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Giuseppe La Torre, Brigid Unim, Silvia Miccoli, Elisa Langiano, Maria Ferrara & Elisabetta De Vito

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Changes in knowledge, attitudes and behaviors of Italian university students regarding contraceptive methods and STDs (1998–2008): a cross-sectional study

Giuseppe La Torre · Brigid Unim · Silvia Miccoli ·
Elisa Langiano · Maria Ferrara · Elisabetta De Vito

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Abstract

Aim The aim of the study is to evaluate changes in opinions and behaviors of university students about sexual attitudes, use and effectiveness of contraceptive methods and sexually transmitted diseases (STDs).

Subjects and methods The study was carried out through three surveys in 1998, 2003 and 2008. A self-completion questionnaire, divided into three major sections, was administered. The groups were analyzed with the Chi-square test and the multiple logistic regression analysis; the significance level was set at $p < 0.05$.

Results Contraceptive methods were not used by 12.0, 12.5, and 16.2 % of the sample in 1998, in 2003 and 2008 respectively. The condom was the most common method used by responders, followed by the pill; both methods of birth control are also considered the most effective. In 2008, students demonstrated to have a good knowledge about STDs transmission through sexual intercourse and contraceptive use was higher among responders with multiple partners ($p = 0.028$), lower in smokers ($p = 0.003$) and female gender ($p = 0.001$).

Conclusion The results highlight the necessity to activate programs on sex education, on the use of contraceptives and STD prevention. Peer education should also be considered.

Keywords Contraception · Sexually transmitted diseases · STD · Students · Sexual education · Sexual behavior

Introduction

Unintended pregnancies, sexually transmitted diseases (STDs) and other serious reproductive health problems are high among youth all over the world (Oringanje et al. 2009; CDC 2011). Unintended pregnancies in adolescents are certainly a problem of great importance for families and the society, and result in abortion in at least 50 % of cases (Pezzini and Arisi 2008). According to the CDC (Centers for Disease Control and Prevention) survey, despite declines since 1991, the USA national teen birth rate was 39.1 births per 1,000 adolescents aged 15–19 years. The USA leads in the number of teen births compared to most European countries, surpassing even the United Kingdom, which has the highest rate in Western Europe (CDC 2011). A specific plan to reduce underage pregnancies has been developed, in the United Kingdom, through a multi-level strategy (Department of Health, United Kingdom 2008).

According to the WHO (World Health Organization) estimates, more than 340 million new cases of curable STDs, namely those due to *Treponema pallidum* (syphilis), *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Trichomonas vaginalis*, occur every year throughout the world in both genders aged 15–49 years. The incidence of STDs is higher in developing countries, particularly in the region of south and south-east Asia, sub-Saharan Africa, Latin America and the Caribbean (WHO 2001). However, industrialized

G. La Torre · B. Unim (✉) · S. Miccoli
Department of Public Health and Infectious Diseases,
Sapienza University of Rome,
Piazzale Aldo Moro 5,
00185 Rome, Italy
e-mail: brigidunim@yahoo.it

S. Miccoli
e-mail: silviamiccoli81@gmail.com

E. Langiano · M. Ferrara · E. De Vito
Department of Humanities, Social and Health Sciences,
University of Cassino and Southern Lazio,
Campus Folcara, Sant'Angelo St.,
03043 Cassino, Italy

nations can also be expected to experience an increased burden of disease because of the prevalence of non-curable viral infections, trends in sexual behaviour and increased travel (WHO 2007). In industrialized countries, two thirds of those infections affect the population under 24 years of age (Cates and McPheeters 1997). The STD prevention has become a particularly urgent issue due to their etiological role in many pathological conditions of the genital tract such as sterility, tumors, pelvic inflammatory disease, increased risk of miscarriage and high risk for HIV (Human Immunodeficiency Virus) infection acquisition and transmission.

The socio-economic costs of these infections and their complications are substantial, considering the health-care visits that drain both national health budgets and family income, and the quality of life of the affected individual. In particular, for third world countries the economic loss is estimated to be around 17 % (Mayaud and Mabey 2004).

Several surveys conducted in Italy and internationally underline that the age of sexual initiation is shifting forward (Cafaro 1998; Moore et al. 1998; Warren et al. 1998; Andrade et al. 2009; CDC 2011). According to some authors, this is probably an indirect consequence of continuous campaigns related to the mode of transmission of AIDS (Acquired Immune Deficiency Syndrome). However, a relatively low use of contraceptive methods during the first sexual intercourse or, lately, during other sexual experiences emerged from these investigations. In particular, in our country the reasons for this situation are identified mainly in incapacity, negligence or indifference often demonstrated by the major educational agencies in addressing a serious and comprehensive sex education in its different facets. It is widely recognized that the main mechanism for the prevention of risky sexual behaviour is sexual education of young people, but this recognition in academic circles failed to translate in the dissemination of educational programs for socio-cultural and religious reasons, except in some of the most developed countries in the world (Andrade et al. 2009).

The objectives of this study are:

1. Acquisition of information about opinions and behaviors of students at the University of Cassino, in relation to their sexual habits, use and effectiveness of contraceptive methods and the efficacy of contraceptives in preventing STDs
2. Evaluation of changes in university students' knowledge and behaviour about STDs and contraception in a period of 10 years

Materials and methods

In 1998, a self-completion anonymous questionnaire on knowledge and use of contraceptive methods was

administered to a stratified random sample of 600 students attending the faculties of Philosophy and Human Sciences, Law, Economics, Engineering, Social Sciences and Nursing at the University of Cassino.

In 2003 and 2008, the aforementioned survey was administered in the same University to a stratified random sample of 560 and 1,025 students respectively, to evaluate differences and changes in knowledge and behavior. The questionnaires were distributed to students during their undergraduate courses by the authors of the present study. All the filled questionnaires were collected and stored for analysis.

Questionnaire

In the first part of the questionnaire, students were asked to indicate the frequency of sexual intercourse, the number of partners they had in the last 3 years and in the previous year only for 2008, the use of contraception and the most commonly used method of contraception.

In the second part of the questionnaire, students' knowledge regarding the degree of protection against STDs provided by condoms and pills were investigated. Finally, in the last part of the questionnaire opinions on STDs were considered. For these types of questions, the possible answers were: Yes - No - I don't know.

Statistical analysis

Data entry was carried out using a relational database. The software SPSS 19.0 for Windows was used for the statistical analysis. Differences between groups were analyzed with the Chi-square test and the level of statistical significance was set at $p < 0.05$. A multiple logistic regression analysis was conducted to evaluate the effect on the dependent variable 'use of contraceptives' of the following explanatory variables: age (18–19, 20–22, ≥ 23 ; the latter as reference), the number of partners in the last 3 years and in the previous year (≥ 3 and < 3 ; the latter as reference), smoking status ('no' as reference), the type of faculty (Philosophy and Human Sciences as reference) and gender ('male' as reference). The backward elimination method was applied for each variable that did not contribute significantly to the model, using a cutoff of 0.10 for the significance level (Hosmer and Lemeshow 1989).

Results

Sample description

The present study compares opinions, knowledge and attitudes of students at the University of Cassino on the use and effectiveness of contraceptive methods and STDs. Table 1

Table 1 Frequency distribution of students by faculty and gender

| Faculty | Gender | | | | | |
|-------------------------------|-----------------------|-----------------------|--------------------|----------------------|-----------------------|-----------------------|
| | 1998 | | 2003 | | 2008 | |
| | Males <i>N</i> (%) | Females <i>N</i> (%) | Males <i>N</i> (%) | Females <i>N</i> (%) | Males <i>N</i> (%) | Females <i>N</i> (%) |
| Economics | 55 (43) | 73 (57) | 52 (44.4) | 65 (55.6) | 81 (48.8) | 85 (51.2) |
| Engineering | 157 (83.5) | 31 (16.5) | 169 (86.7) | 26 (13.3) | 76 (72.4) | 29 (27.6) |
| Philosophy and Human Sciences | 17 (16.2) | 88 (83.8) | 18 (16.2) | 93 (83.8) | 40 (8.0) | 457 (92.0) |
| Law | 20 (40) | 30 (60) | 12 (17.1) | 58 (82.9) | 24 (51.1) | 23 (48.9) |
| Social Services | 8 (9.6) | 75 (90.4) | 13 (31) | 29 (69) | 0 (0) | 3 (100) |
| Nursing | 5 (17.9) | 23 (82.1) | 1 (5.6) | 17 (94.4) | 10 (20.4) | 39 (79.6) |
| Sport Sciences | - | - | - | - | 48 (56.5) | 37 (43.5) |
| Total | 262 ^a (45) | 320 ^a (55) | 265 (47.9) | 288 (52.1) | 297 ^b (30) | 692 ^b (70) |

^a 2 missing values for the variable “gender”

^b 37 missing values (18 male and 19 female) for the variable “faculty”

shows the distribution of the three classes of students by faculty and gender, respectively in 1998, 2003 and 2008. In 1998, 584 students participated in the survey, 45 and 55 % were male and female respectively, with a mean age of 21.96 years (SD = 2.73). In 2003, 553 students participated in the study, 47.9 % were male and 52.1 % female, with a mean age of 22.02 years (SD = 2.98). In 2008, 1025 students were interviewed, 29.3 % male and 70.7 % female, with a mean age of 22.60 (SD = 3.59). The age of sexual initiation is between 16 and 18 years for both gender and for the three groups considered.

Sexual intercourse

In 1998, 342 (58.6 %) respondents reported that they were already sexually active and 425 (76.9 %) affirmed the same in 2003. In both years there was a statistically significant difference between response rates relatively to gender (respectively males 69.2 %, females 49.8 %, $p < 0.001$; males 80.8 %, females 73.3 %, $p = 0.037$); regarding the faculties, the differences were significant only in 1998 ($p = 0.002$). The most sexually active students were those attending Social Sciences in 1998 (75.6 %) and Nursing in 2003 (94.4 %). In 2008, 856 (83.5 %) students declared they had sexual relations and the difference between gender was not statistically significant ($p = 0.055$); contrarily, for the faculties the differences were statistically significant ($p < 0.001$). The responders that resulted more sexually active were law students (93.8 %) in 2008.

Number of partners

In 1998, with regard to the number of partners over the past three years, 49.7 % of responders report having one partner and 26.5 % of the sample declared having three or more

partners. There was a statistically significant difference between faculties ($p = 0.051$). Law and engineering students are those who reported having many partners over the past three years (33.3 %). Most students attending the School of Social Services (73.3 %) declared only one partner. In 2003, 32 % of responders affirmed they had only one partner and 21.2 % reported having three or more partners. The highest proportions were reported by engineering students (30.8 %), while the lowest number was declared by nursing students (4.5 %). In 2008, differences between faculties were significant ($p = 0.001$) relatively to the number of partners in the last year: economics students claimed more than three sexual partners (28 %), while 55.9 % of human science students reported to have had just one partner.

Contraceptive use

In 1998, 88 % of sexually active students declared using contraception, while 12 % of the sample affirmed not to make use of any contraceptive method, although sexually active (see Table 2). The analysis highlighted that 95.2 % of respondents from the School of Social Services uses contraceptives versus 71.4 % of nursing students. In 2003, 87.5 % of responders claimed to use contraceptive methods versus 12.5 % of those who reported not to use any method despite they were sexually active. All nursing respondents affirmed to make use of contraceptive methods. In 2008, 83.8 % of the participants claimed to use contraceptive methods against 16.2 % of those who declared not using any method, though sexually active.

Most commonly used contraceptive methods

In 1998, 67.6 % of responders used condoms as the main contraceptive method. The pill was used, however, by 17.6 % of participants. Data analysis evidenced that in

Table 2 Contraceptive use among sexually active students

| Faculty | Contraceptive use | | | | | |
|-------------------------------|-------------------|------------------|-----------------|------------------|-------------------|------------------|
| | 1998 | | 2003 | | 2008 ^a | |
| | No <i>N</i> (%) | Yes <i>N</i> (%) | No <i>N</i> (%) | Yes <i>N</i> (%) | No <i>N</i> (%) | Yes <i>N</i> (%) |
| Economics | 10 (12.7) | 69 (87.3) | 11 (12.1) | 80 (87.9) | 12 (8.7) | 126 (91.3) |
| Engineering | 14 (12.8) | 95 (87.2) | 21 (14.3) | 126 (85.7) | 10 (12.5) | 70 (87.5) |
| Philosophy and Human Sciences | 6 (14) | 37 (86) | 14 (16.9) | 69 (83.1) | 82 (19.4) | 341 (80.6) |
| Law | 4 (11.8) | 30 (88.2) | 2 (3.5) | 55 (96.5) | 9 (20) | 36 (80) |
| Social Services | 3 (4.8) | 59 (95.2) | 5 (16.7) | 25 (83.3) | 0 (0) | 2 (100) |
| Nursing | 4 (28.6) | 10 (71.4) | 0 (0) | 17 (100) | 7 (17.1) | 34 (82.9) |
| Sport Sciences | - | - | - | - | 10 (13.7) | 63 (86.3) |
| Total | 41 (12) | 300 (88) | 53 (12.5) | 372 (87.5) | 130 (16.2) | 672 (83.8) |

^a 42 missing values for the variable "faculty" among the sexually active students; 11 missing variables for "contraceptive use"

2003 and in 2008 the majority of responders used condom (84 and 58.2 %) as the main method of contraception, followed by the pill (15.5 and 13 %) respectively.

Knowledge on how to prevent STDs

With regard to students' opinions on the efficacy of contraceptives in preventing STDs, it is interesting to note that the methods considered most effective are those that actually have a very high safety index of contraception: condom (84.3, 69.4, 95 %) and the pill (9, 13, 1.3 %) in 1998, 2003 and 2008 respectively.

In 1998, statistically significant differences concerning the efficacy of pills ($p=0.05$) and condoms ($p=0.05$) were found between groups. The most effective method for STDs prevention is the pill according to nursing students (14.8 %), followed by economics students (10.3 %). While, 90.2 % of students in social services and 77.8 % of nursing students considered condoms as the safest method to control the spread of venereal diseases.

In 2003, statistically significant differences among faculties emerged only for the pill's efficacy ($p<0.001$). In particular, 18 % of economics students considered oral contraceptives effective against STDs compared to 5.7 % of law students who declared that they offer the lowest level of protection.

In 2008, there were no statistically significant differences among faculties regarding students' knowledge about methods of prevention. Though, the undergraduates in Philosophy and Human Sciences and Economics gave more correct answers. In particular, the condom was considered the safest way to prevent STDs by 52 % of students frequenting Philosophy and Human Sciences, followed by 16.4 % of those attending the Economic faculty ($p=0.32$). The pill, instead, wasn't effective against STDs for 54 % of

Philosophy and Human Sciences participants and 18 % of economics undergraduates ($p=0.31$).

Students' opinions

In 1998, 50.7 % of respondents believed that all sexual intercourses are potentially at risk of contracting STDs, while 35 % declared that there are no risky intercourses and 14 % were not able to answer the question. Relatively to the symptoms of STDs, they are not always evident for 61.8 % of responders versus 12 % who had opposite views. There were significant differences between groups. In particular, the symptoms are not always evident for 67.5 % of engineering students and 48 % of those attending Nursing ($p=0.012$).

In 2003, 45 % of the respondents believed that all sexual intercourses are potentially at risk for STDs, while 34 % had the opposite opinion. Regarding the evidence of symptoms, most participants (55 %) believed that they do not always manifest, while for 14 % they are always appreciable. The difference between groups was not significant for all questions regarding opinions on STDs.

In 2008, students demonstrated having a good knowledge about the possibility of contracting STDs through sexual activities: the percentages for AIDS, genital herpes and syphilis were respectively 87, 56 and 42 %. With regard to the faculties, there were significant differences for syphilis ($p=0.003$), AIDS ($p<0.001$) and herpes ($p<0.001$). Relatively to students in Philosophy and Human Sciences, 49 % affirmed that syphilis is transmitted through sexual activity, while 48 % was of the opposite opinion. According to 30 % of respondents from the aforementioned faculty, AIDS is not transmitted through sexual intercourse, while 51.5 % of students are aware that all sexual intercourses are at risk. With regard to genital herpes, 36 % of Philosophy and

Human Sciences responders affirmed that it's not sexually transmitted. Contrarily, for 59 % of students, it is transmitted through sexual contact.

Multiple logistic regression analysis

The results of the multiple logistic regression analysis are reported in Table 3 for all the three groups of students considered. In 1998, contraceptive use was significantly low in the age groups 18–19 and 20–22 years compared to older students (OR = 0.30 and OR = 0.49 respectively). Contraceptive use is 2.5 times higher in smokers than non-smokers, and about eight times higher in individuals who had multiple partners (≥ 3) in the last three years compared to those with a low number of sexual partners (< 3). Compared to students attending the Faculty of Philosophy and Human Sciences, methods of contraception are mainly used by students in Social Services (OR = 3.84).

In 2003, it emerged that the use of contraceptives in the 18–19 year age group was low (OR = 0.33), while in the 20–22 year age group it was similar to the references (OR = 1.01). Contraceptive use is higher in smokers (OR = 2.09) than non-smokers and is higher in individuals with multiple partners ≥ 3 (OR = 5.09) compared to those who had less

than three partners. Most nursing students used contraceptive methods (OR = 10.54), followed by those attending Social Services (OR = 1.54). In 2008, relatively to contraceptives use, there were no significant differences in the three age groups and between faculties. However, contraceptive use was higher among students with a number of partners ≥ 3 (OR = 0.61), and lower in smokers (OR = 0.61) and females (OR = 0.51).

Discussion

Among industrialized nations, Italy has the lowest percentage of utilization of safe methods for fertility regulation, as evidenced in a survey conducted in 2003 in five European countries (France, Germany, Spain, Great Britain and Italy) on more than 12.000 women, aged 15–49 years. The study by Skouby (2004) highlights that 17 % of Italian women use unsafe methods in contrast to 2–5 % in other countries considered in the survey. The present survey conducted among university students points out that the percentage of responders who affirmed they were not sexually active decreased from 1998 to 2008. The percentage of students without sexual experience is higher in 1998 compared to the

Table 3 Results of the multiple regression analysis on contraceptive use. ($-2 \log$ likelihood: 667.230; $\chi^2=141.811$, $p<0.0001$)

| Variables | 1998 | | | 2003 | | | 2008 | | |
|------------------------------|------|-----------|--------------------------|-------|------------|--------------------------|------|-----------|--------------------------|
| | OR | 95% CI | Statistical significance | OR | 95% CI | Statistical significance | OR | 95% CI | Statistical significance |
| Age (years) | | | | | | | | | |
| 18–19 | 0.30 | 0.17–0.51 | <0.001* | 0.33 | 0.19–0.59 | <0.001* | 1.40 | 0.75–2.58 | 0.295 |
| 20–22 | 0.49 | 0.30–0.81 | 0.005* | 1.01 | 0.65–1.59 | 0.964 | 1.22 | 0.89–1.70 | 0.228 |
| ≥ 23 (reference) | 1 | | | 1 | | | 1 | | |
| Partner | | | | | | | | | |
| <3 (reference) | 1 | | | 1 | | | 1 | | |
| ≥ 3 | 7.75 | 3.95–15.2 | <0.001* | 5.09 | 2.70–9.61 | <0.001* | 0.61 | 0.39–0.95 | 0.028* |
| Smoking status | | | | | | | | | |
| No (reference) | 1 | | | 1 | | | 1 | | |
| Yes | 2.53 | 1.61–3.98 | 0.001* | 2.09 | 1.30–3.34 | 0.002* | 0.61 | 0.44–0.85 | 0.003* |
| Faculty | | | | | | | | | |
| Philosophy and Human Science | 1 | | | 1 | | | 1 | | |
| Economics | 1.80 | 1.04–3.13 | 0.036* | 0.54 | 0.26–1.13 | 0.101 | 1.04 | 0.65–1.65 | 0.876 |
| Engineering | 1.94 | 1.15–3.28 | 0.013* | 0.95 | 0.52–1.72 | 0.862 | 1.22 | 0.63–2.37 | 0.547 |
| Social Services | 3.84 | 2.00–7.38 | 0.001* | 1.54 | 1.03–2.38 | 0.033* | 1.02 | 0.52–1.82 | 1.000 |
| Nursing | 0.75 | 0.17–2.69 | 0.748 | 10.54 | 1.37–80.99 | 0.024* | 0.98 | 0.47–2.06 | 0.951 |
| Sport Sciences | | | | | | | 0.98 | 0.53–1.83 | 0.953 |
| Gender | | | | | | | | | |
| Male (reference) | 1 | | | 1 | | | 1 | | |
| Female | 0.98 | 0.68–1.52 | 0.851 | 0.72 | 0.48–1.09 | 0.121 | 0.51 | 0.34–0.78 | 0.001* |

* $p<0.05$

Italian national data, according to which only 5.9 % of 20-years-olds have not had intercourse (Cafaro 1998), and compared to data from surveys conducted at international levels (Moore et al. 1998; Ni Riain 1998; Warren et al. 1998; Siegel et al. 1999; Pezzini and Arisi 2008; Andrade et al. 2009; CDC 2011).

The average age for the first sexual experience is about sixteen years in Italy, as in many industrialized countries (USA, Canada, France, Great Britain; Warren et al. 1998; Pezzini and Arisi 2008) and Eastern Europe (Ukraine; Matytsina 1996). It is important to note that a significant percentage of first sexual intercourses take place without the use of any contraception at all, with greater exposure to unwanted pregnancies and risk of STDs, including HIV (Gayet et al. 2003; Walker et al. 2006; CDC 2011).

Almost 50% of the sample reported that they had only one partner in the last 3 years, this finding suggests that young people prefer stable and lasting relationships, and tend to avoid casual sex. Regarding these questions, students demonstrated a responsible attitude. Unfortunately, the use of contraceptives is definitely a cause for concern. In fact, 13.6 % of sexually active students affirmed they did not use any contraceptive method; the national rate is 14.3 %. The use of pills for birth control (15.4 %) is lower than the value published by the Italian National Health Institute in central and southern Italy (25 %) in the early 1990s (Spinelli et al. 1993). A more reassuring result regards male condom, which is the contraceptive method mostly used by sexually active students. In Italy, condoms are used by 22.8 % of sexually active population (Cafaro 1998). Another positive data regards the knowledge about the effectiveness of contraceptive protection against STDs. In fact, many university students believe that condom can provide a high degree of protection against STDs. A significant proportion of the sample in 1998 (35 %) and in 2003 (34 %) believed that not all sexual activities are risky, while students in 2008 had a good knowledge about STDs. The improvements in knowledge and conducts of students in 2008, compared to their colleagues in the previous years, could be attributed to the intervention on a sample of 1,000 students at the University of Cassino in the academic year 2005/2006. The intervention consisted of a multimedia exhibition, which included different sections: historical overview, biological and clinical aspects of infections, epidemiology, prevention and a section called the "Red Zone" with clear and explicit images related to STDs. This intervention highlighted that an educational program can modify students' knowledge and increase condom use (Ferrara et al. 2010).

The results of the multiple regression analysis showed that in 1998 and in 2003 contraceptive use was lower among young people; besides, it was high in smokers and in probands reporting multiple partners. In 2008, the opposite situation was observed with regard to smoking and there

were no differences between age groups and between faculties. In addition, results indicated that females were less careful (OR=0.51); hence, they used less contraceptive methods than males.

The limitation of this study concerns the different sample size which is low for Nursing in 2003 and Social Services in 2008; while, for the Faculty of Philosophy and Human Science in 2008, the number of participants is very high. Another limitation is the lack of homogeneity among the faculties considered; in fact, Sports Sciences is present only in 2008. The strength of the present survey is the comparison of three academic years in order to evaluate changes in opinions and behaviors over 10 years (1998–2008).

Conclusions

The results of the present investigation, about knowledge on the effectiveness of contraceptive methods and STDs prevention, underline the need to activate an education program regarding sexuality, the use of contraceptives and STDs. It has been demonstrated that an effective sexual education program focuses on the influence of social and cultural factors on young people (sexually active or not), on how to use contraceptives, analyses risky sexual behaviors and emphasizes the negative consequences of unprotected sex (Kirby 1992; Donati et al. 1994; Finicelli 1995). Young people (especially women) usually change the type of contraception used with facility, which suggest that measures providing appropriate information on contraceptives to prevent unwanted pregnancies and STDs should be taken (Kusseling et al. 1995). In this context, it seems appropriate to promote the role of family counseling (Grandolfo 1996) that, with schools and families, can become the main scenario of sexual education in Italy for the implementation of such programs on all levels of education, from elementary to university.

Positive models for young people are young people themselves (Landi 2004) and peer-education interventions (Croce and Gemmi 2003) may be more effective than a traditional preventive campaign. Therefore, it is necessary to develop additional education programs among equals and encourage knowledge sharing, especially among adolescents and children. The institutions (e.g. social services, educational institutions) should work together with youth organizations to implement effective prevention programs. The first important thing is what you want to say, but the second important thing is how you say it! The medium is the message (McLuhan 1967).

Conflicts of interest The authors declare that they have no conflict of interest.

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