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Knowledge and Attitude of Undergraduate Students towards Sexually Transmitted Infections in Tirana, Albania

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Aim. To assess the knowledge and attitude of undergraduate students in Tirana, Albania, towards sexually transmitted infections (STI).

Methods. A sample of 729 students (76% women) at the University of Tirana were surveyed by the use of an anonymous questionnaire with 10 multiple-choice questions testing their knowledge and 27 statements testing their attitude towards STI (adapted to a 1-5 Likert scale, with a low score indicating poor attitude). Socio-demographic data were also collected. The survey was carried out in October and November 2002. Multiple regression analysis was used to assess the associations between socio-demographic factors on the one hand and attitude towards and knowledge about sexually transmitted infections, on the other.

Results. Men had poorer knowledge and attitude toward STI than women (= -4.59, $p < 0.001$ for attitude, and $\beta = -0.38$, $p = 0.006$ for knowledge). Higher parental education and urban origin were strongly associated with better STI knowledge. After adjustment for age, sex, marital status, religion, income, and number of siblings, students whose parents had low and middle education level had a mean STI knowledge score of < 1.16 (95% confidence interval [CI], 0.85-1.47) and < 0.98 (95% CI, 0.74-1.23), respectively, which was significantly lower than the score of students with highly educated parents ($p < 0.001$ for linear trend). Also, students born in rural areas had significantly lower mean STI knowledge score (< 0.70, $p = 0.003$) than students born in urban areas.

Conclusion. Parental education and origin are strongly associated with knowledge and attitude of undergraduate students in Tirana towards sexually transmitted infections.

Key words: *Albania; attitude; knowledge; sexually transmitted infections; students*

Although the rates of sexually transmitted infections in Eastern Europe are rapidly increasing (1,2), little is known about sexual risk-behavior and knowledge on sexually transmitted infections among Eastern European youth, including Albania.

As society in Albania has become more liberated in the last few years, the rate of sexually transmitted infections has increased (3,4). Since 1997, there has been a 10-fold increase in syphilis rate after it had been virtually absent before 1995 (3). Although Albania has the lowest rates of human immunodeficiency virus (HIV) infections and acquired immunodeficiency syndrome (AIDS) in Europe, trends indicate that this situation may soon change (4). According to a study carried out in 2000, Albanian women of childbearing age had little or no knowledge about HIV/AIDS prevention (5). However, the rate of gonorrhea has been showing continual decrease since the peak in 1982 (4).

Due to the fact that sexually transmitted infections in Albania are substantially underreported (6), the real rate of sexually transmitted infections is certainly higher, especially in the view the social changes in Albania, including migration and prostitution.

There is a considerable body of literature relating socioeconomic factors, such as parental education, and income with the likelihood of incurring sexually transmitted infections (7-9). Also, there is a strong link between personality traits and sexual behavior (10,11). Yet, there are no reports on sexual behavior of Albanian youth and its association with their socioeconomic level, personality traits, emotional state, social control, and social learning.

Our aim was to assess the knowledge and attitude of undergraduate university students in Tirana towards sexually transmitted infections. We expected the students born in rural areas and/or those whose parents had a low level of education to be at the high-

est risk of unhealthy sexual behavior (based on a previous cluster study, ref. 6). We surveyed the student population because it is at particularly high risk of incurring sexually transmitted infections (6) and because university provides an excellent setting to conduct a cross-sectional survey.

Subjects and Methods

Subjects

In October 1, 2002, there were 10,470 students at 7 schools of the Tirana University (Fig.1). We obtained the student list from the Rectorate and identified (separately for each school) the number of students in each course and the number of student-groups at each year of the respective courses (Fig.1). We excluded 696 medical and dentistry students of the 4th, 5th, and 6th year, because they had already been exposed to extensive teaching on sexually transmitted infections during different courses, such as courses in microbiology and infectious diseases. Out of 435 student groups consisting of 5 to 33 students per group, we defined 427 groups, or sampling units, with mostly 18 to 22 students per group (range, 16-25).

The required size for a simple random sample of 9,774 students was estimated at 370 students, with 90% power to detect a mean difference of 1 for the knowledge score and a mean difference of 10 for the attitude score between subgroups that differed in origin and/or parental education (12).

The final postulated sample size was 720 students (36 groups of 20 students each), calculated from the required simple random sample (370 students), under the assumption of equal-sized groups (20 students per group) and with a design effect of 2 (12).

Out of 427 sampling units, a simple random sample of 37 groups (to correct for potential incompleteness of questionnaires and/or students' absence) was drawn. The total number of students from these groups to be included in the study was 779, and the mean number of students per group was 21 (range, 16-25) (Fig. 1). Out of 779 potential respondents, 27 students were either absent during the survey or refused to fill out the questionnaire (96% response rate). Eleven questionnaires of students from Kosovo/Former Yugoslav Republic of Macedonia and 12 incomplete questionnaires (Albanian students) were excluded from the analysis. This left a total of 729 valid questionnaires to be included in the analysis.

Variables

Parental education was classified as high if one of the student's parents had a university degree, and low if neither of parents had a formal education of more than 8 years (elementary school). Income was assessed according to the reported family revenue ("How would you rate your monthly family income including wages, allowances, family businesses, and other sources of income, subtracting the rent your family might be paying for the apartment or house?"). Income per capita was calculated as the ratio of total income to number of family members living to-

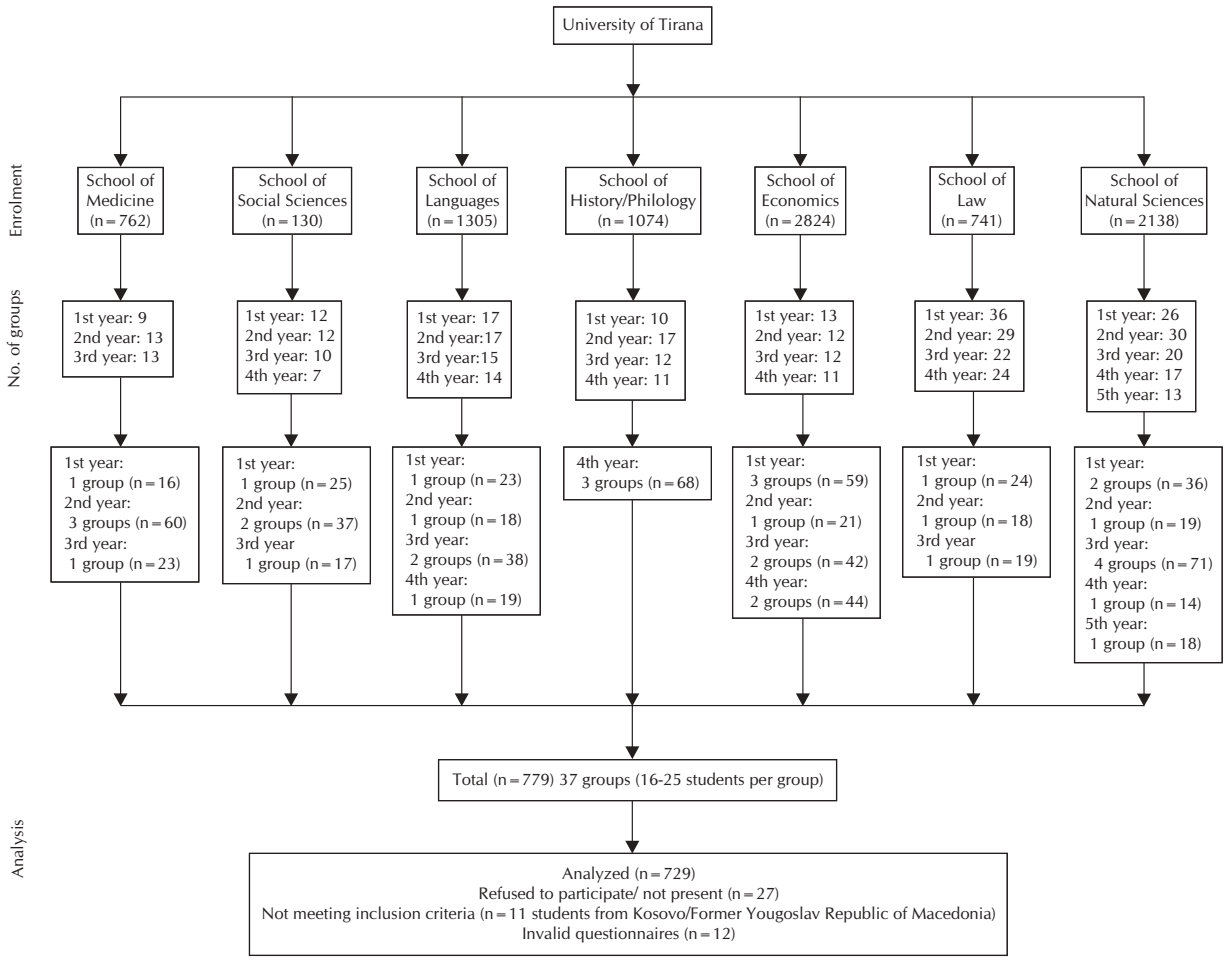

Figure 1. Sampling procedure of undergraduate students at the University of Tirana, October 2002. There were 435 student groups, which mostly consisted of 18 to 22 students. Few student-groups from the Tirana University Faculty of Foreign Languages (Greek, Turkish, and Russian languages) and Faculty of Natural Sciences (Physics and Mathematics) consisted of no more than 5-8 students; these small groups were merged into larger groups to assure about 20 students per group. Several other student-groups from different schools (13 groups) counted up to 27-33 students.

gether (parents, siblings, and partner) and categorized as low, fair, and high.

Other socio-demographic variables included age, sex, religion, place of birth, place of residence (rural vs urban area), and number of siblings.

Attitude towards Sexually Transmitted Infections

Assessment of students' attitude towards sexually transmitted infections was based on 27 statements (adapted to a 1-5 Likert scale) testing the students' beliefs, feelings, and intention to act regarding contraction of sexually transmitted infections (13). The questionnaire, translated into Albanian and adjusted for the Albanian student population, was pretested on 134 undergraduate medical students (3rd year) in May and June 2002, yielding a Cronbach's alpha of 0.71 and a test-retest reliability of 0.75 (during a 5-7 day period).

The attitude questionnaire administered in our study yielded a Cronbach's alpha of 0.74. A summary score, ranging from 27 to 135, was calculated for each student. Lower scores indicated students predisposed to high-risk sexual behavior.

Knowledge on Sexually Transmitted Infections

Knowledge on sexually transmitted infections was tested by 8 multiple-choice questions (14). The pre-tested questionnaire yielded a Cronbach's alpha of 0.63. Test-retest reliability was 0.69.

The knowledge questionnaire administered in our study yielded a Cronbach's alpha of 0.66. For each student, the total number of correct answers was calculated and interpreted as an asset for safe/healthy sexual behavior.

We took high correlation between the summary scores of knowledge and attitude (Pearson's r=0.72) as an indicator of "construct validity" of our instrument.

Statistics

Cronbach's alpha was used as a measure of internal consistency, based on the average inter-item correlation for knowledge questions and attitude statements. Pearson correlation coefficient was used as a measure of linear association between knowledge and attitude scores. The distribution of knowledge and attitude scores assessed by skewness values, kurtosis, and one-sample Kolmogorov-Smirnov test did not significantly deviate from normal.

The significance of the difference in attitude and knowledge between students of different age, sex, religion, parental education, income, number of siblings, and place of origin and residence was evaluated by analysis of variance. Beta coefficients and their p-values across different socio-demographic subgroups were calculated for both knowledge and attitude scores.

Multiple regression analysis was used to assess the "independent" associations of parental educational and place of origin or residence with levels of knowledge and attitude towards sexually transmitted infections. The assumption of equality of variances of the dependent variables (knowledge and attitude) across subgroups/categories of the independent variables (socio-demographic parameters) was tested with Levene's test of equality of error variances. Linear regression models were used to asses collinearities among covariates (tolerance and variance inflation factor).

All statistical analyses were performed with SPSS 10.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

The mean attitude score was 90 for men and 95 for women (range, 27-135), whereas the mean knowl-

Table 1. Socio-demographic characteristics and their association with knowledge and attitude of undergraduate students towards sexually transmitted infections (STI), Tirana 2002

Socio-demographic factor	No. (%) of students*			Attitude towards STI		Knowledge about STI	
	men (n=173)	women (n=556)	total (n=729)	ß†	p (df)‡	ß†	p (df)‡
Sex:							
men	–	–	–	-4.59	<0.001	-0.38	0.006
women				0§	–	0§	–
Age (years):					0.688 (2)		0.689 (2)
18-19	58 (34)	178 (33)	236 (33)	1.07	0.506	0.09	0.620
20-21	78 (45)	275 (50)	353 (49)	1.30	0.361	-0.03	0.860
>22	37 (21)	93 (17)	130 (18)	0	–	0	–
Marital status:							
single	160 (94)	486 (88)	646 (89)	0.48	0.787	0.12	0.538
engaged/married	11 (6)	68 (12)	79 (11)	0	–	0	–
Place of birth:							
rural area	36 (22)	107 (20)	143 (20)	-5.28	<0.001	-1.30	<0.001
urban area	129 (78)	426 (80)	555 (80)	0	–	0	–
Place of residence:							
rural area	24 (15)	87 (16)	111 (16)	-3.02	0.051	-1.15	<0.001
urban area	141 (85)	446 (84)	587 (84)	0	–	0	–
Parental education:					<0.001 (2)		<0.001 (2)
low (<8 years)	13 (7)	18 (3)	31 (4)	-12.33	<0.001	-2.05	<0.001
medium (9-12 years)	85 (49)	309 (56)	394 (54)	-7.06	<0.001	-1.24	<0.001
high (>12)	76 (44)	228 (41)	304 (42)	0	–	0	–
Monthly family income (€ per capita):					0.004 (2)		<0.001 (2)
low (<80)	58 (38)	185 (36)	243 (36)	-3.92	0.005	-0.75	<0.001
middle (80-150)	42 (27)	176 (34)	218 (33)	0.01	0.963	-0.24	0.122
high (>150)	54 (35)	152 (30)	206 (31)	0	–	0	–
Religion:							
Islamic	109 (64)	370 (67)	479 (66)	-2.77	0.017	-0.41	0.001
Christian	62 (36)	183 (33)	245 (34)	0	–	0	–
Siblings:					0.006 (2)		<0.001 (2)
0-1	76 (44)	217 (39)	293 (40)	6.21	0.002	1.08	<0.001
2	53 (30)	192 (35)	245 (34)	3.87	0.046	0.51	0.020
3	44 (26)	146 (26)	190 (26)	0	–	0	–

*Discrepancies in totals are due to missing values.
†Results of analysis of variance. β coefficient indicates the change in the mean level of attitude (range, 27-135) and knowledge (range, 0-10) for an increase of 1 year for age, whereas for categorical variables β indicates the difference between mean levels of attitude and knowledge and the respective reference categories. Positive β indicates more positive STI attitude and/or better STI knowledge.
‡Overall p-value (degrees of freedom).
§Reference category (variable set to zero because of redundancy).

Table 2. Socio-demographic factors (independent variables) as predictors of attitude and knowledge of undergraduate students on sexually transmitted infections (STI), Tirana 2002*

Socio-demographic factors	Attitude towards STI			Knowledge about STI		
	beta†	p (df)‡	comment	beta†	p (df) ‡	comment
Age (1 year)	-0.07	0.846	no age-effect	0.02	0.663	no age-effect
Sex:						
men	-4.24	0.002	men have a poorer attitude towards STI	-0.38	0.006	men know significantly less about STI
women	0§	–		0§	–	
Marital status:						
single	-0.54	0.774	no difference	-0.30	0.891	no difference
engaged/married	0	–		0	–	
Place of birth:						
rural area	-4.52	0.052		-0.70	0.003	
urban area	0	–	rural-born students have a poorer attitude towards STI	0	–	rural-born students know less about STI
Residence area:						
rural	-3.49	0.165	no difference	-0.06	0.809	no difference
urban	0	–		0	–	
Parental education:		<0.001 (2)	the higher parental education, the more		<0.001 (2)	the lower the parental education, the
low (<8)	-5.21	0.103	positive attitude towards STI	-1.16	<0.001	lower the level of STI knowledge
medium (9-12 years)	-5.83	<0.001		-0.98	<0.001	(linear trend, p <0.001)
high (>12)	0	–		0	–	
Monthly family income (€ per capita):		0.743 (2)	income does not "predict" attitude towards STI		0.991 (2)	income does not "predict" knowledge about STI
low (<80)	0.61	0.731		0.02	0.920	
fair (80-150)	1.16	0.449		0.01	0.995	
high (>150)	0	–		0	–	
Religion:			students of Islamic religion have a			students of Islamic religion know
Islamic	-2.10	0.088	poorer attitude towards STI	-0.25	0.045	significantly less about STI
Christian	0	–		0	–	
Siblings (1brother or sister)	-1.13	0.082	the larger number of siblings, the poorer attitude towards STI	-0.15	0.025	students with more siblings know less about STI

*Results of multiple regression analysis.
†β coefficient indicates the change of mean level of attitude and knowledge for an increase of 1 year for age, and 1 brother/sister for siblings, whereas for categorical variables β indicates the difference between the mean levels of attitude and knowledge and the respective reference categories. A positive beta indicates a more positive STI attitude and/or better STI knowledge.
‡Overall p-value (degrees of freedom).
§Reference category (variable set to zero because of redundancy).

edge score was 5.3 for men and 5.7 for women (range 0-10). Men had a significantly poorer attitude towards sexually transmitted infections than women (= -4.59, p<0.001) and a significantly lower level of knowledge (= -0.38, p=0.006) (Table 1). No significant differences were found between age groups (18-19, 20-21, and 22 years) or between single and engaged/married students. Students of Islamic religion had poorer attitude (p=0.017) and lower knowledge level (p=0.001) on sexually transmitted infections than students of Christian religion (Table 1). Rural-born students and those currently living in a rural area had a substantially poorer attitude (p<0.001 and p=0.051, respectively) and knowledge about sexually transmitted infections (both p<0.001) than students of urban origin and/or residence. Higher parental education was strongly and linearly associated with more positive attitude and better knowledge about sexually transmitted infections (p<0.001 for linear trend for both attitude and knowledge). Lower income per capita (<80 €/month) was associated with lower levels of both attitude and knowledge, compared with higher levels of income (>150 €/month) (attitude, p=0.005; knowledge, p<0.001). There was no significant difference between middle-income (80-150 €/month) and wealthier students (Table 1).

Multiple regression analysis revealed parental education and place of origin to be significant and independent predictors of attitude and knowledge about sexually transmitted infections (Table 2). Linear regression models, testing collinearity among covariates (origin vs residence and parental education vs income) did not reveal any significant collinearity (data not shown).

Upon adjustment for socio-demographic factors (age, sex, marital status, religion, income, number of siblings, and origin/residence) (Table 2), parental education showed strong, linear association with the level of knowledge on sexually transmitted infections (p<0.001 for linear trend). Students with low-educated parents had a mean knowledge score of <1.16 (95% confidence interval [CI], 0.85-1.47) and those with mid-educated parents had a mean score of <0.98 (95% CI, 0.74-1.23) in comparison with students whose parents were highly educated. According to their attitude score, students whose parents had mid-level education (9-12 years) were at the highest risk for unhealthy sexual behavior (mid-education vs high education: = -5.83, p<0.001).

Upon adjustment for covariates, current place of residence was weakly and insignificantly associated with knowledge on sexually transmitted infections, unlike the place of birth. Rural-born students had poorer attitude (= -4.52, p=0.052) and lower level of knowledge (= -0.70, p=0.003) on sexually transmitted infections (Table 2).

After adjustment for covariates, income did not predict attitude or knowledge levels (even in models

run without parental education; data not shown), whereas male sex, Islamic religion, and a greater number of siblings could indicate a poorer attitude and knowledge on sexually transmitted infections (Table 2).

Discussion

The principal finding of our study was the strong and significant association of a higher parental education and/or urban origin of the students with the low-risk attitude and the best knowledge on sexually transmitted infections.

The mean scores of knowledge (5.3 for men and 5.7 for women; range, 0-10) and attitude (90 for men and 95 for women; range, 27-135) in our study were low, which gives cause for serious concern. Moreover, our data are in accordance with a report from Budapest, showing poor knowledge and attitude towards sexually transmitted infections among adolescents in Hungarian high schools (2). This clearly represents a call for action, since low levels of knowledge on AIDS were recently shown to predict high-risk sexual practice among men in Hungary (15).

There are no previous reports on knowledge of Albanian students about sexually transmitted infections. The data available refer to a cluster survey on a national level among 5,456 women aged 15-49 years (5), which revealed that 31% of women born in urban areas had sufficient knowledge of HIV/AIDS transmission vs 22% age-matched women of rural origin. Although our study population was different, we also found positive association between rural origin and poor knowledge and attitude towards sexually transmitted infections. Self-education, however, was not found to be linearly associated with knowledge on HIV/AIDS among women aged 15-49 years, as 21% of women with primary education, 30% of women with secondary education, and 28% of women with higher education had sufficient knowledge of HIV/AIDS transmission (5). Our study revealed a consistent and statistically significant correlation between educational level of parents and students' attitude and knowledge on sexually transmitted infections.

The association of parental education with attitude and knowledge on sexually transmitted infections may be viewed as counter-intuitive, as higher parental education might encompass a whole range of predisposing factors for low-risk behavior, such as a better education of children, higher economic level, and generally more advantageous socioeconomic, learning, and practicing environment (7-8,11). Nevertheless, in our study, parental education was not significantly associated with family income, nor was family income associated with knowledge and attitude towards sexually transmitted infections (after adjustment for the other socio-demographic factors). In addition, income failed to predict levels of knowledge and attitude even in models without parental education. In the absence of more persuasive data on Albanian youth, we speculate that parental education exerts a direct influence upon children's (students') knowledge through better transmission of information and stronger feedback mechanisms.

We should also further investigate into the finding that the students of Islamic religion had poorer knowledge on sexually transmitted infections than others.

There are several possible limitations of our study. Since we asked about sexual attitude and knowledge, reporting bias could be inherently present. However, there is no plausible reason for subgroups that differ in parental education and/or origin to report differently about their attitude and knowledge on sexually transmitted infections. Therefore, notwithstanding its possible role, reporting bias does not seem to be a major explanation of our findings. Another limitation is the reliability of the knowledge test (0.66), which was not high. Although the students had enough time to fill out the questionnaires, one possible explanation for the relatively low knowledge test reliability could be the time-pressure felt by the students because knowledge test was the last section in the questionnaire.

Furthermore, we cannot generalize our findings to all Albanian youth, since we targeted undergraduate students only. Also, we cannot draw any conclusions about possibly causative association between parental education and/or attitude and knowledge of students about sexually transmitted infections, because we performed a cross-sectional study.

Despite these limitations, we believe that our study provides a pioneering evidence about the magnitude and socio-demographic determinants of knowledge and attitude towards sexually transmitted infections among undergraduate students, a particularly vulnerable group for sexually risky behavior in a transitional country.

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