

## Research Article

# Sexually Transmitted Diseases: How Much Do Adolescents Know?

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**Background:** Sexually Transmitted Diseases (STD) are a major area of world public health. Behavior at risk, often encountered in the very young, is among the determinants of their incidence. The aim of this study was to establish how aware adolescents are of the risk of STD.

**Methods:** This cross-sectional study was conducted in May and June 2014 in three high schools in the town of Arezzo. The data was obtained with an anonymous questionnaire. Sample size, calculated by EpiInfo (C.I. 99%) was 390. The t-test and ANOVA were used to compare males and females and the different school years (classes); the Odds Ratio was used to evaluate propensity to answer the questions correctly by females and males and in 3rd years compared to 4th and 5th years. The number of questionnaires analysed was 603.

**Results:** The mean age of participants was 17.8 years (SD 1.01); 62.2% were female. A correct definition of STD was given by 64.3%: males outnumbering females (OR 1.48,  $p < 0.05$ ) and 5th year outnumbering 3rd and 4th years ( $p < 0.001$ ). A high percentage of students (98.5%) knew that HIV was sexually transmitted and awareness was also high with regard to syphilis (79.6%) and Candida infection (72.3%). Older students were less informed about HPV than younger students (OR 0.55;  $p < 0.001$ ). Exchange of syringe needles between drug abusers and unprotected sexual intercourse were recognized as risky for STD by 92.5% and 78.2% of the sample, respectively; 66.4% knew that ignorance was associated with situations of high risk. The percentage of respondents using condoms for intercourse with casual partners was 85.4%, falling to 42.9% for habitual partners; only 55.9% knew that the contraceptive pill does not protect against infection.

**Conclusion:** In general, respondents' awareness of the problem showed many gaps, especially regarding behaviour exposing to risk of infection and regarding methods of protection. Since this knowledge is indispensable for risk perception, projects to inform and raise awareness are important to promote behaviour that will prevent transmission of STD, especially in the very young.

**Keywords:** Sexually transmitted diseases; Adolescents

## Introduction

Sexually Transmitted Diseases (STD) are a major problem of public health at world level, both in industrialized and developing countries, also because if they are not diagnosed and treated early they can have major health sequelae [1]. The high incidence of STD can be attributed to behaviour at risk, especially in the young, as well as the numerous etiologies and drug resistance [2]. Indeed, the World Health Organisation (WHO) reports that the impact of STD exceeds 400 million new cases in women and men between 15 and 49 years of age each year [3]; of these, at least 111 million cases regard persons less than 25 years of age. In 2010, a WHO study aimed at describing sexual behaviour in the young showed that 22% of girls and 26% of boys had already had sexual intercourse for the first time by the age of 15 years [4]. The 15 to 25-year age range constitutes 25% of the sexually active population and is particularly at risk because STD may often be asymptomatic. Besides, social stigma can negatively affect the attitude of the very young towards prevention [5].

In Europe, many studies have shown that adolescents are aware of HIV, whereas confusion reigns regarding the use of condoms and contraceptive methods [6]. According to Italian studies, the main risk factor for STD is incorrect or no use of condoms [7-9].

The aim of the present study was to evaluate awareness of young people regarding STD, to understand the extent to which this influences their behaviour, and to pinpoint critical defects in their knowledge/behaviour to remedy with health education campaigns.

## Materials and Methods

### Study setting and design

This cross-sectional study was conducted in May and June 2014 at three high schools in the town of Arezzo. The population involved consisted of young adolescents aged 15-20 years, in the 3rd, 4th and 5th year classes. The information was collected by anonymous printed questionnaires that were distributed in agreement with teachers and principals.

### Sample

To have a correct representation of the phenomenon we set a minimum sample size. According to ISTAT, the population of Arezzo in the age range of interest was 4727. To avoid underestimation, we used a expected prevalence of 50% and postulated a confidence interval of 99%. Using EpiInfo 7, we calculated that the minimum number of subjects to interview was 390.

### Questionnaire

The questionnaire, previously used for research by the University of Ferrara [10], was accompanied by a letter in which the study and its motivations were presented. Students were reassured that their answers would be completely anonymous. The questionnaire consisted of a demographic part (age, gender, class) and five closed questions regarding:

1. The definition of STD;
2. Identification of STD in a list of different diseases;
3. Evaluation of risk of transmission of STD in a list of situations at risk and not at risk;
4. Frequency of condom use;
5. Evaluation of the safety of different methods of contraception.

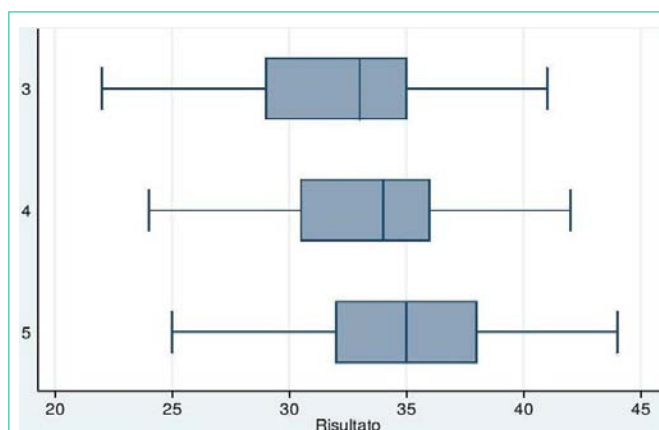
Students were giving 20 minutes to answer autonomously, and once complete the questionnaire was posted in a closed box. The questionnaires were then processed with a Remark Office OMR, version 2 optical readers (Remark Product Group, 301 Lindenwood, Suite 100 Malvern, Pennsylvania, USA) that quickly and automatically recorded the data, avoiding errors. The resulting database had the following fields: gender, age (15-19+ years), class (3rd, 4th, 5th) and the replies to the five questions. In order to evaluate overall knowledge on the topic, a point score was calculated by summing: one point for correct definition of STD; one point for each STD identified in the list; one point for identifying each situation at risk for transmission of STD; one point for correct evaluation of the safety of the different contraceptive methods. The maximum point score (all correct answers) was 48.

### Statistical analysis

After descriptive analysis of the sample (means, percentages and standard deviations), the Shapiro-Wilk test was applied to test for normal distribution of continuous variables and comparisons were made between males and females and the different classes by t-test and ANOVA. The Odds Ratio was used to evaluate propensity of females and males, and of 3rd class versus 4-5th classes, to answer the questions correctly. Significance was set at  $p < 0.05$ . The data thus organised was analysed by software Stata<sup>®</sup> SE, version 12.1 (Stata Corp, College Station, Texas, USA).

### Results

The number of questionnaires handed out was 630 and 603 (95.7%) were returned. Mean age of the responder population was 17.8 years (SD 1.01), with girls comprising 62.2% of the sample. Stratifying by “age”, the population was composed as follows: 15 years 0.3%; 16 years 9.6%; 17 years 28.1%; 18 years 36.2%; 19 years 22.1% and 19+ years 3.7%; and by “class”: third year 24.1%; fourth year 34.5%; fifth year 41.4%.



**Figure 1:** Graphic distribution of total point scores showing minimum, 25<sup>th</sup> percentile, median, 75<sup>th</sup> percentile and maximum of the classes.

**Table 1:** Odds Ratio between males and females and between classes, p values and confidence intervals with regard to answers to the question: “Indicate which of the following STD are”.

Disease	Groups*,**	Odds Ratio	P Value	Confidence Interval
AIDS	Males	2.15	0.33	0.44-10.45
	Fourth	4.37	0.17	0.45-42.87
	Fifth	1.03	0.98	0.24-4.39
HPV	Males	1.05	0.79	0.75-1.46
	Fourth	0.52	<0.01	0.34-0.80
	Fifth	0.55	0.01	0.36-0.84
Candida	Males	0.62	0.01	0.43-0.89
	Fourth	1.49	0.1	0.92-2.42
	Fifth	0.99	0.97	0.64-1.55
Herpes	Males	1.55	0.02	1.07-2.25
	Fourth	1.42	0.14	0.89-2.26
	Fifth	1.1	0.67	0.71-1.70
Hepatitis	Males	0.84	0.3	0.60-1.17
	Fourth	0.76	0.22	0.50-1.17
	Fifth	0.88	0.54	0.58-1.33
Syphilis	Males	1.86	0.01	1.20-2.90
	Fourth	1.7	0.04	1.02-2.84
	Fifth	1.73	0.03	1.06-2.82

\* In comparing genders we used the female group as baseline with a value of 1  
 \*\* In comparing classes we used third year as baseline with a value of 1.

The mean point score for general knowledge on the topic was 33.7 (SD 4.3), without any significant difference between genders, whereas ANOVA revealed differences between classes ( $p < 0.01$ ) with mean scores of 32.5 (SD 3.9) in third year, 33.5 (SD 4.1) in fourth year and 34.6 (SD 4.5) in fifth year (Figure 1).

### Discussion

The high rate of return of the questionnaires (95.7%) indicates that the students were interested in the topic. From the first question it emerged that 33.2% were unable to correctly define STD, indicating patchy knowledge on the subject. The students recognized the major

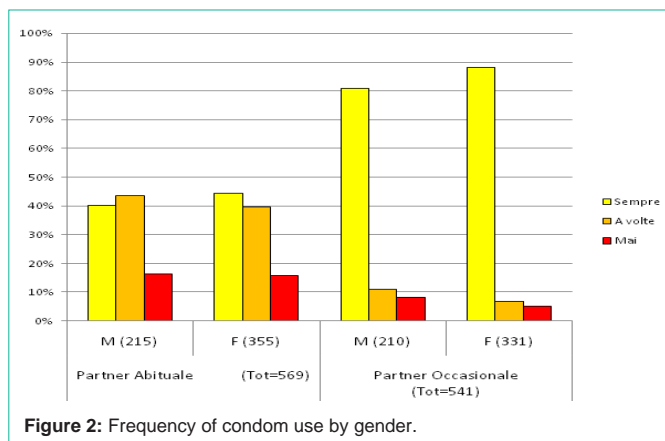


Figure 2: Frequency of condom use by gender.

STD, namely HIV, Candida, herpes and syphilis, with results similar to those obtained by Bergamini et al. [10]. However, some uncertainty was shown for HPV, recognized by only 41.5%, lower than expected since the campaign to prevent cervical cancer is recent. The result is nevertheless in line with another study [6] and suggests that the campaign was not completely clear to the girls targeted or that their interest was not optimal [11]. Comparison between classes showed that third year girls were better informed than fourth and fifth year girls, probably because they were more recent protagonists of the vaccination campaign [12]. This suggests that the campaign needs to insist in order to avoid losing attention for this growing problem (Table 1).

A good 65.5% of respondents claimed that ignorance about STD was a major risk factor, as found in the original study [10]; this shows young people’s awareness of the problem.

Observing the percentages obtained with the fourth question regarding the frequency of condom use, it is clear that interest in the subject, demonstrated by the high percentage of returns, did not seem to have much impact on sexual behaviour, considering the large percentage of students who did not always use a condom, and that they lack of correct information’s about the risks linked to different sexual practices. This is also sustained by other studies that found very low condom use among the young, especially in the case of occasional partners [10].

The Italian study EDIT aimed to analyse sexual behaviour in young people. It showed that recent constant decline in condom use is associated with increasing use of the contraceptive pill. This puts prevention of STD in second place, after prevention of undesired pregnancy [7]. Further studies show that girls who use the pill claimed, more than boys, to insist on condom use. This shows that they put prevention in first place [13]. Our study did not find significant differences between males and females in condom use, unlike a recent study [7] (Figure 2).

The question regarding knowledge of contraceptive methods is the one that indicated greatest uncertainty. The first considerations regard hormonal contraception: 43.8% of respondents thought that the contraceptive pill is very safe or partly safe for prevention of STD, whereas 35.7% thought the same of the emergency contraceptive (“morning after”) pill. These interesting results underline confusion of respondents between prevention of undesired pregnancies and

Table 2: Odds Ratio between males and females and between classes, p value and confidence intervals of answers to the question “Indicate if the listed situations are at high, medium or zero risk of transmission of STD”.

Situations	Groups*,**	Odds	P Value	Confidence Interval
		Ratio		
Multiple partners	Males	1.04	0.85	0.69-1.57
	Fourth	1	1	0.59-1.69
	Fifth	0.94	0.81	0.56-1.56
Unprotected sex (without condom)	Males	0.88	0.52	0.59-1.31
	Fourth	1.13	0.64	0.68-1.89
	Fifth	1.02	0.95	0.62-1.66
Exchange of needles between drug abusers	Males	0.98	0.94	0.53-1.80
	Fourth	1.38	0.39	0.66-2.90
	Fifth	1.68	0.16	0.80-3.52
Blood transfusions	Males	1.2	0.28	0.86-1.67
	Fourth	1.38	0.15	0.89-2.13
	Fifth	1.4	0.12	0.92-2.13
Vaginal sex	Males	1.62	<0.01	1.16-2.26
	Fourth	1.25	0.3	0.82-1.92
	Fifth	0.93	0.75	0.61-1.41
Anal sex	Males	1.05	0.78	0.75-1.48
	Fourth	1.2	0.42	0.77-1.86
	Fifth	1.12	0.61	0.73-1.71
Oral sex	Males	1.07	0.79	0.67-1.70
	Fourth	0.91	0.75	0.50-1.65
	Fifth	0.94	0.85	0.53-1.68
Injections	Males	0.77	0.13	0.55-1.08
	Fourth	0.71	0.13	0.46-1.11
	Fifth	1.04	0.86	0.69-1.57
Ignorance	Males	1.43	0.05	1.00-2.04
	Fourth	0.92	0.7	0.58-1.43
	Fifth	0.94	0.77	0.61-1.45
Rape	Males	1.6	0.06	0.98-2.64
	Fourth	0.73	0.31	0.39-1.34
	Fifth	0.87	0.65	0.47-1.60

\* In comparing genders we used the female group as baseline with a value of 1

\*\* In comparing classes we used third year as baseline with a value of 1.

prevention of STD.

Spermicidal and IUD/spiral were correctly indicated as unsafe for prevention of STD by 38.3% and 40.5% of students, showing certain ignorance on the subject. According to EDIT, coitus interrupts is the third most frequently used contraceptive method after the pill and the condom. In our sample, only 58% of students considered it unsafe for prevention of STD (Table 2).

**Limits**

A limit of our study could be the point score given to answers in order to calculate the total of each questionnaire. As previously mentioned, we assigned one point to all correct answers and zero to every wrong answer to facilitate calculation. However, not all answers

necessarily had the same importance. We opted for not quantifying the importance of the different questions since we were unable to find any indications in that sense in the literature.

A further critical point could be that all the schools in the study were lyceums (classical, scientific and teaching). It may have been worthwhile to involve other types of secondary schools. According to Bergamini [10], the type of school attended by students did not seem to significantly influence their answers.

## Conclusion

The first aspect on which to reflect is the high percentage return of the questionnaire (95.7%) that demonstrates high interest in the topic. This is a good basis for future prevention campaigns. On the whole, the students had patchy knowledge on the causes of STD and we also found uncertainty about more specific and technical aspects, such as the safety of contraceptive methods. It would therefore be useful to invest time, personnel and resources to design new campaigns of sexual education and to broaden existing ones on the basis of WHO standards [14]. These standards include instruction, listening and analysis of personal needs, as well as assessing and integrating gaps in knowledge, and evaluating the effectiveness of the various activities with tests and follow-up [15]. It is well to bear in mind that investment in prevention does not bring immediate results, though many studies confirm that effective measurable results have been obtained and maintained in the short and medium period.

The objective is to create a good knowledge base that enables young people to have a satisfying but responsible sex life [16]. In the field of sexuality it is necessary to introduce new types of health services or to adapt existing ones, concentrating on information and education [14]. The present study identified a need for knowledge in certain areas, and it is here that prevention campaigns should concentrate.

Holistic instruction on the topic would give adolescents the possibility of more complete understanding as well as psychological support so that they feel free to consult gynaecologists, obstetricians [17] and their family doctors to assuage any doubts, especially since family clinics are free and open to all.

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