The aim of the study is to determine awareness about sexually transmitted diseases (STDs) and their prevention in people aged 14-19 of Ferrara and province. The study was carried out using a self-administered standardised anonymous questionnaire in a sample of students attending to three upper secondary schools. Total number of collected questionnaires was 2695, the average age of interviewed was 17.1. Only 52.3% of respondents correctly recognized STD definition. Over 95% of subjects identified acquired immune deficiency syndrome (AIDS), while properly classification of Hepatitis B increased with age and lowest degree of knowledge concerned herpes infection and Candidiasis. Sex without condom (95.97%) and needle exchange in drugs abusers (94.9%) are considered high risk behaviours. 80.3% of interviewed, without distinction of school attendance, sex, and age considered lack of information as a situation of high risk. Condoms are not used by 46.4% of the subjects in case of sex with a regular partner and by 9.5% with casual partner. Majority of students declared condoms very safe in preventing STDs but an important percentage indicated also contraception methods; correct answers were higher among females and increased with age. Main sources of information were TV (21.6%), school (21.1%) and friends (14.8%) and a few sought information from family doctor (7.4%) and web (4.8%).

The study suggests, as priority, to improve teenagers’ awareness about risk behaviours and prevention of STDs. School can play an important role in reinforcement of sexual education programmes and directing young people to general practitioners and primary sexual health care services.

Introduction

Sexually Transmitted Diseases (STDs) are a large group of infectious diseases associated with different aetiologies (bacteria, chlamydia, mycoplasma, fungi, viruses, protozoa and ectoparasites), and characterized by their sexual transmission and genital location [1]. The risk of severe complications and their role in the increased risk of human immunodeficiency virus (HIV) transmission [2] make STDs a social problem worldwide. In fact, several studies demonstrated a strong association between both ulcerative and non-ulcerative STDs and HIV infection [3, 4], so that there is clear evidence that conventional STDs increase the likelihood of HIV transmission [5]. The World Health Organization (WHO) estimated 333 million/year worldwide the total of STDs cases, mostly localized in the south-east Asia, in Africa, and Latin America [6], where the higher prevalence is seen among sexually active young people [7]. The sex-related incidence of STDs is greater among males than in females (except during adolescence, when the ratio is reversed), yet the prevalence is greater among women and homosexual men [8, 9]. The current spread of STDs is related with a number of different factors involving not only their aetiology (emerging pathogens, and antibiotic resistance), but also inadequate health information [10], low income [11], and modified sexual lifestyles (frequent unprotected intercourse with different partners, an increased demand for prostitution, and the decreasing average age at which young men and women become sexually active) which have occurred in the general population in the last 50 years [12]. In regards to this last feature, adolescents and young adults (15-24 years old) represent only 25% of the sexually active population but almost 50% of all new acquired STDs [12] – this is caused by sexual ignorance, non-use of condoms, increased number of relationships between young subjects and older partners, use of psychoactive substances, and poor attitude towards consulting specialist health care services [13]. In a recent randomized controlled trial, it was demonstrated that the behavioural intervention promoted by Sexual Awareness For Everyone (SAFE) on teenagers (aged 14 to 18 years) significantly decreased high-risk sexual behaviours [14]. In Italy, even though adolescents have their first sexual experience at a very early age, and often without protection against STDs [15], a health education programme has been running for the last several years, with special attention given to the prevention of STDs [16]. In order to determine how information and awareness about STDs may modify sexual behaviours of Italian adolescents, a study was per-
formed on a sample of students of 14-19 years living in Ferrara and its province.

Materials and methods

Study design
A cross-sectional study of a sample of students population attending upper secondary school was developed to achieve the following objectives: a survey of the knowledge of STDs, the source of related information, knowledge level related risk and its influence in determining sexual lifestyles.

The questionnaire
A structured self-administered questionnaire containing 18 closed questions was used for data collection. The aim of this approach was to ensure that answers could be reliably aggregated and that comparisons could be made with confidence between subgroups or different survey periods. The design of the questionnaire was developed following the international guidelines [17]. The questions were close-ended, providing a set of responses or options from which respondents indicated their choice. (Close-ended questions are particularly useful where the study concerns factual issues, and can be narrowed down to a limited range of responses.)

As to the content of the questions, the items were formulated considering the following features:
1) basic knowledge of STDs and the risks involved;
2) perception of risk and measures to prevent it;
3) sources and quality of information;
4) sex and age.

To determine the best formulation and sequence of the questions, a pilot study in two phases with an increasing number of respondents was performed. In the first phase we asked each respondent of a small group the degree of understanding of each item in the questionnaire, the degree of self-awareness for each question asked, and the appropriateness of the terminology used. In the second phase the entire questionnaire was administered – based on the responses, it was corrected, supplemented, and amended. The distribution of questionnaires took place in the course of one day in all the considered school-classes. The completion time was 10 minutes.

The setting
The present study was performed in three different upper secondary schools located in the Emilia-Romagna Region (Northern-Italy).

The population
This investigation has considered students of both sexes, 15-19 years of age, attending upper secondary school. In order to verify the existence of different knowledge levels in students from different kinds of school, the questionnaire was distributed in three different high schools, one focusing more on humanities, one on sciences and one on technical studies. The sampling of the population was conducted among the students from the towns of Ferrara and Cento. In view of the sensitivity of the topics covered by the questionnaire, the under-age students needed written consent of their parents in order to take the test.

The data analysis
Statistical analysis was calculated by chi-squared test.

Results
This study was completed between December 2011 and February 2012. The sample consisted of 2800 students – 26.9% of the entire school population of the province of Ferrara. The questionnaire was completed by 2695 students, representing 96.2% of the considered population sample and 42.6% of the students attending upper secondary schools in the province of Ferrara. The average age of the respondents was 17.1 years (SD ± 1.25). The group of respondents consisted of 1145 males (42.5%) and 1550 females (57.5%). The division by year of attendance was the following: second year: 34.8% (mean age 15.9 years), third year: 22.8% (mean age 16.8 years), fourth year: 18.6% (mean age 17.8 years), fifth year: 23.8% (mean age 18.7 years).

The first area of investigation was the real knowledge of what an STD is (Tab. I). Five definitions were proposed to define this point. The 52.3% of respondents answered correctly, with a no significant difference among sexes (p = 0.1352). In contrast with the fact that the second-year students had many uncertainties [60.4% gave wrong answers], 65.5% of the fifth-year students were able to identify the correct definition (p < 0.0001). The kind of school attended by the students had no significant influence on their answering (p = 0.1352).

To better determine the information level among the students, a list of 17 diseases was included (Tab. II). The results were fairly uniform only for AIDS, which has been correctly recognized by over 95% of subjects with no significant difference among sexes. Although the Hepatitis B had a considerable percentage of proper identification among all students (total: 74.6%, males: 70.9%, females: 77.3%), the level of knowledge increases with age, going from 73.0% in the 15-16 years old subgroup to 78.0% for students aged 18-19 (p = 0.0294). A slightly lower level of knowledge was demonstrated with regards to herpetic infection (total: 69.1%) with a significant difference (p < 0.0001) between younger and older students of both sexes (62.0% and 74.2% respectively). Candidiasis was correctly recognized by 65.5% of subjects, with a significant gender-related difference. In fact, 77.1% of the female students answered correctly, compared to the much lower 48.9% of the male students (p < 0.0001). With regard to the non-sexually transmitted diseases, the respondents correctly identified botulism (88.4%), leptospirosis (62.2%), cholera (67.2%), measles (71.2%), tetanus (72.2%), chickenpox (73.9%), flu (74.1%), salmonellosis (75.8%), and rabies (81.1%). The most surprising finding was that the majority of respondents (72.0%) identifies Hepatitis A as a STD.

The second item considered the ability among the adolescents to recognize risk situations for STDs (Tab. III). In
Tab. I. Definition of what a sexually transmitted disease is. Expressed percentages according to gender and year of attendance.

| A sexually transmitted disease is: | Total | Males | Females | Year of attendance |
|----------------------------------|-------|-------|---------|-------------------|
| a disease transmitted by any form of physical contact (kissing, caressing, etc ...) between males and females | 0.4  | 0.8   | 0.2     | 0.1 0.0           |
| a disease only transmitted by sexual intercourse | 21.1  | 21.4  | 21.0    | 28.9 14.5         |
| a disease only transmitted by petting | 25.5  | 22.6  | 27.6    | 30.9 18.7         |
| a disease only transmitted through males having sex with males | 0.6   | 1.1   | 0.2     | 0.5 0.8           |
| a disease mostly transmitted by sex, but not only | 52.3  | 54.1  | 51.0    | 39.6 65.5         |

Tab. II. Identification of a true or false sexually transmitted disease. Expressed percentages according to gender and year of attendance.

| Disease          | Total | Males | Females | Year of attendance |
|------------------|-------|-------|---------|-------------------|
| Rabies           | 18.9  | 81.1  | 22.4    | 77.6             |
| Candidiasis      | 65.5  | 34.5  | 48.9    | 51.1             |
| Pediculosis      | 16.8  | 83.2  | 20.9    | 79.1             |
| Botulism         | 11.6  | 88.4  | 17.7    | 82.3             |
| Flu              | 25.9  | 74.1  | 32.5    | 67.5             |
| Tetanus          | 27.8  | 72.2  | 31.4    | 68.6             |
| Leptospirosis    | 37.8  | 62.2  | 42.5    | 57.5             |
| Cholera          | 32.8  | 67.2  | 37.7    | 62.3             |
| AIDS             | 98.9  | 1.1   | 98.5    | 1.5             |
| Herpes           | 69.1  | 30.9  | 70.4    | 29.6             |
| Salmonellosis    | 24.2  | 75.8  | 29.3    | 70.7             |
| Hepatitis A      | 72.0  | 28.1  | 71.6    | 28.4             |
| Chickenpox       | 26.1  | 73.9  | 30.3    | 69.7             |
| Hepatitis B      | 74.6  | 25.4  | 70.9    | 29.1             |
| Parkinson’s disease | 4.0  | 96.0  | 5.5     | 94.5             |
| Measles          | 28.8  | 71.2  | 33.2    | 66.8             |
| Down’s syndrome  | 8.1   | 91.9  | 10.0    | 90.0             |

Tab. III. Ability among adolescents to recognize risk situations. Expressed percentages according to gender and risk.

| Risk factor                  | Total | Males | Females | Year of attendance |
|------------------------------|-------|-------|---------|-------------------|
| Multiple partners            | 76.8  | 19.5  | 3.7     | 66.7             |
| Sex without condom           | 96.0  | 3.4   | 0.6     | 94.1             |
| Sex out of marriage          | 8.2   | 36.2  | 55.6    | 8.5             |
| Sex before marriage          | 4.5   | 28.7  | 66.8    | 4.1             |
| Needle exchange in drug abusers | 94.9 | 2.5   | 2.6     | 92.9             |
| Pregnancy                    | 10.9  | 35.2  | 55.9    | 8.8             |
| Blood transfusion            | 42.9  | 43.0  | 14.1    | 37.5             |
| Vaginal sex                  | 60.3  | 33.3  | 6.4     | 54.4             |
| Anal sex                     | 47.6  | 37.9  | 14.5    | 45.4             |
| Oral sex                     | 23.3  | 42.2  | 33.5    | 21.5             |
| Kisses                       | 2.2   | 24.7  | 73.1    | 1.9             |
| Stings                       | 6.1   | 31.9  | 62.0    | 6.8             |
| Underwear exchange           | 4.1   | 31.2  | 64.7    | 3.2             |
| Toothbrush exchange          | 9.6   | 35.9  | 54.5    | 7.9             |
| Shaking hands                | 0.9   | 3.0   | 96.1    | 1.5             |
| Hugging                      | 0.6   | 2.2   | 97.2    | 0.7             |
| Coughing and / or sneezing   | 3.4   | 36.2  | 60.4    | 3.6             |
| Working in the same room     | 1.2   | 8.8   | 89.9    | 2.1             |
| Sexual violence              | 92.6  | 6.0   | 1.4     | 89.5             |
| Exchange of glasses and cutlery | 6.1  | 38.5  | 55.4    | 5.3             |
| Lack of knowledge of the STDs | 80.3  | 16.0  | 3.7     | 76.9             |

| 2nd | 5th |
|-----|-----|
| 81.2| 18.8|
| 21.5| 78.5|
| 87.5| 12.5|
| 95.7| 6.3 |
| 74.6| 25.4|
| 74.7| 25.3|
| 73.1| 26.9|
| 29.7| 70.7|
| 0.3 | 99.7|
| 25.8| 74.2|
| 81.4| 18.6|
| 70.1| 29.9|
| 74.9| 22.0|
| 93.6| 6.4 |
| 71.4| 28.6|
| 94.9| 5.1 |
Tab. IV. Prevalence among adolescents of attitudes to use condom in sex with casual or single partner. Expressed percentages according to gender and year of attendance.

|                     | Total | Males | Females | 2nd | 5th |
|---------------------|-------|-------|---------|-----|-----|
|                     | Never | Sometimes | Always | Never | Sometimes | Always | Never | Sometimes | Always | Never | Sometimes | Always | Never | Sometimes | Always |
| Single partner      | 10.0  | 36.4   | 53.6    | 12.4 | 42.8   | 44.8   | 8.2  | 31.7     | 60.2   | 5.8   | 38.5      | 55.7   | 18.0  | 36.1      | 45.9   |
| Casual partner      | 3.9   | 5.6    | 90.5    | 4.7  | 7.4    | 87.9   | 3.3  | 4.3       | 92.4   | 5.6   | 5.5       | 88.9   | 3.8   | 7.6       | 45.9   |

This case, three options were provided: high risk, low risk, no risk. Among the students of both sexes perception of high risk was respectively attributed to the following features: sex without condom (95.97% of respondents) and the needle exchange among drug abusers (94.9% of respondents). When it comes to multiple sexual partners, however, a relevant sex-related difference \( p < 0.0001 \) was observed (total: 76.8%, males: 66.7%, females: 84.3%). On the other hand, it is very comforting to note that the majority of respondents (80.3%), without distinction of school attendance, sex, and age considered the lack of information as a situation of high risk of contracting an STD.

As to sexual practices, a surprising absence of STDs-related risk was respectively attributed to oral sex by 33.5% of subjects of both sexes, to anal sex by 14.4% of subjects (males: 18.7%, females: 11.3%), and vaginal sex by 6.3% of the interviewed (males: 8.6%, females: 4.6%). Table IV illustrates the findings as to the use of condoms within a relationship and with casual partners. 46.4% of the subjects do not use condoms regularly when in a relationship. This percentage falls at 9.5% in case of sex with casual partners (males: 12.1%, females: 7.6%). Surprising enough, age seems to have little influence over this behaviour (second-year students: 11.1%, fifth-year students: 10.5%) \( p = 0.7401 \).

Questions about the means of prevention of STDs have been included within this area of information. Students were asked to establish whether these items were very safe, partly unsafe, or unsafe in preventing STDs (Tab. V). Even though the vast majority of students is correct in considering the use of condoms as very safe in preventing STDs, there is a surprisingly significant minority of students considering very safe the following items: contraceptive pills (total: 22.1%, males: 27.1%, females: 18.0%), spermicides (total:14.6%, males: 16.2%, females: 13.5%), intra uterine device (IUD) (total:18.2%, males: 20.6%, females: 16.6%). The morning-after pill (total: 9.8%, males: 13.6%, females: 6.9%) \( p < 0.0001 \), and the coitus interruptus (total: 8.1%, males: 12.2%, females: 5.2%) \( p < 0.0002 \) obtained lower percentages. In this area of questions, a gender difference that sees females give correct answers in much higher percentage than males was found. However, with older students these gender differences became less pronounced. Similarly, the percentages of those who identified as a “highly secure protection” contraceptive pills, spermicides, IUD, morning-after pills, and coitus interruptus appeared significantly reduced among fifth-year students \( p < 0.0001 \).

The last part of the survey was aimed to investigate the role of information in STDs prevention. The first item concerned the role of the school to provide information about health and sexual education. 96.8% of the students declared that school should provide information, with the 68.7% of respondents thinking it should be given to them starting from their preteen years, while only 28.1% believed that they should receive this kind of information in high school only. With regard to the sources of information, television (total: 21.6%) and school

Tab. V. Knowledge about the means to prevent sexually transmitted diseases among adolescents. Expressed percentages according to gender and year of attendance.

|                     | Very safe | Party safe | Unsafe | Very safe | Party safe | Unsafe | Very safe | Party safe | Unsafe | Very safe | Party safe | Unsafe | Very safe | Party safe | Unsafe | Very safe | Party safe | Unsafe |
|---------------------|-----------|------------|--------|-----------|------------|--------|-----------|------------|--------|-----------|------------|--------|-----------|------------|--------|-----------|------------|--------|
| Contraceptive pills | 22.1      | 23.5       | 54.4   | 27.1      | 26.2       | 46.7   | 18.0      | 21.7       | 60.3   | 27.5      | 23.9       | 42.5   | 13.3      | 18.7       | 68.0   |
| Morning-after pills | 9.8       | 30.0       | 60.2   | 13.6      | 35.6       | 50.8   | 6.9       | 25.9       | 67.2   | 12.0      | 39.8       | 48.2   | 7.3       | 18.2       | 74.5   |
| Condom              | 89.0      | 10.0       | 1.0    | 88.6      | 10.0       | 1.4    | 89.2      | 10.1       | 0.7    | 88.0      | 11.3       | 0.6    | 91.2      | 7.1        | 1.7    |
| Single partner      | 56.6      | 36.4       | 7.0    | 57.0      | 34.8       | 8.2    | 56.3      | 37.5       | 6.1    | 56.9      | 35.7       | 7.3    | 54.5      | 38.9       | 6.6    |
| No pregnancy        | 13.7      | 31.4       | 54.9   | 16.0      | 35.2       | 50.8   | 11.7      | 30.1       | 58.2   | 20.4      | 34.6       | 45.0   | 6.2       | 25.3       | 68.5   |
| Spermicides         | 14.6      | 46.9       | 38.4   | 16.2      | 49.1       | 4.7    | 15.5      | 45.4       | 41.0   | 19.0      | 55.0       | 26.0   | 6.0       | 36.9       | 57.1   |
| Intra uterine device| 18.2      | 39.1       | 42.7   | 20.6      | 45.9       | 35.5   | 16.6      | 35.5       | 47.9   | 25.7      | 45.0       | 29.3   | 10.4      | 30.8       | 58.8   |
| Coitus interruptus  | 8.1       | 38.3       | 55.6   | 12.2      | 39.1       | 48.7   | 5.2       | 37.7       | 57.2   | 11.0      | 49.2       | 39.8   | 4.9       | 30.9       | 64.2   |
son’s ability to recognize risk situations for STDs. Three
The second area of investigation considered the young per-
males. This is most probably due to the greater awareness
awareness regarded herpes infection and Candidiasis, with
independent factors, not shared with parents, friends or girls
455
5 
was due to the greater awareness of and hepatitis. Unfortunately, other STDs
456
295
10 
the risks of AIDS and hepatitis. Unfortunately, other STDs
did not share this level of awareness. The lowest level of
were shown to answer more correctly than males. This is most probably due to the greater awareness
females have about gynaecological infections. The kind of
school attended by the interviewed students showed to have a good understanding of
the risks of AIDS and hepatitis. Unfortunately, other STDs
not do share this level of awareness. The lowest level of awareness regarded herpes infection and Candidiasis, with
a strong significant gender-related difference ($p < 0.0004$),
since females were shown to answer more correctly than males. This is most probably due to the greater awareness
females have about gynaecological infections. The kind of
school attended by the interviewed students showed to have no significant impact in the responses they gave.
The second area of investigation considered the young person’s ability to recognize risk situations for STDs. Three
quarters of the interviewed population were unanimous in
considering the lack of information as a possible risk fac-
tor. However, this does not seem to significantly affect the sexual habits of a considerable percentage of teenagers who believe that oral, anal, and vaginal sex are at low risk of contracting an STD. So much so that they feel comfortable trusting prevention of STDs to the use of condom, contraceptive pills, spermicides, and IUD. This result implies that a significant percentage of teenagers confuse STDs
and pregnancy preventions. A general agreement was ob-
served in the perception of risk related to sex with multi-
ple partners, whereas a single partner was seen as a safety
factor. However, this awareness was significantly higher
among second-year female students, who also believe it is
important to always use condoms [19] even with a single partner. The questionnaire shows that this particular belief
is affected by the age of the interviewed student and that
fifth-year female students are more likely to trust their part-
er (rather than rely on the use of condom). In spite of the
increasing trust, the greater part of the respondents didn’t see the partner as a sufficient source of information about
sex and STDs. Indeed, the majority of males and females
reported receiving sexual health information especially
from television, school and friends. It is interesting to note
that, contrary to what was observed in other studies [20,
21], internet as a source of information was considered less
important than newspapers, and it was used only by a mi-
nority of respondents. The lack of knowledge about the appro-
priateness of using local health care services has been
detected in the overall student population and at all ages, as
noted by previous studies [22, 23]. The present study sug-
gests that work is needed to improve teenagers’ access to,
and use of, primary sexual health care services. In particu-
lar, the identification of strategies that improve teenagers’
awareness of services and general practitioners’ approach-
es towards teenagers could be considered a priority.
A further key point to emphasize is the fact that no substan-
tial differences were observed in the responses given by
students of different kinds of schools. These findings lead
to the conclusion that what the students know about sex
and connected risk of STDs is uncertain and derives mostly
from the media (especially TV) and their friends. So, the
school has an important role in conveying basic informa-
tion, but it does not help to create proper awareness of the
risks associated with sex and fails in modifying sexual be-
haviours. Although the proportion of correct answers was
observed to increase for fifth-year students, the fact that a
high percentage of students confuses the prevention against
STDs and pregnancy is an indication that a confusion of
ideas thrives among our teenagers, despite the apparent
easiness of their life conduct. Therefore, it is necessary to
reinforce preventive measures in the younger age groups
to design and implement sexual education programmes,
and further studies are needed to better understand how our
children think and act about their sexual life.

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Received on February 12, 2013. Accepted on April 9, 2013.

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