for instance, introducing sexual education into university degree courses as obligatory subjects and/or organizing informative and educational events; informative intervention should also be carried out throughout the territory (posters or brochures providing information) placed in places where people gather e.g. parishes, social centres, university canteens etc. A further intervention, based on the widespread use of internet and IT by young students would be for institutions, like the Ministry of Health, to create a website dedicated to the promotion of sexual health - this has been demonstrated, by other studies, to have a wide impact on the prevention of STIs and would help, at the same time, to

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provide knowledge [21-23]. Future studies are needed to assess the effectiveness and cost of education programs that should also be addressed to young adults who do not attend university. It is necessary to carefully plan the interventions that could require additional human and financial resources [24]. However, it is wellknown that having sufficient knowledge is not solely necessary in order to prevent high-risk sexual behaviors [17, 25].

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Author's contribution statement

All individuals listed as authors have contributed

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