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## AWARENESS, KNOWLEDGE AND BEHAVIOR OF HIGHSCHOOL STUDENTS CONCERNING SEXUALLY TRANSMITTED INFECTIONS

*SVEST, ZNANJE I PONAŠANJE SREDNJOŠKOLACA U VEZI SA POLNO PRENOSIVIM INFEKCIJAMA*

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### Summary

**Introduction.** This paper presents the results of a research conducted among senior high school students in northern Kosovo and Metohija on their knowledge about sexually transmitted infections, emphasizing their awareness and sources of information, as well as their sexual behavior and use of contraceptives. **Material and Methods.** The survey of senior high school students was done using a previously prepared anonymous questionnaire which was followed by statistical processing of fully completed questionnaires. **Results.** The research included students aged 17 to 19; 63% were females and 37% males; 35.8% were sexually active. The correct definition of sexually transmitted infections was identified by 49%. School was the source of information on these infections for 45.6% of students and biology class for 45.7%. There were 40.6% sexually active male respondents and 33.0% of female (on average, 18 years old). Of the surveyed students of both sexes, 40.6% became sexually active at the age of 17. Condom use was reported by 49% of respondents of both sexes, whereas 50.8% of sexually active students always used condoms. There were 38.7% (38.9% girls, 38.4% boys) of students who used condoms for protection against sexually transmitted infections, and 58.1% of them personally decided whether to use them. **Conclusion.** The majority of our respondents were able to identify the correct definition of sexually transmitted infections, and they most often heard of the human immunodeficiency virus/acquired immune deficiency syndrome. School was their most common source of information, biology class, and a considerable number were informed about this issue on the Internet. The majority of sexually active girls did not use any contraceptives. School curricula and parent-child relationships should have a greater impact on the youth's awareness of reproductive health.

**Key words:** Sexually Transmitted Diseases; Adolescent; Health Knowledge, Attitudes, Practice; Schools; Contraception Behavior; Surveys and Questionnaires

### Introduction

Adolescence is the period of transition from childhood to adulthood and it is a very important part of life of every individual. The World Health Organization defined adolescence as the period between 10 and 19 years of age [1, 2]. **Recently, ado-**

### Sažetak

**Uvod.** Rad prikazuje rezultate anketiranja učenika završnih razreda srednjih škola na severnom Kosovu i Metohiji o polno prenosivim infekcijama, njihovoj obaveštenosti i izvorima informisanja, njihovoj seksualnoj aktivnosti i korišćenju kontraceptivnih sredstava. **Materijal i metode.** Anketiranje učenika završnih razreda srednjih škola na severu Kosova i Metohije prethodno pripremljenim anonimnim upitnikom. Statistički su obrađeni kompletno popunjeni upitnici. **Rezultati.** Istraživanjem su obuhvaćeni učenici od 17 do 19 godina, 63% ženskog i 37% muškog pola; 35,8% ispitanika je seksualno aktivno. Tačnu definiciju polno prenosivih infekcija prepoznalo je 49% anketiranih učenika. Škola je izvor informisanosti o polno prenosivim infekcijama za 45,6% učenika, a za 45,7% anketiranih časovi biologije u školi. Seksualno je aktivno 40,6% učenika i 33% učenica; oni imaju prosečno 18 godina. Polno aktivno pre sedamnaeste godine postalo je 40,6% anketiranih učenika. Većina seksualno aktivnih ispitanika, 49%, oba pola koristi kondom kao kontraceptivno sredstvo. Uvek koristi kondom 50,8% polno aktivnih učenika. Seksualno aktivni ispitanici koriste kondom zbog zaštite od polno prenosivih infekcija – 38,7% (38,9% učenika i 38,4% učenica), a 58,1% lično odlučuje o njihovoj primeni. **Zaključak.** Većina naših ispitanika je prepoznala tačnu definiciju polno prenosivih infekcija, a najčešće su čuli za infekciju virusom humane imunodefijencije/sindrom stečene imunodefijencije. Ispitanici su najčešće bili obavešteni u školi, na časovima biologije, a znatan broj je informisan o ovom problemu putem interneta. Školski sadržaji i razgovor sa roditeljima bi trebalo značajnije da utiču na svest mladih o reproduktivnom zdravlju.

**Cljučne reči:** polno prenosive infekcije; adolescent; znanje o zdravlju, stavovi, praksa; škole; kontraceptivno ponašanje; istraživanja i upitnici

lescent sexuality has been considered a risky behavior with the following consequences: reproductive health disorders, unwanted pregnancies, and sexually transmitted infections (STIs) that may lead to epidemics [3]. STIs are becoming a major public health issue. The incidence of STIs is on the rise in the whole world, especially among adolescents whose

**Abbreviations**

WHO	– World Health Organization
STIs	– sexually transmitted infections
HIV	– human immunodeficiency virus
AIDS	– acquired immunodeficiency syndrome
IUD	– intrauterine device

sexual behavior is changing [1, 3]. The increase of STIs is followed by an increase of complications. The most dangerous complications for women are sterility, ectopic pregnancies, development of neoplasms, and for fetuses - intrauterine and perinatal mortality, infections and malformations [4]. A significant factor in the prevention of STIs and their complications is a higher level of knowledge about them, their characteristics and precautions.

The aims of the study were to analyze the knowledge of senior high school students from North Kosovo about STIs, sources of their information, measures of preventions, methods of contraception, as well as their sexual activity and their first sexual experience.

**Material and Methods**

During a four-month period, October 2014 - February 2015, a survey was performed among high school students aged 17 to 19 years. The survey was conducted in the cities of North Kosovo: North Mitrovica, Zvečan and Leposavić. The following high schools were involved in the study: Medical High School, High School of Economics and Trade, High School of Mechanical Engineering, Gymnasium, High School of Vučitrn (temporarily relocated to Kosovska Mitrovica), Zvečan High School Center (laboratory technicians and sanitary-ecological technicians) and Leposavić High School Center (economics and law and Gymnasium).

Our survey was approved by our institutions (project: "Sexually transmitted infections – knowledge of secondary school students in northern Kosovo and Metohija") and by the Ministry of Education, Science and Technological Development of the Republic of Serbia. We also provided a consent from the head of school administration in northern Kosovo and Metohija as well as a consent from all principals of all schools and parent school councils. All students that were included in the survey had to sign an informed consent for an anonymous questionnaire. In agreement with all the institutions, the confidentiality of research results was guaranteed and the results can be used for study purposes only. The survey was performed during a regular school day.

The anonymous questionnaire was previously prepared. At the beginning of the survey, the examinees were informed that the questionnaire was anonymous, how to fill it in and what the goals of the research were. The first part of questionnaire referred to the basic information (place of residence, age, gender, high school, place of education, grades in high school, level of parents' education, parental marital status). The second part of questionnaire was intended to determine the actual knowledge of teenagers about STIs. It contained questions about STIs, their definitions and measures of pre-

vention. In this part the examinees were supposed to mention STIs that they have heard of. There were questions about sources of information about STIs, their sexual activity (if they were sexually active), first sexual experience, knowledge about contraceptives and their usage, as well as awareness of risky sexual behavior. Most of the questions were multiple choice questions and examinees were supposed to circle only one answer per question. At the end of the questionnaire, students had the opportunity to ask questions and give suggestions regarding this issue. After collecting completed questionnaires, the survey examiners responded to the examinees' questions.

Statistical analysis was performed using the Statistical package for social sciences (SPSS software package, version 18.0; SPSS Inc., Chicago, IL, USA). Descriptive data were expressed as mean values  $\pm$  standard deviation (SD) or percentage for coefficient of variation. Nonparametric data were tested using Mann-Whitney test. Categorical variables were compared using Chi-square test (2 x 2). P value less than 0.05 was considered statistically significant.

The univariate logistic regression was done using 12 independent variables (gender, age, maternal education, paternal education, marital status of parents, grades, answers to questions: have you ever heard of STIs at school, have you ever read about STIs on the Internet, have you ever heard of STIs on television, have you ever heard of STIs from your parents, did you have sexual intercourse, and so on).

**Results**

The study included 433 students from 17 to 19 years of age. The average age was  $17.8 \pm 0.5$  years. On average, the respondents of both sexes were 17.8 years old. Two thirds of examinees were females (63%) and 37% were males. The majority of examinees were 18 years old (68.1%), every fourth (25.4%) was 17 years old, and about 6.5% of examinees were 19 years old. Three quarters of female (75.1%) and more than half of male students (56.2%) were 18 years old. The majority of female students attended the Medical High School in Kosovska Mitrovica (79.6%). There was a statistically significant difference ( $p < 0.001$ ) between the number of female and male students.

Most respondents' mothers had a secondary level of education (70.4%). The education of mothers and gender of examinees showed a statistically significant difference ( $p < 0.05$ ). The highest percentage of examinees' fathers also had secondary education (78.3%). The parents' level of education and gender of examinees showed a statistically significant difference ( $p < 0.01$ ) as did the level of paternal ( $p < 0.01$ ) and maternal knowledge about STIs ( $p = 0.001$ ). Most parents were married (84.5%), while parents of every sixth female student were divorced – 15.5%. There was a statistically significant difference between gender of examinees and the number of divorced parents ( $p < 0.01$ ).

Most students of both genders have heard about STIs (94.9%), 96.3% of female and 92.5% of male examinees. Every fifth student (20.3%) thought that

**Anonymous questionnaire – SEXUALLY TRANSMITTED INFECTIONS**

**Short introductory notice:** Please read all the questions carefully and answer them sincerely and to the best of your knowledge, since the survey is anonymous and the data concern rather serious sexually transmitted infections (STIs). World literature data are warning about the increase of these infections among youth worldwide, so we would hereby like to examine the following - your understanding of the issue, your awareness, having had and/or been treated for these infections, as well as about taking measures for preventing STIs.

**Note before filling out the questionnaire:** students who are not sexually active do not respond to questions in section 5 to 18!

**I GENERAL INFORMATION:**

**Initials (anonymous poll):**

**Gender:** M F

**Age:** **Place of residence:**

**School you attend:**

**Education level of your mother:** Basic; Secondary; College; Bachelor Degree or higher

**Education level of your father:** Basic; Secondary; College; Bachelor Degree or higher

**Parental marital status:** married; divorced; single parents; you have only a mother; you have only a father; your parents are deceased

**II SEXUALLY TRANSMITTED INFECTIONS (STIs)**

**1. Do you know what sexually transmitted infections are:**

- a. Yes
- b. No

**2. If your answer to the previous question is affirmative, please circle the answer you think defines STIs:**

- a) Infections which are transmitted only through sexual contact
- b) Infections which are transmitted by any kind of physical contact between two people
- c) Infections most commonly transmitted through sexual contact, but it is not the only route of transmission
- d) Infections exclusively transmitted by sexual intercourse without any protection

**3. Specify the STIs you have heard about:** \_\_\_\_\_

**4. Have you heard of any of the listed STIs?**

a. Human immunodeficiency virus (HIV) infection:	Yes	No
b. Acquired Immune Deficiency Syndrome (AIDS):	Yes	No
c. Syphilis:	Yes	No
d. Gonorrhoea:	Yes	No
e. Condyloma (genital warts):	Yes	No
f. Hepatitis B, C:	Yes	No
g. Chlamydia infection:	Yes	No
h. Genital herpes:	Yes	No
i. Trichomonas vaginalis:	Yes	No

**5. Are the following diseases also STIs?**

a. HIV infection:	Yes	No
b. AIDS:	Yes	No
c. Brucellosis:	Yes	No
d. Syphilis:	Yes	No
e. Scabies:	Yes	No
f. Pediculosis pubis:	Yes	No
g. Eczema:	Yes	No
h. Gonorrhoea:	Yes	No
i. Condyloma (genital warts):	Yes	No
j. Influenza:	Yes	No
k. Chickenpox:	Yes	No
l. Lyme disease:	Yes	No
m. Hepatitis B, C:	Yes	No
n. Genital herpes:	Yes	No
o. Trichomonas vaginalis:	Yes	No

**6. Where have you first heard about STIs?**

- a. At school
- b. From a friend
- c. From a youth counselor
- d. From books
- e. On television
- f. From newspapers
- g. From my parents

**7. At school you first heard about STIs:**

- a. At biology class
- b. Talking to my class teacher
- c. Events and lectures on this topic

**8. You got information on STDs:**

- a. On the Internet
- b. On TV
- c. From newspapers

**9. Have you heard about events related to this medical problem?** a. Yes b. No

**10. Do you know the International Day Against some of the STIs?** a. Yes b. No

**11. Do you know any preventive measures for these infections?** a. Yes b. No

**12. Have you heard or do you know something about contraception?** a. Yes b. No

**13. Do contraceptive measures prevent pregnancy?** a. Yes b. No

**14. Do contraceptives prevent transmission of STIs?** a. Yes b. No

**15. Indicate some contraceptives/methods:** \_\_\_\_\_

**16. Do contraceptives/methods include?**

- |                           |     |    |
|---------------------------|-----|----|
| a. Condoms/Preservatives: | Yes | No |
| b. Contraceptive pills:   | Yes | No |
| c. Coils:                 | Yes | No |
| d. Spermicides:           | Yes | No |
| e. Coitus interruptus:    | Yes | No |
| f. Others (specify) _____ |     |    |

**III SEXUALLY TRANSMITTED INFECTIONS AND YOUR SEXUAL ACTIVITY**

**1. Have you ever been examined for some STIs?** a. Yes b. No

**2. Have you been examined before for the following reasons?**

- |                               |     |    |
|-------------------------------|-----|----|
| a. Syphilis:                  | Yes | No |
| b. Gonorrhea:                 | Yes | No |
| c. HIV:                       | Yes | No |
| d. Genital herpes:            | Yes | No |
| e. Condyloma (genital warts): | Yes | No |
| f. Trichomonas vaginalis:     | Yes | No |

**3. Have you ever had?**

- |  |        |       |
|--|--------|-------|
| a. Genital redness:  | a. Yes | b. No |
| b. Pain, burning sensation:                                  | a. Yes | b. No |
| c. Changes of the urinary color due to genital inflammation: | Yes    | No    |
| d. Enlarged lymph nodes in the groove:                       | Yes    | No    |

**4. Are you sexually active?** Yes No

**5. How old were you when you had your first sexual intercourse?**

- a. > 12
- b. 13
- c. 14
- d. 15
- e. 16
- f. 17
- g. 18
- h. 19

**6. Your first sexual intercourse was:**

- |  |     |    |
|--|-----|----|
| a. Voluntary:  | Yes | No |
| b. Due to the insistence of my current boyfriend/girlfriend: | Yes | No |
| c. Under the influence of alcohol:                           | Yes | No |
| d. Under the influence of drugs:                             | Yes | No |
| e. At a party:   | Yes | No |

**7. What do you use when having sex?**

- |                           |     |    |
|---------------------------|-----|----|
| a. A condom/preservative: | Yes | No |
| b. Contraceptive pills:   | Yes | No |

c. Coitus interruptus:	Yes	No
d. A coil:	Yes	No
e. Spermicides:	Yes	No
f. Morning after pill:	Yes	No
g. Other (specify) _____		
<b>8. How often do you use the aforementioned methods?</b>		
a. Regularly:	Yes	No
b. Irregularly:	Yes	No
c. Never:	Yes	No
d. Never, because you have a regular partner (trust):	Yes	No
<b>9. What are your reasons for using aforementioned contraceptive methods?</b>		
a. Protection from STIs:	Yes	No
b. Pregnancy protection:	Yes	No
<b>10. Who makes the decision whether to use contraceptives?</b>		
a. You personally make the decision:	Yes	No
b. You let your partner to make the decision:	Yes	No
c. You have a steady partner who you trust:	Yes	No
<b>11. Do you have a steady sexual partner?</b>		
a. Yes		
b. No		
<b>12. You have no steady sexual partner and you change partners:</b>		
a. Occasionally:	Yes	No
b. Frequently:	Yes	No
<b>13. Do you use contraception when engaging in sexual intercourse with a non-steady partner?</b>		
a.	Yes	No
b.	Yes	No
<b>14. Do you engage in sexual intercourse with a stranger or a casual acquaintance?</b>		
a.	Yes	No
b.	Yes	No
<b>15. If your answer to the previous question is affirmative, do you use contraceptives when engaging in sexual intercourse with a stranger or an acquaintance?</b>		
a.	Yes	No
b.	Yes	No
<b>16. Have you engaged in sexual intercourse in short-term relationships (shorter than 7 days)?</b>		
a.	Yes	No
b.	Yes	No
<b>17. Have you had a sexual intercourse with a person you have only met (a one-night stand)?</b>		
a.	Yes	No
b.	Yes	No
<b>18. Do you think there is a risky sexual behavior?</b>		
a.	Yes	No
b.	Yes	No
<b>19. If your answer to the previous question is affirmative, can you define such a behavior?</b>		
a.	Yes	No
b.	Yes	No
<b>20. If your answer to the previous question is affirmative, is risky sexual behavior related to the following?</b>		
a. Changing sexual partners:	Yes	No
b. Sexually transmitted infections:	Yes	No
c. Sexual intercourse without any protection:	Yes	No
d. Sexual intercourse under the influence of alcohol:	Yes	No
e. Sexual intercourse under the influence of drugs:	Yes	No
f. Sexual relationship outside marriage:	Yes	No
g. Kissing:	Yes	No
h. Insufficient knowledge about STIs:	Yes	No
i. Other (please specify) _____		
<b>21. Do you have any questions about the above issues/questions?</b>		
If you have a question, please feel free to ask! _____		
<b>22. Your suggestions on this issue</b> _____		

**Table 1.** Students' distribution regarding the definition of STIs and gender**Tabela 1.** Distribucija učenika prema definiciji polno prenosivih infekcija (PPI) i polu

STIs definition Definicija PPI	Total Ukupno		Schoolgirls Učenice		Boys Učenici	
	No/Br.	%	No/Br.	%	No/Br.	%
Infections transmitted only through sexual contact <i>Infekcije koje se prenose samo polnim kontaktom</i>	88	20,3	55	9,5	33	7,6
Infections which are transmitted by any kind of physical contact between two people/ <i>Infekcije koje se prenose bilo kojim fizičkim kontaktom između dve osobe</i>	66	15,2	41	9,5	25	5,8
Infections most commonly transmitted through sexual contact, but it is not the only route of transmission/ <i>Infekcije koje se najčešće prenose polnim kontaktom, ali to nije jedini način prenošenja infekcije</i>	212	49	141	32,6	71	16,4
Infections exclusively transmitted by sexual intercourse without any protection/ <i>Infekcije koje se prenose samo polnim odnosom bez zaštite</i>	67	15,5	36	8,3	31	7,2
Total/ <i>Ukupno</i>	433	100,0	273	63,0	160	37,0

STIs are infections that can only be transmitted during sexual contact (12.7% of girls and 7.6% of boys) (Table 1). The exact definition of STIs was recognized by two thirds of students that lived in Kosovska Mitrovica (49%). There was a statistically significant difference between respondents who recognized the exact definition of STIs and their place of living ( $p < 0.01$ ).

Students had to fill in blank questions and list STIs they knew: 42% of examinees knew only one STI (human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) and syphilis; 25.6% of students listed two STIs (AIDS and syphilis or syphilis and gonorrhea), whereas 11.32% of respondents have not heard of any STIs. Of all the students, 82.4% have heard of HIV/AIDS (Table 2). The awareness of students of HIV/AIDS by the place of education has shown a statistically significant difference ( $p = 0,001$ ). Of all

the students, 83.9% of female and 80% of male students were aware of HIV/AIDS. There were 80.6% sexually active examinees: 84.4% of girls and 75.4% of boys. Only 40.9% of examinees have heard of syphilis. The analysis of students who have and who have not heard of syphilis showed a statistically significant difference ( $p = 0.004$ ). The awareness of respondents of gonorrhea was very low. Only 15.9% of examinees have heard about this STI, 13.5% of them were sexually active, 17.8% of girls and 7.7% of boys. Just a few students have heard about genital warts (6.5%), 8.4% of sexually active examinees (10% of girls and 6.2% of boys). The awareness of genital warts according to sexual activity has not showed a statistically significant difference ( $p = 0.225$ ). A few students mentioned chlamydia, herpes virus infection, pubic lice, hepatitis B and C (6.7%). None of the examinees have heard

**Table 2.** Students' distribution regarding their knowledge of STIs and gender**Tabela 2.** Distribucija učenika prema znanju o PPI i polu

	Total/ <i>Ukupno</i>		Schoolgirls/ <i>Učenice</i>		Boys/ <i>Učenici</i>	
	No	%/Br.	No	%/Br.	No	%/Br.
Have you heard of HIV/AIDS?/ <i>Da li ste čuli za HIV/AIDS?</i>						
Yes/ <i>Da</i>	357	(82,4)	229	(83,9)	128	(80,0)
No/ <i>Ne</i>	76	(17,6)	44	(16,1)	32	(20,0)
Have you heard of syphilis?/ <i>Da li ste čuli za sifilis?</i>						
Yes/ <i>Da</i>	177	(40,9)	126	(46,2)	51	(31,9)
No/ <i>Ne</i>	256	(59,1)	147	(53,8)	109	(68,1)
Have you heard of gonorrhea?/ <i>Da li ste čuli za gonoreju?</i>						
Yes/ <i>Da</i>	69	(15,9)	42	(15,4)	27	(16,9)
No/ <i>Ne</i>	364	(84,1)	231	(84,6)	133	(83,1)
Have you heard of HPV infection? <i>Da li ste čuli za HPV infekciju?</i>						
Yes/ <i>Da</i>	28	(6,5)	21	(7,7)	7	(4,4)
No/ <i>Ne</i>	405	(93,5)	252	(92,3)	153	(95,6)
Have you heard of chlamydia infection? <i>Da li ste čuli za infekciju hlamidijom?</i>						
Yes/ <i>Da</i>	29	(6,7)	19	(7,0)	10	(6,3)
No/ <i>Ne</i>	404	(93,3)	254	(93,0)	150	(93,7)

**Table 3.** Sources of information about STIs and gender distribution  
**Tabela 3.** Izvori informisanosti o PPI i pol ispitanika

Gender/Pol	School/Škola		Internet/Internet		TV/TV		Parents/Roditelji	
	No/Br.	%	No/Br.	%	No/Br.	%	No/Br.	%
Female/Učenice	124	45,4	80	29,3	23	8,4	23	9,2
Male/Učenici	74	46,3	32	20,0	15	4,7	8	4,7
Total/Ukupno	198	45,7	112	25,8	38	8,7	31	7,1

**Table 4.** Students' distribution regarding sexual activity, age at first sexual intercourse and gender  
**Tabela 4.** Distribucija učenika prema seksualnoj aktivnosti, godinama prvog seksualnog odnosa i polu

Sexual activity (age at first sexual intercourse) Seksualna aktivnost (starost prilikom prvog seksualnog odnosa)	Total/Ukupno		Schoolgirls/Učenice		Schoolboys/Učenici	
	No/Br.	%	No/Br.	%	No/Br.	%
17	42	27,1	19	21,1	23	35,4
18	103	66,5	68	75,6	35	53,8
19	10	6,4	3	3,3	7	10,8
Total number of sexually active/Ukupna seksualna aktivnost	155	35,8	90	33,0	65	40,6

about *Trichomonas vaginalis* infection. A small number of respondents have listed infections that are not sexually transmitted (measles, meningitis, some allergies, Candida infection).

The univariate logistic regression analysis has been done to evaluate the impact of different factors on the probability to define STIs correctly. This analysis showed that three factors impacted the probability: age of respondents (correlation 3.79, 95% CI [1:59 9.07]  $p = 0.003$ ), level of mothers' knowledge (correlation 2.47, 95% CI [1.07, 5.72],  $p = 0,035$ ) and answers of respondents to the question "Have you ever heard about STIs at school?" (correlation 3,54, 95% CI [1,17,10,78],  $p = 0,026$ ). These three factors were examined using multivariate logistic regression analysis. The results showed that the age of respondents had the strongest impact on defining STIs correctly (correlation 2,89, 95% CI [1,20, 6,94],  $p = 0,018$ ), showing that the knowledge about STIs increased 2,8 times each year.

There was a statistically significant difference between sexually active students who learned about STIs at school (36.8%) and those who were not sexually active and also heard about STIs at school (63.2%) ( $p = 0.005$ ). A quarter of our examinees have found data about STIs on the Internet (25.8%), every third girl (29.3%) and every fifth boy (20%) (Table 3). There was a statistically significant difference between the gender and Internet as a source of information ( $p = 0.033$ ). TV was the source of information for a small part of our examinees (8.7%), 4.7% of male and 8.4% of female

students. The lowest percentage of our examinees has been informed about STIs by talking to their parents (7.1%), 9.2% of girls and 4.7% of boys.

Every third respondent was sexually active (35.8%), 40.6% of boys and 33.0% of girls (Table 4). There was a statistically significant difference between sexual activity of our respondents and place of living ( $p = 0.034$ ). The highest percentage of sexually active examinees was attending a high school in Kosovska Mitrovica (78.1%). The frequency of sexual activity was variable from school to school and it showed a statistically significant difference ( $p < 0.000$ ). The average age of sexually active respondents was 18 years. The majority of examinees became sexually active at the age of 17 years (40.6%), every third examinee at the age of 16 years (35.5%) and 12.3% around the age of 15. The sexual activity started around the age of 13.5 and 18 years in both genders, more frequently in males. There was a statistically significant difference between the respondents that had their first sexual intercourse (sexarche) at the age of 17 years and those who changed sex partners ( $p = 0.031$ ). The same was established between students with sexarche at 16 years of age and changed their sex partners ( $p = 0,000$ ) and students who changed their sex partners and had sexarche when they were younger than 15 years of age ( $p = 0.000$ ). Most students had their first sexual experience under the influence of alcohol (82.5%), psychoactive substances at the party (14.8%) or because of the pressure from their girlfriend/boyfriend (2.6%).

**Table 5.** Measures for preventing STIs  
**Tabela 5.** Mere prevencije PPI

Measures for preventing STIs/Mere prevencije PPI	%
Informed/Informisani	31,9
Not informed/Neinformisani	68,1
Total/Ukupno	100,0

Of all the examinees, 31.9% were informed about measures for preventing STIs, and 68.1% were not (**Table 5**). A statistically significant difference ( $p = 0.001$ ) was established between the place of education and knowledge about measures for preventing STIs. Condoms were used by 51% of sexually active boys and 49% of girls. More than a half of sexually active examinees (51%) used condoms regularly (44.5% of females and 21.3% of males) and 49% used them irregularly. Contraceptive pills were used by 24.5% of sexually active respondents, 20.6% of females and 3.2% of males said that their partners were using them. Of all the examinees, 5.9% of female examinees have heard about contraceptive intrauterine device (IUD) or coil, equally by sexually active and inactive students. They were students of a secondary medical school. None of the examinees named a spermicide or a morning-after pill as a contraceptive method. Our respondents were asked about the reason for using contraceptive devices/methods: 14.8% said they were for preventing STIs/pregnancy and 13.9% said they were for STIs prevention. Just a few respondents (1.2%) used contraceptive methods for avoiding unwanted pregnancy.

About 58.1% of respondents have decided to use contraception on their own (61.1% of girls and 53.8% of boys). Since 30% of respondents, more boys (40%) than girls (35.6%), have a regular partner, it did not matter who made the decision to use contraception. Every other examinee had a regular sex partner (46.5%), 47% of boys and 45.6% of girls. Every fifth respondent (21.3%) changed sex partners and those were more often boys (23.1%) than girls (20%). Most sexually active respondents, equal percentage of both genders (60%) used protection with an irregular partner, but 40% did not. Over 20% of sexually active students (23.2%) visited a doctor due to some of these symptoms: genital redness - 14.2%, urinary color changes - 8.4% or genital secretions - 10.3%. There was a statistically significant difference for symptoms like genital redness ( $p = 0.000$ ) and genital secretions ( $p = 0.000$ ), as well as urinary color changes ( $p = 0.000$ ). Our results indicated that there was a statistically significant difference among students that became sexually active at 18 years of age and had urinary color changes ( $p = 0.039$ ). Genital warts had been earlier reported by 12.3% of sexually active respondents, with a statistically significant difference ( $p = 0.000$ ). A statistically significant difference was also present in sexually active students with genital redness who changed their sex partners ( $p = 0.009$ ), as well as in students with genital warts ( $p = 0.000$ ). The results showed that there was a statistically significant difference in respondents that became sexually active at the age of 17 and had genital redness ( $p = 0.001$ ) and genital warts earlier ( $p = 0.031$ ). The same goes for the examinees that had first sex when they were 16 years old and had genital redness ( $p = 0.000$ ), genital secretions ( $p = 0.007$ ) and urinary color changes ( $p = 0.000$ ). A statistically significant difference was found in students who had sexarche when they were younger than 15 years and had genital warts earlier ( $p = 0.000$ ).

About 35.6% of boys and 30% of girls considered that risky behavior was related to STIs. More than a half of the examinees (67.9%) did not agree about it, 70% of boys and 64.4% of girls. Similar results were obtained from sexually active respondents. Almost every third sexually active examinee (27.7%) thought that there was risky sexual behavior, but most of them (72.3%) denied it. We asked those who thought that there was risky sexual behavior to define it, and every third examinee did it successfully (29.7%), with a statistically significant difference between genders - 36.7% of females and 20% of males. They thought that this kind of behavior was connected to change of sexual partners, unprotected sex or having sex with strangers and without protection.

## Discussion

The average age of students of both sexes in this study was 17.8 years. More than two thirds of examinees (63%) were females and 37% were males. In a similar survey, Kisić-Tepavčević D. et al. [5] there were 56.2% of female and 43.8% of male students. Oni et al. conducted a survey of students; the average age of male examinees was 18.1 years and 16.1 years of female students [6]. In another research, the examinees were 15 years of age on average, 55% of females and 45% of males [7]. Bergamini et al. surveyed students from 14 to 19 years of age [8]. In a research of students from 15 to 19 years, 19% were sexually active [9]. The examinees of Manaf et al. were 18 years old (97%) on average, 56% of them were females and 4.5% of them were sexually active [10]. Kaptanoglu et al. studied 49% of males and 50% of girls, aged 15.6 years on average [11]. The respondents of Oliveira-Campos et al. were a little bit younger than ours - 79.8% of them were younger than 14 years, 52.5% of girls and 47.5% of boys. Every third examinee was sexually active, most of them before 13 years of age [12]. The study of Devine S. et al. included 60.4% of girls and 39.6% of boys, from 14 to 18 years of age, and a lot of them had already had more than one risky sexual intercourse [13].

Most students have heard about STIs, with a small difference between genders. The exact definition of STIs was recognized by every other student, more often by female students. Every other respondent recognized the exact offered definition of STIs, without gender difference [8]. The highest percentage of examinees was familiar with STIs (91%) while 8.75% did not know about them [11]. A research on the awareness of STIs of high school students in Germany, the authors also included the mothers' level of education in demographic variables, apart from students' age and gender. In their earlier researches, these factors were connected with the awareness and knowledge of adolescents about STIs. A significant association was established only between high and basic level of education [7]. Successful development and improvement of sex education in schools depends on parents' attitudes as well. The parents of



students had limited knowledge about STIs and they very rarely talked about this issue with their daughters [14]. We found a statistically significant difference between the level of education of our examinees parents based on gender and also their knowledge on the exact definition of STIs.

A statistically significant difference was found on the awareness of students about HIV/AIDS in regard to the place of school. A high percentage of examinees have heard about HIV/AIDS and most of them attended a school in Zvečan (92.6%). The girls were a little bit better informed about HIV/AIDS than boys were. Our examinees showed less knowledge about other STIs, like syphilis, gonorrhoea and genital warts. A research in Germany showed that 99% of examinees have heard about HIV/AIDS, 51% about syphilis, 23% for chlamydia and 17% for gonorrhoea [7]. About 91% of students from Cyprus have heard about AIDS and 48% about gonorrhoea. Molluscum contagiosum was mentioned by 52% and bacterial vaginosis by 44% of examinees [11]. Because of insufficient knowledge about STIs and contraception, the incidence of STIs is still growing among young people [15].

Our examinees were asked to list all STIs that they have heard about: 42% have heard only about one STI, 25% about two STIs and 11% listed none. A little bit less than a half of our examinees have heard about STIs in Biology class at school. The majority of examinees that were informed about STIs at school were still sexually inactive (36.8%). We hope that the information have affected them to delay the start of sexual activity. Adolescents in Ethiopia have sexarche at younger age than in the past. They most often have unprotected sexual intercourse, with an increased risk of developing or transmitting STIs (HIV infection) and unwanted pregnancy [9]. The teacher's role is very important to increase the level of knowledge about sexual and reproductive health [16]. Only 7.6% of examinees talked about STIs with their parents in study of Lindberg et al. [17]. Over 95% of respondents knew about AIDS. The main sources of information were television and school (21% each) [8]. Every other female examinee was informed about reproductive health talking to her mother and every fourth male examinee was informed by his father. About 67% of examinees have not heard about contraception. For 30% of boys the source of information about STIs were parents and for 23% of them school. For 70% of girls the source of information were parents and for 60% of them the Internet. The majority of respondents (80%) answered the questions about STIs and 79% of them knew about AIDS [6]. Most of the students were well informed about STIs because they learned about it at schools and they considered that sex education at schools should be better [18]. About 87% of students talk openly about sex with other students and friends, and just a few of them talk about it with brothers and sisters, parents and teachers [19]. About 42% of students listed school as source of information about STIs [9] and for 78% of them the main source was biology class. Sexual education should include other STIs besides HIV/AIDS [7]. The respondents of Oni et al.

have been informed about contraception via media, TV/radio/magazines - 54.5% of boys and 21.5% of girls [6]. Every third male examinee was informed by a teacher/professor (34%) and 19% of female students were informed talking to their parents. The main sources of information about contraception were mass media [8].

The school sex education programs have not reduced the number of teenage pregnancies and their consequences [20]. The awareness and knowledge about reproductive health and STDs should be improved, especially in the younger population (10 – 14 years old) [21]. Poorly-informed teenagers are at higher risk of unwanted pregnancy and STIs [5]. The respondents from Brazil become sexually active at very young age and they very rarely use condoms during sexual intercourse [12]. Over 31% of surveyed students were informed about measures/methods of STI prevention. Practice is not always followed by adequate knowledge and behaviors related to STIs and contraceptive pills [22].

Every third respondent of both genders is sexually active. More than a half of sexually active students of both genders live in Kosovska Mitrovica. Sexually active students are 18 years old, on average. Our results are mostly in agreement with literature data. The research of Salih et al. showed that 29% of girls at the age between 14 and 20 years were sexually active, with sexarche at 16.6 years [2]. Of all the examined students, 5% had a STI, and one girl (0.44%) had an unwanted pregnancy [5]. The high school students included in the study had first sexual experience at 15 years of age and 2 sexual partners on average [7]. The sexual activity began between 15 and 18 years, at 16 in girls and at 17 in boys [23]. The sexarche in 42% of male and 9% of female students was before 14 years of age [24]. In order to improve the sexual health of young people it is important to delay the first sexual intercourse and to increase the parents' level of knowledge [20]. About 42% of girls and 44% of boys between 15 and 19 years of age had a sexual intercourse at least once [25]. About 54% of pregnant women were between 15 and 17 years old and 54% of them had sexarche before the age of 14 years [26]. Increased and earlier sexual activity followed by rare use of contraceptive methods lead to more unwanted pregnancies and STIs [19]. In our research, 20% of sexually active persons visited a doctor because of genital symptoms (genital redness, urinary color changes and secretion from urethra). Of course, these symptoms may be caused by other causes, and our respondents do not need to know or recall the diagnosis that was then set. A statistically significant difference was obtained for sexually active examinees, for those who changed their sex partners, and examinees that became sexually active before the age of 18 years. They usually used no contraceptives. The boys had multiple sex partners (4.2%) compared to girls (2.4%). Chlamydia was diagnosed in 8% of boys and 15% of girls and gonorrhoea in 2% of boys and 4% of girls [24].

Although the majority of sexually active students did not agree with it, 27.7% of them thought that there was risky sexual behavior. Risky sexual behavior was precisely defined by 36.7% of sexually active girls and 20% of sexually active boys. They associated this behavior with multiple sex partners, sexual relations without contraceptive means, having sex with strangers and using no protection.

Most students of both genders had voluntary first sex experience. A small percentage of respondents said that their first sex experience was at a party under the influence of drugs or alcohol. The smallest percentage of respondents had their first sexual intercourse at their partner's insistence.

Every third examinee has heard about measures of STIs prevention. Two thirds of examinees knew about contraceptive methods. High school students claimed that condoms were the most frequently used contraceptive method (89.8%) [19]. The students of both sexes used condoms more frequently than contraceptive pills. A certain number of them frequently changed sex partners without using contraceptives [2]. More than 90% of sexually active examinees

used contraception during the first sexual intercourse, 37% of girls and 51% of boys used only condoms [7]. About 22% of students had only one sex partner, and 21% of examinees had five partners. Condom use as a contraceptive method was reported by 74% of examinees and 14.9% of examinees used oral hormonal contraception [27]. About 50% of sexually active students did not use any kind of contraception during their first sexual intercourse. About 23% of studied girls had an unwanted pregnancy and 91% had an abortion [25]. Sexarche was often the result of pressure from peers or partners [28].

### Conclusion

Our examinees showed poor knowledge about sexually transmitted infections and measures of their prevention, which can be explained by insufficient and improper education about reproductive health. This can be changed by educating parents, health professionals and teachers, as well as by organizing more informative events.

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