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Original Article

Knowledge, attitude and stigma towards HIV patients: a survey among medical students in Tuzla, Bosnia and Herzegovina

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Abstract

Introduction: This survey aims to assess knowledge, attitude and stigma towards HIV patients, among medical students in Tuzla, Bosnia and Herzegovina. We also aimed to assess potential risk factors for HIV infection among fourth year medical students.

Methodology: Data were collected from specific questionnaire that was completed by 171 students of the Faculty of Medicine, University of Tuzla. A multivariable logistic regression was performed.

Results: Majority of students (79%) had a good knowledge of HIV, (median value of correct answers was 9 (95%) with at least 6 correct responses). Also, majority of students (73.6%) had a positive attitude towards HIV patients and the median positive value was 6 (95% CI: 6-7). More than a third of students considered that all hospitalized patients should be tested for HIV. Total of 81% of students considered that they should inform the sexual partner of HIV positive patient, although she/he disagrees. 61.4% of students had a discriminatory attitude towards HIV, with the median values of 3 (95% CI: 3-3). Multivariate regression analysis identified positive attitude towards HIV patients as an independent predictor for a non-discriminatory attitude. Moreover, an overall attitude towards HIV patients defines student`s determination to work with AIDS population. Male gender, and older age, were identified as predictors of risky behavior.

Conclusions: Preventive measures, including better HIV education, are crucial. Knowledge can increase awareness of HIV infection, decrease the incidence and reduce stigma towards HIV patients.

Key words: Knowledge; attitude; HIV; discrimination; students.

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Introduction

HIV/AIDS (Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome) has been a global problem for the last 30 years. However, due to antiretroviral therapy, HIV has become a chronic disease and, as a consequence, an important public health problem [1]. Having a professional relationship with HIV patients, without the influence of stigma is crucial in everyday clinical practice. It is very important that medical students have adequate knowledge regarding HIV infection and positive attitude towards HIV patients (people living with HIV–PLWH).

HIV/AIDS is a disease that primarily targets stigmatized population with high-risk behavior and lack of knowledge regarding HIV and other sexually transmitted diseases but there is also a risk for the rest of the population. Vulnerability and stigma are factors that can prevent HIV positive people to seek care for early diagnosis and treatment [2]. According to The World Health Organization (WHO) young people (18-24 years old) make 50% of all newly diagnosed HIV positive cases which indicates the need for implementing a better education regarding this issue [3]. Globally, a lot of young people use drugs and alcohol to relax and have fun. The everyday pressure, frustrations, fear, stress, anxiety have been identified as factors for risky behavior [4]. The incidence rate of new HIV infections did not satisfy the goals set by the UN General Assembly in 2016: less than 500,000 new infections annually by the year 2020 [5].

Bosnia and Herzegovina (B&H) is located in the south-eastern region of Europe which has been recognized as one of the fastest growing HIV epidemic regions in the world. Although the prevalence of HIV in B&H is low, this country has specific characteristics that could lead to epidemic. The young in Bosnia have increased risk factors for acquiring HIV infection due to social and economic status as a consequence of transition and war events such as: high migration rate, unemployment, poverty, stigmatized homosexual community, large population of migrants and asylum seekers [6]. Since the first documented HIV infection in

B&H in 1986, the official estimation of HIV cases in the country had reached 369 cases at the end of 2019, giving a national infection rate of less than 1% in the general population. However, these data are only the estimates. Approximately 80% of HIV infected persons do not know their serostatus, which is a serious public health problem, as it may lead to spread of infection. According to the mode of transmission, the dominant mode of HIV infection is unprotected sexual intercourse, namely MSM (men who have sex with men) 49.3%, heterosexual with 40.5%, and injecting drug users with 6.7%. In recent years, there has been an increase in HIV infection among the MSM population. A lack of knowledge can create a negative attitude towards people living with HIV [7]. Health education about HIV depends on many different factors: socio-demographic characteristics, gender, age, origin, religion, tradition, and potential contacts with HIV [8]. Therefore, the aim of this study was to assess the level of knowledge and stigma towards HIV patients, among students of the fourth year of the Faculty of Medicine at the University of Tuzla.

Methodology

We conducted a cross-sectional survey using a questionnaire, that was specifically designed by 4 infectious disease specialists, trained in HIV disease. Several previously validated questionnaires were used in the design of the study [9,10]. The final version had 24 questions, related to socio-demographic data, knowledge of HIV transmission and prevention, attitude towards HIV infected individuals and possible discrimination, risk behavior, compliance with treatment. On the World AIDS Day and during the "European Testing Week" participating students were included in a study. The research group included 203 students of the fourth year, (academic 2016/2017). Total of 171 students (84.2%) completed the questionnaire. We used multiple choices questions with possible answers: 'yes', 'no' or 'I do not know'. A student's knowledge of HIV/AIDS was evaluated by 11 questions. Each correct answer was given 1 point and incorrect 0. Maximum number of points was 11. Total result from 0 to 5 was considered as poor knowledge, 6-8 average, and 9-11 represented a good knowledge of HIV. The global stigma against HIV patients was assessed by 10 questions. 1 point was given for each positive and 0 for each negative answer. Points between 0 and 5 were marked as negative attitude towards HIV patients while points between 6 and 10 were marked as positive. Possible discrimination in various health care procedures was assessed with six questions and scoring, with a minimum of 1 and a maximum of 6. Statistical analysis was performed using the MedCalc software, version 8.1 (MedCalc Software, Mariakerke, Belgium). The distribution of the variables was tested with a Kolmogorov-Smirnov test. Spearman's correlation coefficient and Kruskal-Wallis were used to compare the tested variables. Multivariate logistic regression analysis has estimated the predictive value of significant variables in relation to independent variables: the will to treat AIDS patients and AIDS stigma. The difference between the samples was considered significant if $p < 0.05$. This study was approved by the Ethics Review Committee for Scientific Research Work of the University of Tuzla, in December, 2019.

Table 1. Demographic characteristics of the students.

Variable	N (%)
Answer rate	171 (100)
Age (years)	24 (23-25) *
≤19 years	0 (0)
≥ 20 years	171 (100)
Gender	
Female	115 (67.3)
Male	56 (32.7)
Residence	
City	119 (69.6)
Village	36 (21.0)
Suburban area	16 (9.4)
Previous education on STD's	
Yes	160 (93.6)
No	10 (5.8)
Not sure	1 (0.6)

Results

Out of 203 medical students of both genders from the fourth study year, 171 filled the questionnaire and were included in the study, with average age of 24 years old and females were predominant (67.3%). The percentage of pre-education about sexual transmitted diseases was high (93.6%) (Table 1). We found a satisfactory level of knowledge about HIV among students. More than a half of the students (53.8%) think that HIV is transmitted using common shaving accessories, and 57% did not know that after the accidental injury by a needle in AIDS patients, the likelihood of acquiring HIV is up to 0.5% (Tables 2 and 3).

The students' knowledge regarding HIV was evaluated by 11 questions, and the median value of the correct answers was 9 (95%), with at least 6 correct answers, while 18 (10.5%) students answered correctly all HIV/AIDS related questions. According to that, 79%

Table 2. Students' knowledge regarding HIV/AIDS.

Question	Correct answer N (%)	Incorrect answer N (%)
HIV/AIDS is a sexually transmitted disease that weakens immune system	169 (98.8)	2 (1.1)
All people infected with HIV have AIDS	151 (88.3)	20 (11.7)
Only homosexuals and prostitutes have HIV/AIDS	171 (100)	0 (0)
People who look healthy can be infected with HIV	171 (100)	0 (0)
Even one unprotected sexual encounter can lead to an HIV infection	163 (95.3)	8 (4.7)
Appropriate and regular condom use lowers the risk of HIV infection	166 (97.1)	5 (2.9)
Contraception pills prevent HIV infection	164 (95.9)	7 (4.1)
After an accidental injury by a needle used in AIDS patient, the probability of getting HIV infection is 0,3 - 0,5%	74 (43.3)	97 (56.7)
HIV can be transmitted during routine work with patients in health care institutions	112 (65.5)	59 (34.5)

of students are classified as having good knowledge of HIV. Interestingly, female students had better knowledge ($p = 0.0073$) (Table 4a).

The overall attitude towards HIV/AIDS among students was assessed by 10 questions. The median value of the positive answers was 6 (95% CI: 6-7). The lowest score was 2 (1.2% of students), while only one student had a positive opinion on all the questions asked. Discriminating views regarding various medical procedures performed on HIV patients were frequent. More than a third of students agreed with a highly stigmatizing statement that "All patients who are assumed to be admitted to the hospital should make test for HIV" (36.3%), even in the absence of informed consent. More than one third of the students (36.3%) condemn the MSM population. The lack of respect for confidentiality was common, 81% of the students support that partners of HIV + patients, should be informed of their HIV status, even though they do not have consent. 20% of participants don't not want to deal with PLWH. In general, majority of the students (73.6%) had a positive attitude towards HIV. There was no significant correlation of the overall attitude towards HIV patients, in regards to age ($p = 0.5993$), gender ($p = 0.1160$) and residence ($p = 0.7787$) (Table 5).

There was difference in opinions depending on residence ($p = 0.001$) (Table 4b). Even though we found that positive attitude towards HIV patients was predominant among students from urban areas, there was moderately significant positive correlation between the level of HIV/AIDS knowledge and positive attitudes towards HIV/AIDS among students ($p < 0.0001$; $r = 0.34$), with no correlation between the level of knowledge and stigma towards HIV/AIDS ($p = 0.6834$).

A univariate regression analysis confirmed positive correlation between better knowledge regarding HIV and positive attitude towards this population of patients (coefficient = 0.15; standard error = 0.29; $p = 0.003$). Knowing the infection transmission and the overall attitude towards HIV were significantly related to the willingness to work with AIDS positive patients ($p = 0.0169$ and $p < 0.0001$).

The nondiscriminatory attitude of the students was evaluated by 6 questions, and the median value of the discriminating responses was 3, ranging from 1 to 6. More than half of the students (61.4%) had discriminatory attitude towards HIV. A positive correlation was found between non-discriminatory attitude and overall opinions regarding HIV ($p < 0.000$, $r = 0.45$), while gender, age, residence, HIV knowledge were not significantly correlated with discrimination towards HIV. Multivariate regression analysis showed that only positive attitude towards HIV (coefficient = 3.91; standard error =1.04; $p = 0.0002$) is an independent predictor for non-discriminatory behavior related to HIV patients (Table 4c).

Table 3. Students' expertise on the HIV/AIDS transmission.

Question	Affirmative answer N (%)
Unprotected sexual intercourse with an infected person	171 (100)
Blood (using common needles and syringes during intravenous drug transmission)	171 (100)
From infected mother to child	165 (96.5)
Mosquito bite	9 (5.3)
Consuming food in a restaurant where the chief has AIDS	6 (3.5)
Using the same shaving equipment and toothbrush	92 (53.8)

Stigma related to HIV/AIDS was recorded in 36.3% of students. Interestingly, male participants had far more stigma towards HIV positive patients (p = 0.0089). There was no significant correlation between stigma and age (p = 0.5730) or residence (p = 0.5092), while there was significant, but weak negative correlation between stigma and the overall attitude towards HIV patients (p = 0.0025; r = - 0.2297). Multivariate regression analysis identified the overall opinion (coefficient = 1.45, standard error= 0.45; p = 0.0013) and male gender (coefficient = 1.12; standard error = 0.36; p = 0.0021) as independent predictors for HIV stigmatization. Almost a fifth of students (23%) had homophobia towards HIV positive patients. Students with a fear of contracting an HIV infection, had worse attitude towards HIV, and refused to work with PLWH. A significant and high negative correlation was identified between homophobia and overall HIV-related opinions (r = - 0.5930; p <0.0001). We did not find a significant correlation between homophobia and

Table 4a. Knowledge level towards HIV in comparison to gender and residence.

FACTOR	N	KNOWLEDGE LEVEL				Median (95%CI)	p
		AVERAGE (6-8)		GOOD (9-11)			
		f	%	f	%		
Overall	171						
Gender							
Male	56	19	33.9	37	66.1	9 (9-10)	**0.0073**
Female	115	17	14.8	98	85.2	9 (9-9)	
Residence							
City	119	28	23.5	91	76.5	9 (9-9)	**0.2719**
Village	36	7	19.4	29	80.6	9 (9-9)	
Suburban area	16	1	6.3	15	93.7	9.5(9-10)	

Table 4b. Attitude towards HIV in comparison to gender and residence.

FACTOR	N	ATTITUDE				Median (95%CI)	p
		POSITIVE (6-10)		NEGATIVE (0-5)			
		f	%	f	%		
Overall						6 (6-7)	
Gender							
Male	56	36	64.3	20	35.7	6 (6-7)	**0.103**
Female	115	89	77.4	26	22.6	6 (6-7)	
Residence	Mean ± SD						
City	119	92	77.3	27	22.7	6.43 ± 1.53	**0.001**
Village	36	25	69.4	11	30.6	6.19 ± 1.65	
Suburban area	16	11	68.8	5	31.2	6.06 ± 1.39	

Table 4c. Discrimination towards HIV in comparison to gender and residence.

FACTOR	N	DISCRIMINATION				Median (95%CI)	p
		YES (0-3)		NO (4-6)			
		f	%	f	%		
Overall						3 (3-3)	
Gender	Mean ± SD						
Male	56	35	62.5	21	37.5	3.14 ± 1.19	**0.969**
Female	115	70	60.9	45	39.1	3.30 ± 1.06	
Residence							
City	119	70	58.8	49	41.2	3.31 ± 1.07	
Village	36	21	58.3	15	41.7	3.16 ± 1.20	**0.213**
Suburban area	16	13	81.3	3	18.7	3.00 ± 1.21	

gender. A significant but weak, positive correlation between homophobia and refusal to work with AIDS patients was found (p = 0.0165; r = 0.1832;) and moderately positive correlation between the overall opinion and willingness to work with HIV patient (p <0.0001; r = 0.3678). Multivariate regression analysis found that only the overall opinion is an independent predictor for students' willingness to work with AIDS patients (coefficient = 2.03, standard error = 0.52; p = 0.0001), while the level of knowledge, residence, gender and homophobia did not meet the criteria for independent predictors.

Unprotected sex was reported by 23 participants (13.5%), the male participants were significantly associated with risky behavior (p <0.001; r =0.3281;), with positive correlation between students' age and risky behavior (p = 0.0119; r = 0.192). Students who had unprotected sex were older, with mean age of 24.8 ± 2.6 years comparing to students who did not have sex at all (p = 0.0096). Multivariate regression analysis found that the male (coefficient = 1.46; standard error = 0.37; p = 0.0001) and older student age (coefficient = 0.21; standard error = 0.07; p = 0.003) were good predictors of risky behavior. There was not a significant correlation between risky behavior and other analyzed variables (overall attitude, willingness to test for HIV, expertise level and homophobia).

Discussion

The purpose of this research was to evaluate the medical students` attitude towards HIV patients and to assess their level of knowledge regarding this global health care problem. UNAIDS (United Nations Program on HIV/AIDS) and WHO claim that proper HIV knowledge is globally scarce, with a high number of infections among young people aged 24 years of age or younger [11]. Our own results are encouraging. Our study showed that medical students in Tuzla generally have a relatively high level of knowledge. Most of them answered correctly questions related to HIV, ways of transmission and prevention. A study conducted at the University of Xinjiang showed that 74.5% students answered correctly on questions relating to HIV/AIDS transmissions [4]. A study conducted in Israel showed similar results, where 80% of the students answered correctly, as well as a study in Malaysia, and a study in Croatia [10, 12, 13]. In contrary, there are some studies where students had an average understanding of HIV infection [14,15]. Interestingly, a study conducted in Malaysia showed that a large number of students weren't sure whether HIV could be transmitted by mosquitoes, 43.8% of them gave a false answer [13]. Maimati *et al.* reported that 59.5% of students thought that HIV could be transmitted by mosquitoes [4]. In the study by Chemtob *et al.*, 34% of examinees thought that mosquitoes could spread HIV, and 29% thought HIV could be transmitted by snot [16]. Moreover, 40.3%, of the students tested in China, still believe mosquitoes spread HIV [17]. Our 9 students answered that HIV can be spread through a mosquito bite. However, majority of the students involved in the study in India were aware that HIV couldn't be spread through a mosquito bite [18]. At the University in Malaysia, 50.5% of the students believe that healthy people at first glance could be infected with HIV [13]. Moreover, in our survey all students thought that people with HIV can be asymptomatic. Lönn *et al.*, reported that 95% of students knew that the most common ways of spreading HIV is sexual contact, from a mother to her child and sharing needles [19]. A similar result came out of Maimati *et al.*, where over 80% of examinees knew HIV could be spread through sharing syringes/needles, as well as vertical transmission from mother to child [4]. All of our students knew HIV spreads through unprotected sexual intercourse and sharing needles and syringes when injecting drugs, while few of them didn't

Table 5. Students' opinions towards HIV/AIDS.

Question	Positive N (%)	Negative N (%)
Would you work with an AIDS patient?	137 (80.1)	34 (19.9)
Are you willing to get tested for HIV?	151 (88.3)	20 (11.7)
Only homosexuals and prostitutes have HIV/AIDS	171 (100)	0 (0)
Do you consider that HIV positive people should get a treatment from a dentist with special equipment?	45 (26.3)	126 (73.7)
All hospital patients should be tested for HIV	109 (63.7)	62 (36.3)
Would you inform the sexual partner of an HIV positive person even though he/she disagrees with it?	33 (19.3)	138 (80.7)
Do you judge the MSM population (men who have sex with men)?	109 (63.7)	62 (36.3)
Are you homophobic towards HIV?	132 (77.2)	39 (22.8)
Would you eat in a restaurant where you knew the chef was HIV positive?	165 (96.5)	6 (3.5)
Would you use shaving equipment or a toothbrush from an HIV positive person?	79 (46.2)	92 (53.8)

know about vertical transmission. The same results were reported in Korea [20]. However, the opposite was noted in Israel, where only 36.6% of students knew breastfeeding could spread HIV [12]. A Malaysian study showed that 52.4% of their participants were well informed about HIV [13]. Maimati's research shows that 75% of participants were well informed [4]. Also, our study shows that four fifths of our students are well informed regarding HIV with one fifth having an average knowledge. A high percentage of students still believe health workers have a high risk of HIV infection. Almost 35% of students thought their future career would have a high risk of HIV exposure [12]. Our study showed a similar response. The risk perception is exaggerated because the actual risk is small when adequate measures of prevention are taken. There was no positive correlation between gender and level of expertise. In a study from Pristina, women were more informed than men [14]. Educated women have a better perception of HIV exposure, as shown in a study conducted by Nelson et al. [21]. A significant difference in level of knowledge, was found in our study, where women gave better answers than men. A study by Zefi, found that there is no worthy correlation between place of residence and level of HIV expertise [14]. Our study showed the same results. The authors in Kosovo found that less than a half of the participants (47%) knew the difference between HIV and AIDS, while a majority of our students were aware of it [22]. At the Zululand University, 95% of students agreed that using a condom will prevent HIV infection [23]. Similar results were found in other studies [10,17]. Almost all of our examinees knew that even one unprotected sexual encounter can lead to an HIV infection. To conclude, the knowledge regarding HIV prevention was satisfying. In contrary, a study in Israel showed insufficient levels of knowledge regarding HIV prevention (58% to 70%) [12]. A lack of knowledge can create a negative impact on PLWH and encourage stigmatization and discrimination [7]. In a study in Malaysia, a majority of the students showed a positive attitude towards PLWH, as shown by the results in our study [13]. A study conducted in Croatia, indicated negative attitude towards HIV patients [10]. A study done by Bamidele *et al*., conducted among students in India, South Africa and the United States of America found that negative perceptions regarding PLWH can lower people's confidence on whether to get tested that ultimately leads to a higher risk of HIV spreading [24]. To conclude, being aware of knowledge and perception regarding HIV is important in order to plan preventive strategies. Living in urban or rural areas did not seem to influence the knowledge of HIV, based on our study and several others [14,10]. In our study a significant negative correlation was found between homophobia and general attitude towards HIV. The authors in Croatia showed that better knowledge and lower homophobia rates lead to a better perception [10]. Our results showed that 20% of students don't want to work with PLWH, which is similar to the results in Israel and in Croatia [12,10]. These results are devastating because they show a presence of prejudice among medical students. A great majority of our students think that PLWH should go to a dentist with a special equipment while the Xinjiang study shows that half (51.5%) of the participants think that students with HIV should use a special school toilet [4]. Study in Sanaa showed that infected kids should be isolated even from attending school [15]. Multivariate logistic regression analysis showed that overall attitude towards HIV patients was an independent predictor of whether a student was willing to work with an AIDS patient or not. We made a conclusion that continuous education is necessary to change negative attitudes towards PLWH. However, Mitchell said that knowledge alone is not enough to change the perceptions towards PLWH, but societal and cultural factors such as religion, health outlook and risky behavior, especially sexual, can affect the perception [25]. Despite high expertise and positive attitude, over a third of our students agreed with the exceptionally stigmatizing proclamation "All patients that are admitted to the hospital should be tested for HIV", while 80% of Croatian students believed they have a right to know the HIV status of their patient [10]. In one study, about 90% of medical students said that all patients who were admitted to hospitals should be tested for HIV [26]. Our students aren't aware of the many international recommendations that emphasize the importance of informed consent for HIV testing and that testing without a consent is deemed unethical [27]. In an Israeli study, about 80% of students stated they would inform the sexual partner of the HIV positive person against the patient's wishes [12]. Our results are similar, to those of another research [26]. Opposite beliefs were found in Malaysia, where 82% of students preferred to maintain the confidentiality [13]. Our results showed a significant correlation between male gender and stigma, which is similar to a research that showed women had a less discriminatory attitude towards PLWH in comparison to men [20]. The level of fear and emotions related to HIV surprisingly weren't correlated with the level of knowledge. Just above a third of our students had non-discriminatory attitude towards HIV patients, while in a study in Croatia, only

28.3% students had non-discriminatory behavior [10]. Over a third of our students accepted men who have sexual relationships with men without prejudice, which is similar to a research conducted by Tešić *et al.* [10]. Similar discriminatory views were found in other studies [20,26]. Our research confirms that a positive attitude towards HIV is the only independent predictor to a non-discriminatory behavior. In Maimati's study, 15.8% of participants had at least one example of risky behavior including unprotected sexual exposure [4]. Our results confirmed that the male gender was significantly associated with risky behavior. Multivariate logistic regression showed that male and an older age are good predictors of risky behavior.

Our study has its limitations. It was designed as a cross section survey and as such, it does not provide any causality conclusions. It is limited by the honesty of participants while answering the questions, from the questionnaire, which was anonymous. With these limitations, we believe that our study proves that medical students have a high level of knowledge about HIV, but unfortunately, there are still intolerant attitudes and prejudices.

Conclusion

To conclude, it is very important that students understand the prevention and ways of HIV transmission. It is also very important to develop a positive attitude towards HIV patients. The results of this study showed that students with a good knowledge have a positive attitude and perception of HIV. Moreover, study also reported an existence of stigmatizing concepts and fears among medical students towards PLWH. Furthermore, most medical students expressed opinions that were contrary to current guidelines and confidentiality. The results of this study indicate the importance of creating a health education programs to help students understand HIV more effectively, focusing not only on increasing knowledge, but also on minimizing stigma, anxiety, and misconceptions regarding HIV and PLWH. Knowledge can increase awareness of HIV infection, which reduces stigma towards PLWH.

Authors' contributions

RJ, conceptualized the study; participated in its design, coordination, and questionnaire administration. RJ, HPJ, DP, DZ, JP, AC had role in drafting the work and revising it critically for important intellectual content. RJ and DZ performed statistical analysis. RJ, HPJ, DP, DZ, JP, AC drafted the manuscript and approved the final version.

Ethical considerations

The study received ethical clearance from the Ethics Review Committee for Scientific Research Work of the University of Tuzla, Protocol No.03/7-7066-2/19. Participants in this research provided informed consent before completing the questionnaires. Data were treated with a high level of confidentiality.

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