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Source / Izvornik: **Collegium Antropologicum, 2006, 30, 89 - 97**

Journal article, Published version
Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:105:772207

Coll. Antropol. **30** (2006) Suppl. 2: 89–97
Original scientific paper

Attitudes towards HIV/AIDS among Four Year Medical Students at the University of Zagreb Medical School – Better in 2002 than in 1993 but Still Unfavorable

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A B S T R A C T

Fourth-year medical students at Zagreb University School of Medicine were surveyed about their knowledge and attitudes regarding HIV/AIDS in 2002/03 and this was compared to a student generation studying during 1993/94. Results indicated that the 2002/03 students scored significantly higher then did 1993/94 students on knowledge, and attitudes towards HIV/AIDS. However, 84% of 2002/03 students believed that health care workers (HCW) have the right to know the HIV status of their patients, 50% would disclose the HIV status to another HCW against patient's wishes and only 35% believed that HIV testing should be voluntary. The following factors were independently associated with a more favorable attitude towards HIV/AIDS: less homophobia ($\beta = -0.37$, $p<0.001$), experience with HIV/AIDS patients ($\beta=1.02$, $p<0.001$), better knowledge about transmission ($\beta=0.18$, $p=0.016$), and 2002/03 academic year ($\beta = -1.45$, $p=0.011$). Despite improvements, some negative attitudes towards HIV/AIDS remained prevalent in 2002/03.

Key words: *acquired immunodeficiency syndrome, attitude, HIV, knowledge, prejudice, students, medical, homophobia, discrimination*

Introduction

Eastern Europe currently exhibits the greatest relative increase in the number of newly registered HIV infections in the world[1]. At the same time, Central Europe remains relatively spared from the epidemic. Croatia is geographically affiliated to Central Europe, but it has several potential risk factors for the spread of HIV/AIDS: social and economic changes due to transition and recent war events (unemployment, poverty, and migrations), a large number of injection drug users among vulnerable youth, a relatively large population of mobile persons (merchant marines and labor migrants) and a tourism based economy. Improved measures to prevent further HIV spread are needed[2,3].

HIV/AIDS is an illness that primarily affects stigmatized groups, such as men having sex with men, intravenous drug users and sex workers. This infectious illness can evoke irrational emotions and fears in health care providers, including medical students. Hence, it is important to study their knowledge and attitudes, as these two factors could have a profound influence on the quality of services they provide in their work. The education has a significant impact on the level of knowledge about HIV/AIDS infection and the degree of tolerance toward HIV/AIDS related problems as well[4,5].

We assessed the knowledge, attitudes and beliefs towards HIV/AIDS and men having sex with men among medical students in 2002/03 and investigated whether there was any change compared to the generation of students attending medical school during the war for Croatian independence (generation: 1993/94). Factors associated with willingness to treat HIV/AIDS patients have also been investigated.

Received for publication November 2, 2006

Subjects and Methods

Study sample

The questionnaire was distributed to forth-year students who attended the final lecture of the course on infectious diseases in the 1993/94 academic year and in the academic year 2002/03. Out of 350 potential respondents in1993/94, 60 were not present at the lecture. Out of those present, 234 filled out the questionnaire (final response rate 234/350) and in 2002/03 out of 170 students enrolled in the fourth year, 150 got the questionnaire (20 students were not present at the lecture) and 127 filled out the questionnaire (response rate 127/170).

Questionnaire

The questionnaire contained 50 items and most of the questions asked are presented in Tables 1 to 5. The response categories for each item used nominal, binary or Likert-scale responses to facilitate readability and administration. The questionnaire was developed in 1993 by modifying items asked in similar studies at that time[6,7] and following the advice of documents issued by the Global Program on AIDS.[8] The questionnaire examined knowledge about HIV transmission, general attitude towards HIV/AIDS, willingness to treat, attitudes towards confidentiality and HIV-testing, opinions on prevention of HIV/AIDS in Croatia, attitudes towards homosexuality and possible discrimination on different procedures performed on HIV positive patients. Data on the sources of information about HIV/AIDS were also collected, as well as on personal experience with patients and on personal fear of acquiring HIV infection. Demographic data included age, sex and place of origin of the student.

Assessment of students' knowledge about transmission of HIV/AIDS was based on 8 statements with Likert-type scale responses (Table 1). These questions demonstrated good internal consistency; Cronbach α of the scale was 0.71 in 1993/94 students and 0.71 for all students. The concrete knowledge about HIV/AIDS was tested by 3 multiple-choice question (Table 1). Assessment of students' general attitudes toward HIV/AIDS was based on 9 statements (adapted to a 1–5 Likert scale) testing the students' beliefs, feelings and opinions regarding HIV/AIDS (Table 2). The Cronbach α of the scale was 0.71 and 0.70 for students studying in 1993/94 and 2002/03 respectively. There were also 13 questions about the support for routine testing of different populations on a three point scale (yes, don't know, no). The scale ranged from 13 to 39, the lower scores indicating less support for testing. Cronbach α of this scale was 0.92 in 1993/94 and 0.93 in 2002/03. To assess student's attitude toward homosexuality we used 5 statements (Table 2) with Likert-type scale responses. Cronbach α for this scale was 0.86 in the first period, and in the second it was 0.88. Possible discrimination in various procedures in health care settings was evaluated by five multiple choice questions (Table 4). A score was calculated by assigning the value of one to each non-discriminatory answer for the first 4 questions (Table 4). Hence, a score of 4 means that a student answered all questions in a non-discriminatory way. Fear from contagion was assessed by the question »I am afraid I might get the AIDS virus« with yes, no, and don't know answer.

Statistics

Cronbach's α was used as a measure of internal consistency, based on the average inter-item correlation for knowledge questions, attitudes statements and testing preference. We used Pearson's χ^2 exact test, Spearman rank-order correlation, Mann-Whitney U-test or Kruskal-Wallis rank test, or simple linear regression for different comparisons in our bivariate analysis. All reported tests are two-sided.

Multivariate analysis was done by multiple linear regression and multinomial logistic regression analysis for the attitude score and willingness to treat as dependent variables respectively. Initially variables with a $p<0.25$ on bivariate analysis were included in the model. If a variable did not contribute to the model, or if the meaning of the variable in the model was questionable it was discarded from the final analysis. There were no serious violations of the assumptions of linearity, normality of residuals, homoscedasticity and no evidence of collinearity in our multivariate linear regression model. We evaluated the fit of the multinomial logistic regression model using the Hosmer-Lemeshov test for binary comparison. The statistical analysis was performed by SAS version 8.2 (SAS Institute Inc., Cary, NC, USA).

Results

A total of 234 students (37.6% male) were included in the study in 1993/94 academic year (response rate 80.7%) and 127 students (34.7% male) in 2002/03 (84.7%). The median age was 22 (range: 21 to 26) years for both generations.

The median transmission knowledge score was 37 (range: 21 to 40) out of maximum 40 points. Respondents from the 2002/03 academic year achieved a significantly higher score than students in 1993/94 (median: 38, range 21 to 40 vs. 36, range 21 to 40; $p<0.001$, Mann-Whitney U test). Students with personal experience with HIV/AIDS patients compared to those without experience had a better knowledge score in 2002/03 ($p<0.001$, Mann-Whitney U test), but not in 1993/94 ($p=0.17$, Mann-Whitney U test). The analysis of students' individual statements on the transmission knowledge test (Table 1) showed that they were most likely to correctly identify how HIV is transmitted (close to 100%), than how HIV is not transmitted (2–12% false answers). 12% of students from 2002/03 still believe that HIV can be transmitted by mosquito bites (Table 1).

The median general attitude score was 27 (range: 10 to 40) out of maximum 45 points and indicated intolerant attitudes towards HIV/AIDS (Table 2). Students from the 2002/03 period had significantly less intolerant attitude than students 9 years earlier (median: 29, range 16

TABLE 1
COMPARISON OF KNOWLEDGE OF 4-YEAR MEDICAL STUDENTS ABOUT HIV/AIDS IN ACADEMIC YEARS 1993/1994 AND 2002/2003

Statement	Percent of students who answered correctly*		
	1993/1994 (n=234)	2002/2003 (n=127)	p†
Knowledge about HIV/AIDS transmission:			
HIV/AIDS can be transmitted by:			
Sharing needles	99	98	0.615
Sexual contact	100	98	0.123
From mother to child	99	97	0.247
Mosquito bites	81	88	0.076
Hand shaking	97	98	0.718
Eating in a restaurant where the cook has the AIDS virus	94	94	0.640
Sharing utensils with someone who has AIDS	88	90	0.598
Sneezing and coughing	84	94	0.004
Concrete knowledge:			
An Anti-HIV test (ELISA) usually become positive after 3 weeks to 4 months	82	71	0.011
After a needlestick injury (with a needle which had been used in a patient with AIDS) the probability of acquiring HIV infection is 0.3–0.5%	43	53	0.077
The probability that a newborn acquires HIV infection from an infected mother is 15–40%‡	46	61	0.006

‡ Students in the period 2002/2003 were asked for the probability of transmission in untreated mothers.

* Correct = definitely true + probably true for positive statements, very unlikely + somewhat unlikely for negative statements, and yes for concrete questions.

† Comparison of students knowledge about HIV infection at different academic years; Pearson's χ^2 exact test.

to 40 vs. 27, range 10–40; $p<0.001$, Mann-Whitney U test). 13.7% students from the period 1993/94 and 19.7% from the period 2002/03 stated that health care workers have the right to refuse to treat an AIDS patient (Table 2). 64.6% from the period 2002/03 would test all patients admitted to the hospital (Table 2) and more than 80% of students from both periods believe they have the right to know the HIV status of their patients. 13.4% of the 2002/03 students expressed personal fear of contracting HIV, 34.6% from 1993/94 ($p<0.001$, Pearson's χ^2 exact test). Students in 2002/03 were more willing to treat HIV/AIDS patients (Table 3). Knowledge about transmission, homophobia, and attitudes scores were significantly associated with willingness to treat in 2002/03 ($p=0.038$, $p=0.006$ and $p=0.002$ Kruskal-Wallis test) and in 1993/94 ($p=0.002$, $p=0.008$ and $p<0.001$, Kruskal-Wallis test). Students from 2002/03 who had some experience with HIV/AIDS patients were more willing to treat them ($p=0.026$, Pearson's χ^2 exact test, d.f. 2), but this was not observed in students from 1993/94 ($p=0.276$ Pearson's χ^2 exact test, d.f. 2). Students from 2002/03, who have not expressed fear from contracting HIV/AIDS were more willing to treat patients ($p=0.044$, Pearson's χ^2 exact test, d.f. 4), but this was not observed in students from 1993/94 ($p=0.707$ Pearson's χ^2 exact test, d.f. 4).

Lack of respect for confidentiality was common, 94.4% of students from 1993/94 and 75.6% from 2002/03 ($p<0.001$, Pearson's χ^2 exact test) would act against patients request on at least one of the three questions asked. Significantly fewer students would inform the sexual partner of an HIV positive person in 2002/03 than in 1993/94 (52.3% vs. 71.2%; $p=0.001$, Pearson's χ^2 exact test) and other medical staff (50.4% vs. 76.4%; $p<0.001$, Pearson's χ^2 exact test) without the patient consent (Table 3).

Only 31.6% of 1993/94 and 36% of 2002/03 students stated that HIV testing should be voluntary ($p=0.09$, Pearson's χ^2 exact test, d.f. 2). The median of the support for HIV testing score was 21 (range: 13 to 39, $N=101$) in 2002/03 and 27 (range: 13 to 39; $p<0.0001$, $N=192$, Mann-Whitney U test) and indicated a preference for routine testing in both student generations. The groups that should be routinely tested were sex workers (78%), injection drug users (76%) and men having sex with men (65%).

Both generations of students thought that AIDS is an important issue in Croatia (88.9% in 1993/94 vs. 75.6% in 2002/03). All students in the first period and almost all in the second (95.3%), thought that more information about HIV/AIDS should be provided at secondary schools. Also, a great majority thought that there is a need to inform secondary school students more concretely and explicitly about sexual intercourse when information on HIV/AIDS is given (97.1% in 1993/94 vs. 91.3% in 2002/03). Students in both periods (96.1% in 1993/94 and 93.6% in 2002/03) considered that Croatia needs an educational project about HIV/AIDS in general population.

Only 12% students from 1993/94 and 7.8% from 2002/03 felt that promoting mutual faithfulness is the most

TABLE 2
MEDICAL STUDENTS ATTITUDES TOWARD HIV/AIDS AND HOMOSEXUALITY IN ACADEMIC YEARS 1993/1994 AND 2002/2003

Statement	Percent of students in academic year						
	1993/1994 (n=234)			2002/2003 (n=127)			
	Agreed (1+2)*	Disagreed (4+5)*	Had no opinion (3)*	Agreed (1+2)*	Disagreed (4+5)*	Had no opinion (3)*	p†
Attitudes toward HIV/AIDS							
I believe that health workers have the right to refuse to treat an AIDS patient	14	82	5	20	69	11	0.015
HIV can be transmitted during routine work with patients in health care settings	21	72	7	19	76	5	0.532
I have no wish to work with AIDS patients	27	64	9	19	70	11	0.272
All patients admitted to the hospital should be HIV-tested	44	45	11	65	31	5	<0.001
I am concerned that in the future we will find out that AIDS can be transmitted in ways now thought safe	41	25	34	25	32	42	0.014
People infected with HIV should go only to the dentist with special equipment	52	39	9	30	44	26	<0.001
All physicians should be HIV-tested	56	33	12	30	54	16	<0.001
Patients have the right to know HIV serostatus of physicians	68	22	9	53	36	11	0.010
Health workers have the right to know HIV serostatus of patients	89	6	5	84	14	2	0.012
Attitudes toward men who have sex with men							
Declared homosexuals should be forbidden to work as teachers at secondary schools	21	61	18	17	66	17	0.529
Declared homosexuals should be forbidden to work as physicians	19	68	13	11	72	17	0.141
Declared homosexuals should be forbidden to work as judges	15	72	13	10	76	13	0.484
Homosexuals who have AIDS had deserved it	11	74	15	6	76	17	0.287
Homosexuals have no right on their sexual life style	9	81	10	12	74	12	0.294

* Number indicate answers on the scale from 1 (complete agreement) to 5 (complete disagreement). The sum of percentages is sometimes not equal to 100% because of rounding.

† Comparison of students' opinions about AIDS and homosexuality at different academic years; Pearson's χ^2 exact test, d.f.=2.

‡ Yes, no or don't know instead of agreed, disagreed and had no opinion.

appropriate way to prevent the sexual transmission of HIV in Croatia. On the contrary, 80.7% from 1993/94 and 83.6% from 2002/03 felt that condom use and safe sex messages are the most important things to do for prevention of sexual transmission of HIV/AIDS in Croatia. When asked about how they would protect themselves against HIV/AIDS when planning sex with a new partner 54.4% from the period 1993/94 and 78.5% from the period 2002/03 mentioned condom use. 43% from the period 1993/94 and 18% from the period 2002/03 would protect themselves against HIV by getting to know their new partner. Of note, only 2.6% from 1993/94 and 3.3% from 2002/03 would opt for abstinence with a new partner.

The median homophobia test score was 10 (range: 5 to 25) out of maximum 25 and indicated an overall negative attitudes toward men having sex with men (lower scores indicate higher level of homophobia). Students in 1993/94 year had significantly higher level of homophobia than students in 2002/03 (p=0.01, Mann-Whitney U test). Also, male students were more homophobic than female (p<0.001, Mann-Whitney U test). The analysis of students' individual statement scores on the homophobia scale (Table 2) showed that they had more negative attitude about declared homosexuals being teachers in secondary schools. Only 46% of students from 1993/94 and 41% from 2002/ 03 could feel sympathy with men having sex with men who have AIDS.

Discriminatory views when asked about different medical procedures were common in both study periods (Table 4). Only 41 of 221 (18.5%) students from 1993/94 and

TABLE 3
MEDICAL STUDENTS ATTITUDES TOWARD HIV INFECTED PATIENTS RIGHTS TO CONFIDENTIALITY AND WILLINGNESS TO TREAT IN ACADEMIC YEARS 1993/1994 AND 2002/2003

Statement	Percent of students who answered in academic year						
	1993/1994 (n=234)			2002/2003 (n=127)			
	Yes	No	Hhave no opinion	Yes	No	Have no opinion	p*
Right to confidentiality							
Would inform the sexual partner of an HIV positive person even though she or he strongly disagrees with it	71	9	19	52	17	31	0.001
Would warn other medical staff about patients HIV status though she or he strongly disagrees with it	76	10	13	50	18	32	<0.001
Would inform the employer of an HIV positive person even though she or he strongly disagrees with it	8	19	74	5	15	80	0.318
Willingness to treat							
If given a choice would prefer not to treat:							
HIV infected patients	46	31	23	26	39	35	0.001
Men having sex with men	31	49	20	22	56	22	0.216
Injection drug users	28	58	14	20	55	25	0.064

32 of 113 (28.3%) from 2002/03 answered all first four questions in a non-discriminatory way (p=0.05, Pearson's χ^2 exact test). The question on exchange transfusion for neonatal jaundice was not included in this analysis because many students answered with »don't know« raising doubts about knowledge on the subject and the procedure. The median of non-discriminatory answers for the four questions was 2 (range, 0–4) for students from 1993/94 and 3 (range, 0–4) for students from 2002/03 (p=0.04, Mann-Whitney U test). Students from 2002/03 with a higher knowledge about transmission score were more likely to have a higher non-discriminatory score (p<0.001, Spearman's rho = 0.395), but this was not observed in students from 1993/94 (p=0.223, Spearman's rho = 0.082).

The most common source of information about HIV/AIDS was the communication with physicians. In 1993, 92.7 % students and in 2002, 82.8 % heard about AIDS from physicians (Table 5). We found that students in the period 2002/03 used more frequently different sources of information (Table 5). Information provided from secondary schools showed the biggest increase (30.5% vs. 70.3%) (Table 5). There were 59.8%, 25.7% and 14.5% students from the period 1993/94 that originated from cities with > 100,000, between 20,000 and 100,000 and < 20,000 inhabitants respectively. 45.7% students from the period 2002/03 originated from cities >100,000 inhabitants, 33.8% from towns between 20,000 and 100,000 and 20.5% from those <20,000 inhabitants. 53.9% of students from the period 1993/94 and 47.2% from the period 2002/03 had some personal experience with HIV/AIDS patients (p=0.27 Pearson's χ^2 exact test).

A better knowledge score (β=0.36, standard error = 0.07, p<0.0001) and experience with HIV/AIDS (β=1.96, standard error = 0.56, p<0.0001) were associated with a better attitude score on bivariate linear regression analysis. More homophobia (β=–0.43, standard error = 0.06, p<0.0001) and studying in the period 1993/94 (β=–2.2, standard error 0.58, p<0.0001) were associated with a worse attitude towards HIV/AIDS. This was also the case when the analysis was repeated for each of the study periods. Students with a lower homophobia score, prior experience with HIV/AIDS patients, less fearful ones and from the 2002/03 study period had more positive attitude scores on multiple regression analysis (Table 6).

We also investigated willingness to treat as the dependent variable in a multinomial logistic regression model. The adjusted odds of not willing to treat HIV/AIDS compared to willing to treat decrease 0.86 times (p<0.001) for every one point in the attitude score, decrease 0.9 times (p=0.012) for every point in the knowledge score and increase 1.06 times (p=0.15) in the homophobia score (Table 6). The odds of not willing to treat HIV/AIDS compared to willing to treat were not statistically significantly associated with other variables (Table 6). The odds of not willing to treat and being undecided compared to willing to treat were 0.53 and 0.46 times lower for those who were not afraid of getting HIV (p=0.058 and p=0.028 respectively). Although undecided students came more likely from medium size towns (odds ratio, 1.85; p=0.060) there was not a significant association between the place of origin and willingness to treat (Table 6).

Discussion

Many of the findings in our study are encouraging. There were more positive attitudes toward people living with HIV/AIDS, fewer discriminatory attitudes and less homophobia in 2002/03. When compared to the academic

TABLE 4
POSSIBLE DISCRIMINATORY ATTITUDES TOWARD PROCEDURES FOR HIV INFECTED PEOPLE AMONG MEDICAL STUDENTS FROM ACADEMIC YEARS 1993/1994 AND 2002/2003

Question	Percent of answer in academic year*	
	1993/1994 (n=234)	2002/2003 (n=127)
1. You witness cardiac arrest of a young man in the street. You happen to know that he is HIV positive. What would you do?		
a) Would perform cardiac massage, but would not do mouth-to-mouth resuscitation	42	22
b) Would give up resuscitation to other passers-by	3	2
c) Would resuscitate as if I do not know the HIV status†	42	61
d) Would call the emergency unit and wait	9	9
2. Indications for cardiac surgery (artificial valve implantation) in an HIV-infected asymptomatic person should be:		
a) The same as for HIV-negative persons†	61	62
b) Different (more strict) for HIV-positive persons	21	13
c) Do not know	18	25
3. An HIV-positive person (without any symptoms) wants to get a dental bridge-work. Your reaction would be:		
a) Would try to make him or her change his or hers mind	6	2
b) Would support his or hers intention†	59	58
c) Would neither support nor discourage the patient's decision	22	14
d) Do not know	12	26
4. The reason for admission of an AIDS-patient to intensive-care unit should be:		
a) The same as for other incurable diseases†	59	64
b) AIDS-patients should be isolated from patients with other illnesses	33	20
c) AIDS-patients should not be admitted to intensive-care units, because they have an incurable disease and are to dangerous to the medical staff	3	1
d) Do not know	5	16
5. Criteria for exchange transfusion for neonatal jaundice should be:		
a) The same one as for HIV-negative mothers†	41	30
b) More strict (higher level of bilirubin) than for HIV-negative mothers	9	14
c) Do not know	50	56

* The sum of percentages is sometimes not equal to 100% because of rounding. There were 5% of other answers for the first question in 1993/94 and 6% in 2002/03.

† The answer considered non-discriminatory.

year 1993/94 medical students now have better knowledge about HIV/AIDS and are more willing to treat HIV/AIDS patients. Sources of information have diversified and many of the students were given information about HIV/AIDS in secondary schools. Also, despite the fact that there was no condom promotion program in Croatia our medical students feel that this is the most important issue in HIV prevention and 78% stated that they would use a condom with a new partner as a means of protection against HIV/AIDS. However, despite these improvements there are still gaps in knowledge, many negative attitudes, a strong tendency towards HIV testing without consent, and little respect for confidentiality of the HIV status. Less then half of students from both generations could empathize with men having sex with men who have AIDS. Although significantly more than 9 years ago, only 61% of students from the academic year 2002/03 would resuscitate appropriately a known HIV-infected patients in a community setting. Only 18.5% students from 1993/94 and 28.3% from 2002/03 answered the first 4 question on different medical procedures in a non-discriminatory way (Table 4).

It is not clear why students from 2002/03 had more favorable attitudes towards HIV/AIDS than those in 1993/94. Knowledge about HIV transmission, a lower homophobia score and personal experience with patients were associated with better attitudes in our multivariate model (Table 6). Since there were no major changes in the Medical Schools curriculum concerning HIV/AIDS, it is possible that overall changes in the society including more discussion on different HIV/AIDS issues in the media, in the past decade had a significant impact. It is known that attitudes are getting better with time.[9] Since the period of study was an independent predictor of attitudes toward HIV/AIDS one might also hypothesize that the war events have had an independent negative impact

TABLE 5
SOURCES OF INFORMATION ABOUT HIV/AIDS OF FOURTH YEAR MEDICAL STUDENTS STUDYING IN 1993/94 AND 2002/03 ACADEMIC YEAR

Source	Period of study*	
	1993/1994 (n=234)	2002/2003 (n=127)
Physicians	93	83
Daily press	79	76
News magazines	60	66
Books	53	79
Health education	39	58
Friends	34	43
TV spot	33	40
School	30	70
TV programs	29	55
Posters	24	49
Advertisements	19	30
TV news	16	38
Radio spot	15	20
Radio news	12	19
Radio programs	11	20
Politicians	5	2

* values are percentages

on attitudes in 1993/94. Our study also suggests that students' experience with AIDS patients has a positive influence on their knowledge level as was also shown in the study of physicians and trainees in United States, Canada, India, and Thailand[10].

Despite high knowledge about HIV transmission, when judged by the median attitude score students' attitudes toward HIV/AIDS were not highly tolerant in both generations. A number of studies from different countries have shown similar negative attitudes toward AIDS patients among medical students[6,11–15]. However, it is difficult to compare different studies because the duration, scope and response to the HIV-epidemic is different in different parts of the world. Students who expressed that HIV can be contracted in routine work had a lower knowledge score and this has also been reported [16] as was the finding that fear is one of the main factor in students' unwillingness to treat AIDS patients[17].

Approximately one of eight medical students in academic year 1993/94 and one of five in 2002/03 believed that they had the right to refuse to treat AIDS patients,. These results are better than results from the USA in 1999 and similar to London and Cambridge medical students from 1993[18,19].

The proportion of students favoring voluntary testing was low in both generations (35% in 2002/03 and 31% in 1993/94). 65% of students in 2002/03 and 44% in 2002/03 were in favor of HIV testing of all patients admitted to the hospital. Similarly, 50% of Polish medical students considered acceptable testing all patients on admission to the hospital without their consent[20].

»The right to know the HIV status of patients« and the question on mandatory testing were highly correlated ($p<0.001$) which indicates that our medical students have a paternalistic approach to the patient-doctor relationship when HIV is the issue. Our students are also not aware of the many international recommendations that emphasize the need for informed consent for HIV testing and that testing without consent is considered unethical[21–23].

Our study was the first in Croatia to survey some attitudes toward homosexuality and it found negative attitudes towards men who have sex with men in a quarter of students in both study periods. Students in the year 1993/94 had a significantly less tolerant score than students in 2002/03. The homophobia score was not an independent factor for willingness to treat AIDS patients, similar to the results reported by by Radecki et al[24]. Students had a more negative attitude about declared homosexuals being teachers at secondary schools than other professions. As expected, male students had significantly higher level of homophobia than female[25,26].This has been explained by the fact that traditionally boundaries on boys' gender roles are much more rigid than they are for girls[25,26]. As a result boys have a limited number of ways acceptable to their peer group to express their emotions[25,26]. This often means that their peers may see any expression between boys as latent homosexual interest[25,26].

There are several possible limitations of the study. It was designed as a cross-sectional survey and as such did not allow any causative conclusions. Another limitation of the study could be the length of the questionnaire. It is possible that students became tired after a number of questions and did not concentrate on the answer by the end of the test. Also some factors that might influence attitudes were not examined (parental education, income, etc.) and the predictive value of the linear regression model was low ($R^2=0.21$). Also, attitudes towards men having sex with men have not been comprehensively assessed, hence the results of this score should be interpreted with caution. With these limitations in mind we believe that our study provides evidence that four-year medical students have high knowledge about HIV transmission but unfortunately intolerant attitudes and prejudices are still present.

Since our study found that medical students with personal experience with patients had more favorable attitudes towards HIV/AIDS, it seems important that medical educators try to ensure that medical students spend sufficient time seeing patients with HIV/AIDS during their training. Teachers working at medical schools should become aware that they have to change attitudes, not only improve factual knowledge. Positive attitudes about AIDS, HIV-infected patients and HIV risk groups would help Croatia to fight stigma and discrimination and consequently assist in sustaining Croatia's low HIV-prevalence[27].

TABLE 6
FACTORS ASSOCIATED WITH WILLINGNESS TO TREAT AND ATTITUDES TOWARDS HIV/AIDS OF FOUR-YEAR MEDICAL STUDENTS FROM ZAGREB MEDICAL SCHOOL STUDYING IN 1993/94 AND 2002/03

Variables	No. of students	Willing to treat*				Attitudes toward HIV/AIDS†	
		not willing versus willing‡		undecided versus willing‡		Coefficient§	p
Sex:							
Men	131	0.59	(0.33–1.05)	1.04	(0.56–1.92)	–	–
Women‡	230	1		1			
Attitude score (one point)	361	0.86	(0.81–0.91)	0.90	(0.84–0.95)	–	–
Knowledge score (one point)	361	0.90	(0.83–0.98)	0.94	(0.86–1.03)	0.18	0.016
Homophobia score (one point)	361	1.06	(0.98–1.13)	1.04	(0.96–1.12)	–0.37	<0.001
Fear of infection	361	0.85	(0.64–1.13)	0.68	(0.51–0.91)		
Yes‡	98	1		1		referent	
No	210	0.53	(0.27–1.02)	0.46	(0.23–0.92)	1.21	0.050
Don't know	53	0.53	(0.21–1.33)	0.88	(0.35–2.21)	1.62	0.053
Experience with HIV/AIDS patients:							
Yes	186	0.64	(0.37–1.12)	0.67	(0.38–1.20)	1.92	<0.001
No‡	175	1		1		referent	
Period of study:							
1993/94	234	1.31	(0.71–2.42)	0.55	(0.30–1.01)	–1.45	0.011
2002/03‡	127	1		1		referent	
Place of origin:						–	–
>100.000 inhabitants‡	198	1		1			
20.000 – 100.000 inhabitants	103	0.75	(0.39–1.44)	1.85	(0.98–3.53)		
<20.000 inhabitants	60	0.67	(0.31–1.43)	1.51	(0.71–3.22)		

* Results of multinomial logistic regression analysis. Odds ratios (OR) and 95% confidence intervals (CI) are given. CI not including one are significant.

† Results of multiple linear regression analysis. $R^2=0.21$, $\beta_0=23.9$.

‡ Reference category.

§ Coefficient indicates the change of mean level of attitude for an increase of 1 point in knowledge and homophobia score, whereas for categorical variables indicates the difference between the mean of attitude and the respective reference categories. A positive coefficient indicates a more positive attitude to HIV/AIDS.

Acknowledgments

We would like to thank all medical students who fulfilled the questionnaire.

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STAVOVI PREMA HIV/AIDS-U MEĐU STUDENTIMA ČETVRTE GODINE MEDICINSKOG FAKULTETA SVEUČILIŠTA U ZAGREBU – BOLJI 2002. NEGO 1993. ALI JOŠ UVIJEK NEZADOVOLJAVAJUĆI

S A Ž E T A K

Istraženi su znanja i stavovi studenata četvrte godine medicine Medicinskog fakulteta u Zagrebu akademske godine 2002/03 i uspoređeni s generacijom studenata 1993/94. Rezultati ukazuju na značajno višu razinu znanja i prihvatljivije stavove u generaciji 2002/03. S druge strane, 84% studenata generacije 2002/03 su uvjerenja da zdravstveni djelatnici imaju pravo znati HIV status pacijenata o kojima skrbe, 50% bi ih odalo HIV status pacijenta drugom zdravstvenom djelatniku bez obzira na protivljenje pacijenta, a samo 35% ih smatra da bi HIV testiranje trebalo biti dobrovoljno. Slijedeći čimbenici bili su nezavisno povezani s poželjnim stavovima prema HIV/AIDS-u: manja razina homofobije ($\beta = -0.37$, $p < 0.001$), iskustvo u radu s HIV/AIDS pacijentima ($\beta = 1.02$, $p < 0.001$), bolje znanje o putovima prijenosa zaraze ($\beta = 0.18$, $p = 0.016$), i akademska godina 2002/03 ($\beta = -1.45$, $p = 0.011$). Unatoč poboljšanju situacije u odnosu na 1993/94, pojedini negativni stavovi prema HIV/AIDS-u prevladavaju i dalje.