

Sexual Behaviors, Attitudes, and Knowledge about Sexually Transmitted Infections: A Cross-sectional Study in Romania

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ABSTRACT Sexually transmitted infections (STIs) are serious public health problems. Little is known about sex knowledge, attitudes, and sexual behaviors among young adults in Romania; an effective preventive campaigns should be based on an appropriate understanding of these factors. The aim of the present study was to obtain data about sexual behavior, attitudes, and knowledge about STIs among university students aged 18-25 in Romania. 3872 persons completed an internet-based questionnaire, advertised on Facebook, regarding sexual behavior, attitudes, and knowledge about STIs from January 28 to February 28, 2016. 6.01% of the respondents had no sexual experience; of the remaining (N=3639, 945 men and 2694 women) 94% were heterosexual, 1.5% homosexual, and 4.6% bisexual. 53.7% of the respondents started their sexual activity between 14 and 18 years of age; only 2.3% become sexually active before 14 years of age. 30% of both sexes reported multiple sexual partners during the previous year. 25.9% of men and 23.3% of women used no contraception at sexual onset, the proportion being higher among those with an early sexual debut. 98% of the respondents knew that HIV could be contracted sexually, 75.8% knew that gonorrhea and 61.1% that *Chlamydia trachomatis* were sexually transmitted, and approximately one third knew that trichomoniasis and hepatitis B or C were STIs. We found a relatively high proportion of students engaged in risky sexual behaviors and insufficient knowledge about STIs. The results are important in planning future sexual education campaigns and they call for new preventive strategies.

KEY WORDS: sexual behavior, STIs, youth

INTRODUCTION

Sexually transmitted infections (STIs) are a significant public health problem all over the world, especially among the young (1). It has been estimated that

young people aged 15-24 acquire nearly half of new STIs and that 1 in 20 teenagers contracts a sexual bacterial infection every year (2). In recent years, there has

been a particularly significant increase in STIs among young people, with a high prevalence of human papillomavirus (HPV), *Neisseria gonorrhoeae* or HIV, and the re-emergence of the *Chlamydia trachomatis* infection (1). In addition, more than 10% of all syphilis cases have been reported in the population aged 20-24 years (3). The World Health Organization estimates that more than 1 million STIs are acquired every day. Each year, there are an estimated 357 million new infections with 1 of 4 STIs: *Chlamydia trachomatis* (131 million), gonorrhea (78 million), syphilis (5.6 million) and trichomoniasis (143 million). More than 500 million people are living with genital herpes simplex virus (HSV) infection. At any point in time, more than 290 million women have an HPV infection, one of the most common STIs (4). The high prevalence of STIs is related, together with unwanted pregnancies and high rates of abortion, to risky sexual behaviors (5). Early onset of sexual activity, multiple sexual partners, and unprotected sex are the most important risky sexual behaviors. Fortunately, all these behaviors are modifiable, teenagers and young adults representing the most important target group for education about sexual health and STIs. In order to ensure effective preventive interventions in the future, an appropriate understanding of behavioral characteristics at individual and population levels is needed. Moreover, comprehending the level of knowledge about STIs and their ways of transmission is essential.

The aim of the present study was to obtain data about sexual behavior, attitudes, and knowledge about STIs among university students aged 18-25 in Romania. Compared to the rich knowledge base in other European countries, especially western ones, little is known about sexual knowledge, attitudes, and behavior among young adults in Romania. Due to the current global circumstances, especially migration of population, these data are, in our opinion, not only of local concern.

Romania, as other formerly communist countries, was closed to influences from the West under communist rule. After the collapse of communism, Romania caught up with Western countries regarding sexual behavior and attitude towards sex, but unfortunately no national strategy on sexual health was developed. The National Public Health Institute from Romania reports a continuous decrease of STIs from 2004 to 2014, the incidence remaining, however, one of the highest in Europe for syphilis in 2014 (6). Reporting the cases of STIs unfortunately remains an important problem in Romania, being difficult to estimate in what proportion underreporting is responsible for the decrease.

METHODS

Study design and population

We conducted a nationwide population-based study regarding sexual behaviors, attitudes, and knowledge about STIs among a sample of university students aged 18-25. We developed a self-administered web-based questionnaire for the study, on the basis of a literature search (5,7-9). The questionnaire was distributed weekly to all national student groups identified on Facebook, from January 28 to February 28, 2016. Students aged 18-25 were asked to complete the questionnaire by following a link which was included in the advertisement. The advertisement explained the importance of the research, emphasizing voluntary participation and the anonymous nature of the study. Respondents gave their consent by accessing the link and fully completing the web-based questionnaire. Respondents received no compensation. Incomplete questionnaires were excluded from statistical analysis.

Questionnaire and measures

A self-administered 24-item web-based questionnaire was developed on the basis of a literature search (5,7-9). The web-based questionnaire was first pilot tested among 20 students (aged 18-24) in December 2015.

The standardized questionnaire collected information on the participant's age, gender, place of birth, and residence. Items on sexual behavior concerned sexual orientation (heterosexual, homosexual, bisexual), age at sexual onset (grouped into: under 14, 14-18, after 18), age of the first sexual partner (grouped into: no age difference, partner younger, partner older), contraception used at sexual onset (grouped into: condom, oral contraceptives, other, no contraception), number of sexual partners during the last year (grouped into: no partner, 1 partner, 2-5 partners, more than 5 partners), usual contraception (grouped into: condom, oral contraceptives, other, no contraception), reasons for not using contraception, presence of a steady sexual partner, types of sexual activities practiced (grouped into: vaginal, anal, oral sex), use of condom during vaginal, anal, and oral sex. We added items regarding previous STIs testing and specifically HIV testing. The last questions tested knowledge about STIs (symptoms that can be present in STIs, infections that can be sexually transmitted, ways of contacting STIs), attitude in case of STIs symptoms and opinion regarding the need for sexual education in schools.

Data analysis

Statistical analysis was performed with MedCalc Statistical Software version 16.2.0 (MedCalc Software bvba, Ostend, Belgium; <https://www.medcalc.org>; 2016). First, descriptive statistics were conducted; nominal variables were described by frequency and percent. Next, differences between nominal variables were assessed using the chi-square test. A $P < 0.05$ was considered statistically significant.

RESULTS

Out of the initial 4194 questionnaire completed, 322 (7.6%) were excluded due to incompleteness and the rest of 3872 (92.3%) were statistically analyzed. The population studied (N=3872) comprised 1006 (25.9%) men and 2866 (74.01%) women. With regard to age range, 24.17% were between 18 and 20 years old, and the rest were between 20 and 25 years old. Regarding residence, the studied population comprised responders from all Romanian counties, including the capital.

A total of 233 respondents (6.01%) had no sexual experience, the proportion being significantly higher

($P < 0.005$) in younger responders (13.03% between 18-20 years of age) compared to older ones (3.92% between 20-25 years of age). There were no significant gender differences in the group without sexual experience.

We restricted our analysis regarding sexual behavior, attitudes, and knowledge about STIs to the responders with sexual experience (N=3639, 945 men and 2694 women).

Sexual behaviors are summarized in Table 1. Of the responders, 93.1% of men and 94.2% of women had a heterosexual orientation, 3.5% of men and 0.7% of women had a homosexual orientation, and 3.4% of men and 5% of females were bisexual. Most of the responders started their sexual activity between 14 and 18 years of age (53.7%), only 2.3% becoming sexually active before 14 years of age. Men started their sexual life significantly earlier than women ($P < 0.05$). Most of the responders started their sexual life with an older partner (59.9%).

During the last year, 64.6% of the participants only had one sexual partner, with a higher proportion among women, but approximately 30% of both genders reported multiple sexual partners. The

Table 1. Sexual behavior among sexually active respondents (N=3639, 945 men and 2694 women) Results are presented as % (n)

Variable	Category	Total number % (N)	Women % (n)	Men % (n)	P (Asymp. sig)
Sexual orientation	Heterosexual	94 (3419)	94.2 (2539)	93.1 (880)	<0.05
	Homosexual	1.5 (53)	0.7 (20)	3.5 (33)	
	Bisexual	4.6 (167)	5.0 (135)	3.4 (32)	
Age at sexual onset	Under 14	2.3 (85)	1.3 (34)	5.4 (51)	<0.05
	14-18	53.7 (1953)	51.5 (1388)	59.8 (565)	
	After 18	44 (1601)	47.2 (1272)	34.8 (329)	
Age of the first sexual partner	No age difference	30.5 (1111)	27.2 (734)	39.9 (377)	<0.05
	Partner younger	9.6 (349)	3.5 (94)	27 (255)	
	Partner older	59.9 (2179)	69.3 (1866)	33.1 (313)	
Number of sexual partners during last year	No partner	3.1 (112)	2.7 (73)	4.1 (39)	<0.05
	1 partner	64.6 (2352)	71.1 (1916)	46.1 (436)	
	2-5 partners	25.9 (942)	22.4 (603)	35.9 (339)	
	More than 5 partners	6.4 (233)	3.8 (102)	13.9 (131)	
Presence of a steady sexual partner	No	19.9 (725)	14 (377)	36.8 (348)	<0.05
	Yes	80.1 (2914)	86 (2317)	63.2 (597)	
Types of sexual activities practiced	Vaginal sex	97.9 (3563)	99 (2666)	94.9 (897)	<0.05
	Anal sex	18.2 (661)	13.8 (373)	30.5 (288)	<0.05
	Oral sex	68.4 (2488)	64 (1723)	81 (765)	<0.05
Previous STIs testing	Yes	34.9 (1271)	36.6 (987)	30.1 (284)	<0.05
	No	65.1 (2368)	63.4 (1707)	69.9 (661)	
Previous HIV testing	Yes	25.1 (912)	23.7 (639)	28.9 (273)	<0.05
	No	74.9 (2727)	76.3 (2055)	71.1 (672)	

proportion of men having multiple partners was higher than that of women ($P<0.05$). Moreover, multiple partners were more frequent among homosexuals, 28.3% reporting 2-5 partners and 22.6% reporting more than 5 partners in the last 12 months. 80.1% of the responders had a steady sexual partner. Vaginal intercourse was practiced by 94.9% of men and 99% of women; oral sex was practiced by 81% of men and 64% of women; and anal sex was practiced by 30.5% of men and 13.8% of women.

Data about contraception are summarized in Table 2. Most responders (73.1%) used a condom at sexual onset. Other contraceptive method use was reported at sexual debut by 3% of the participants in the study. In addition, 25.9% of men and 23.3% of women used no contraception at sexual onset. Lack of contraception at sexual onset was reported by 47.1% of responders who started their sexual activity before 14 years, by 25.2% between 14 and 18 years, and 21.2% of those who became sexually active after 18 years of age. The proportion of responders who did not use any contraception was higher among those with a

steady partner (27.8% of men and 31.2% of women). A condom was used usually by 64.1% of the participants, but the proportion was variable for different sexual activities. 23.4% of all participants never used a condom during vaginal intercourse, 58.4% never used a condom during anal intercourse, and 90.0% never used condom during oral intercourse. The reasons for not using contraception were variable, but almost 30% of participants reported they do not want to use it.

Only 34.9% and 25.1% of the participants reported previous STIs testing and HIV testing, respectively. More women than men had been tested. Those with multiple partners were less likely to undergo HIV testing, compared with those with only one partner in the previous year ($P<0.05$).

Knowledge about STIs is summarized in Table 3. Most respondents (98.0%) knew that HIV could be contracted sexually. Fewer students knew that gonorrhea (75.8%) and *Chlamydia trachomatis* (61.1%) were sexually transmitted, and even fewer knew that trichomoniasis and hepatitis B or C were STIs.

Table 2. Contraception habits among sexually active respondents (N=3639, 945 men and 2694 women) Results are presented as % (n)

Variable	Category	Total number % (N)	Women % (n)	Men % (n)	P (Asymp. sig)
Contraception used at sexual onset	Condom	73.1 (2660)	73.7 (1985)	71.4 (675)	<0.05
	Oral contraceptives	2.0 (72)	2.2 (60)	1.3 (12)	
	Other	1.0 (35)	0.8 (22)	1.4 (13)	
	No contraception	24.0 (872)	23.3 (627)	25.9 (245)	
Contraception used usually	Condom	64.1 (2333)	60.9 (1640)	73.3 (693)	<0.05
	Oral contraceptives	14.5 (526)	17.1 (461)	6.9 (65)	<0.05
	Other	3.4 (124)	3.9 (106)	1.9 (18)	<0.05
	No contraception	28.9 (1052)	29.3 (790)	27.7 (262)	>0.05
Contraception used with the steady partner	Condom	45.5 (1654)	46.7 (1257)	42.0 (397)	<0.05
	Oral contraceptives	12.1 (440)	13.8 (373)	7.1 (67)	<0.05
	Other	4.0 (145)	4.3 (117)	3.0 (28)	>0.05
	No contraception	30.3 (1104)	31.2 (841)	27.8 (263)	>0.05
If you don't use contraception what is your reason	Contraceptive methods were not explained to me	1.3 (46)	1.2 (32)	1.5 (14)	>0.05
	I do not want to use contraception	29.6 (1076)	27.9 (751)	34.4 (325)	<0.05
	I am scared that my parents could find my contraceptives	0.7 (27)	0.9 (23)	0.4 (4)	>0.05
	Contraception is not healthy	5.00 (182)	5.6 (150)	3.4 (32)	<0.05
	I believe my partner is responsible for contraception	13.5 (490)	15.1 (406)	8.9 (84)	<0.05
	I want to have a child	5.1 (185)	5.4 (145)	4.2 (40)	<0.05

Table 3. Knowledge about STIs among sexually active respondents (N=3639, 945 men and 2694 women) Results are presented as % (n)

Variable	Category	Total number % (N)	Women % (n)	Men % (n)	P (Asymp. sig)
The following can be considered STIs	HIV	98.0 (3568)	98.4 (2650)	97.1 (918)	<0.05
	Hepatitis B	36.9 (1342)	37.0 (996)	36.6 (346)	>0.05
	Hepatitis C	40.0 (1457)	39.7 (1069)	41.1 (388)	>0.05
	Infections caused by <i>Chlamydia trachomatis</i>	61.1 (2223)	64.2 (1729)	52.3 (494)	<0.05
	Gonorrhea	75.8 (2760)	77.4 (2084)	71.5 (676)	<0.05
	Trichomoniasis	32.4 (1180)	35.1 (946)	24.8 (234)	<0.05
STIs can present with the following symptoms	Vaginal discharge	82.7 (3008)	86.9 (2340)	70.7 (668)	<0.05
	Urethral discharge	29.1 (1059)	29.7 (799)	27.5 (260)	>0.05
	Abdominal pain	32.7 (1190)	35.2 (948)	25.6 (242)	<0.05
	Burning during urination	72.0 (2619)	69.2 (1865)	79.8 (754)	<0.05
	Infertility	39.7 (1444)	40.8 (1098)	36.6 (346)	<0.05
STIs can be transmitted through	Shaking hands	1.3 (47)	1.0 (26)	2.2 (21)	<0.05
	Kissing on cheeks	0.7 (26)	0.6 (16)	1.1 (10)	>0.05
	Pool water	9.8 (357)	10.1 (272)	9.0 (85)	>0.05
	Insect bites	11.6 (422)	9.4 (253)	17.9 (169)	<0.05
	Toilet bowl seat	27.9 (1016)	29.1 (784)	24.6 (232)	<0.05
	Kissing on the mouth	19.9 (723)	18.5 (498)	23.6 (225)	<0.05
	Medical examination	14.7 (535)	14.4 (389)	15.4 (146)	>0.05
	Dental examination	19.8 (720)	18.9 (509)	22.3 (211)	<0.05
	Breast feeding	15.3 (555)	14.8 (399)	16.5 (156)	>0.05
	Vaginal sex	98.5 (3586)	99 (2668)	97.1 (918)	<0.05
	Anal sex	79.1 (2879)	79.1 (2130)	79.3 (749)	>0.05
	Oral sex	76.5 (2783)	76.9 (2071)	75.3 (712)	>0.05
	Blood transfusion	71.1 (2588)	70.5 (1898)	73.0 (690)	>0.05
	If you suspect a STI, what do you do	I consult my GP	39.2 (1427)	31.5 (849)	61.2 (578)
I consult a dermatologist		11.6 (423)	8.3 (224)	21.1 (199)	<0.05
I consult a gynecologist		78.7 (2865)	92.0 (2478)	41.0 (387)	<0.05
I consult an urologist		19.7 (718)	10.8 (290)	45.3 (428)	<0.05
I treat my self		3.8 (140)	3.7 (100)	4.2 (40)	>0.05
I ignore my symptoms		1.3 (49)	1.1 (29)	2.1 (20)	<0.05

Vaginal discharge (82.7%) and burning during urination (72%) were the most common symptoms associated with STIs. Urethral discharge, abdominal pain, and infertility were known as STIs symptoms only by approximately one third of the responders. Regarding ways of transmission for STIs, vaginal sex, anal sex, oral sex, and blood transfusion were the most known by responders (98.5%, 79.1%, 76.5%, and 71.1%, respectively). Only 15.3% knew about transmission through breast feeding. Moreover, some believed that STIs can be transmitted through shaking hands (1.3%), kissing on cheeks (0.7%), pool water (9.8%), insect bites (11.6%), kissing on the mouth (19.9%), and toilet bowl seats (27.9%).

In case of STI suspicion, most men would consult a GP or an urologist (61.2% and 45.3%), while the majority (92%) of women would go to a gynecologist. The majority of the participants (93.2%) recognized the need for sexual education in schools.

DISCUSSION

Using a sample of 3872 students from all over the country, our study investigated sexual behavior, attitudes, and sexual knowledge in Romania. To our knowledge, this is the first study to examine sexual behavior in young adults undergoing university education in Romania. Although the proportion of female students reported by the National Institute of Statistics is higher than that of male students in Romania

(10), the difference was not as high as in our study, a possible explanation being that women are more open to talking about sexuality compared to men.

Our study showed that the majority of young adults started their sexual life before 25 years of age, only 6.01% of the respondents having no sexual experience. Sexual orientation reported by the respondents was consistent with the one reported by other studies (5,7,11,12). Most of the participants became sexually active between 14 and 18 years of age, similar to the findings of other European studies, but in lower percentages (5,13). The prevalence of early sex, defined as having first intercourse before age 14, was lower in our study than that reported in other countries (5,13,14) but higher than the one reported by a previous study conducted in Romania (0.5%) (15). Similar to the findings of other studies (5,7,13), women waited longer before having their first sexual experience.

The number of sexual partners is one of the most important factors associated with the acquisition of STIs. In our study, approximately 30% of the participants had more than two partners in the last 12 months, with 6.5% having more than 5 partners, consistent with other data reported (5,7,13). When the distribution was separated by sex, the proportion of men having more than 5 partners in the last year was three times higher than that of women. Multiple partners were more frequent among homosexuals, corroborating data from other studies (16,17).

In Romania, condoms are the most common contraception used both at sexual debut and generally. However, approximately one fourth of the responders used no contraception at sexual onset, a larger proportion than the one reported in other countries (5,7). We found that the younger the age at sexual onset, the higher was the likelihood of not using contraception, as reported by studies in other countries as well (8). Moreover, inconsistent or no use of condoms was reported by one third of the respondents during usual intercourse. We find it very interesting that the majority of the respondents used condom during vaginal intercourse, but only 40% and 10% of the students used condom during anal and oral intercourse. This pattern was also observed in other studies (7) and can be explained by the fact that condoms are viewed primarily as a mean to prevent pregnancy, rather than as to prevent transmission of STIs. However, our study showed a slight increase in the prevalence of condom use in Romania compared with previous studies (15).

Previous STIs testing was reported by only one third of the sexually active respondents, the propor-

tion of those who underwent HIV testing being even lower. Although many STIs are frequently asymptomatic and may not be diagnosed or may not result in people seeking care, STI screening is recommended only for high-risk sexual behavior (18). Interestingly, those with multiple partners and those with an early sexual debut were less likely to undergo STI and HIV screening in our study, while homosexuality/bisexuality was associated with a higher likelihood of being tested.

The respondents showed a relatively limited knowledge about infections that can be transmitted sexually. While the majority knew that HIV, *Chlamydia trachomatis*, and gonorrhea are STIs, only approximately one third recognized trichomoniasis and hepatitis B and C as STIs. Similar findings have been reported in other countries (7,19,20). Moreover, urethral discharge, abdominal pain, and infertility were poorly recognized as STIs symptoms. However, students showed satisfactory knowledge about sexual transmission of STIs. Regarding non-sexual ways of transmission, blood transfusion was recognized by most of the participants, but breast feeding was reported by only 15.3%. Furthermore, approximately one third believed that STIs can be acquired from the toilet bowl seat and approximately 10% blamed insect bites.

The results of the present study suggest that, in the Romanian population and as observed in other countries, high risk sexual behaviors are usually associated with one another. Thus, early sexual debut is associated with inconsistent or no use of condoms, with multiple partners, and with the absence of STI/HIV screening. Moreover, homosexual orientation is associated with multiple partners, and anal intercourse with a low chance of condom use. Although early sexual debut was reported in a lower proportion than in Western countries, the prevalence of condomless sex at first sexual intercourse was higher. All of this, coupled with the limited knowledge about STIs, point to the inefficient sexual education in our country. Due to globalization and migration of population, high-risk sexual behaviors and poor sexual education in one country also impact global public health.

Our study had several limitations. The primary limitation was self-selection in the sample, the study being advertised on Facebook; however, Internet-based recruitment through social media has increased in popularity in recent times as a cost-effective way of attracting young people to participate in health research. Current recruitment strategies aimed at young people must be innovative and flexible in order to achieve adequate samples for health research

(21). The second limitation was related to the risk of non-response bias that may result from differences between respondents and students who choose not to respond to the questionnaire, especially because the proportion of women respondents was higher than that of men. Furthermore, the sample was limited to students, so the results may not be appropriate for young adults who do not have a university education, which would require a study as well. Still, taking into consideration that the study was conducted on educated young adults, we can suspect that knowledge among adults without university education is even poorer, supporting the need for educational campaigns which is indicated by our study. Finally, although anonymity and confidentiality were emphasized in the advertisement of the study, we cannot ascertain the degree of under-reporting due to the sensitive issues involved in the questionnaire. A strength of this study was that this evaluation provided sorely needed data on sexual health behavior in the studied population.

CONCLUSIONS

This study examined Romanian students' sexual behavior, attitudes, and knowledge about STIs. The results are important in planning future sexual education campaigns and call for new preventive strategies. We found a relatively high proportion of students engaged in risky sexual behaviors and insufficient knowledge about STIs. Special attention should be given to individuals who engage in early sex and to those who have condom-less sex at their sexual debut. As onset of sexual activity typically occurs during high school, we believe that preventive and educative campaigns should address this age segment in particular.

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