

Knowledge, attitudes and practices related to HIV among health workers in the Federation of Bosnia and Herzegovina

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Abstract

Aim: Federation of Bosnia and Herzegovina has a low prevalence of HIV, less than 1% of the total population. Until November 2011, Federation of Bosnia and Herzegovina had registered 117 persons living with HIV, of which 71 developed AIDS. The aims of this study were to assess training of health workers in HIV/AIDS, prevention measures in the workplace, knowledge, attitudes and practices about HIV with an emphasis on HIV stigma and discrimination.

Methods: This study involved 1118 health professionals in public and private health sector in the Federation of Bosnia and Herzegovina. An anonymous survey with a structured questionnaire was conducted for the purposes of research applied to the stratified cluster sampling in 4 levels.

Results: Results of the survey show that 47.8% (533/1115) of health care professionals appeared to be providing health care to persons living with HIV. Health care workers are certain that HIV is transmitted through blood, sperm and other body fluids containing blood, but not so through other body fluids (saliva, sweat and tears). Only 40.4% of health workers knew that all pregnant women who are HIV-infected will not give birth to babies with AIDS. In the past 12 months of working with patients, 29.3% of health workers had needle-stick injury.

Conclusion: This survey has shown that the health workers' knowledge on the ways of HIV transmission and general issues pertaining to HIV, as well as knowledge and application of safety measures is not satisfactory. These results are reflected in attitudes toward persons living with HIV.

Keywords: AIDS, Federation of Bosnia and Herzegovina, health workers, HIV.

Introduction

The Federation of Bosnia and Herzegovina is one of the two entities of the country Bosnia and Herzegovina. The other entity is Republic of Srpska, and there is also Brčko District, self-governing administrative unit. Approximately, 2,338,625 people were living in the 10 Cantons of Federation of Bosnia and Herzegovina at the time of the survey. Federation of Bosnia and Herzegovina has a low prevalence of HIV, less than 1% of the total population. Until November 2011, there were 117 people living with HIV registered in Federation of Bosnia and Herzegovina, of which 71 people developed AIDS (in Bosnia and Herzegovina 196 persons with HIV, 116 with AIDS). Among persons infected, dominate males (81%). Heterosexual intercourse is the most common mode of transmission (56%), followed by homosexual/ bisexual intercourse (25%), and injection drug use (13%).

In the past 30 years, scientists have achieved amazing success, first in the rapid identification of HIV and development of diagnostic tests, then in matters of transmission, prevention and treatment. However, in 1987 Jonathan Mann, director of the AIDS program of the World Health Organization, identified stigma and discrimination as the third phase of HIV/ AIDS epidemic (after AIDS and HIV epidemic). Despite many international efforts, stigma and discrimination remain the most poorly understood aspect of the epidemic (1).

With the advent of HIV epidemic in the world there appears a growing concern among health workers over a possibility of infection in their daily work. Healthcare personnel are at risk of occupational exposure to blood-borne pathogens, including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Exposures occur through needle-sticks or cuts from other sharp instruments contaminated with an infected patient's blood. Following a specific exposure, the risk of infection may vary due to factors such as these: pathogen involved type of exposure, amount of blood involved in the exposure, amount of virus in the patient's blood at the time of exposure, etc. (2). There are numerous causes of stigma and discrimination in health facilities including lack of knowledge among health care workers about the modes and the risks of HIV transmission, and

judgmental attitudes and assumptions about the sex lives of people living with HIV (3,4). Health workers are members of the community in which they work their views reflect the prevailing stigma that exists in the community, especially toward the marginalized groups, such as sex workers (5).

Methods

Study population and sampling

In Federation of Bosnia and Herzegovina survey we obtained a representative sample of health workers. The pattern is formed on the basis of data on the number of employees in public and private health institutions in the Federation of Bosnia and Herzegovina. For the total number of employees in public health institutions in the Federation of Bosnia and Herzegovina, we used data from the Health-statistics annual of the Federation of Bosnia and Herzegovina for 2009, which is prepared and published by the Institute for Public Health of Federation of Bosnia and Herzegovina, while the data on employees in the private health care institutions were obtained from professional chambers/ associations of the Federation of Bosnia and Herzegovina. For the purposes of research we applied stratified cluster sampling, in 4 levels:

Level I - determination of 4 strata of health facilities (health centers, general hospitals, the Institute for Transfusion and Clinical Center), Level II - 5 strata of health professionals (medical doctors, dental doctors, medical technicians, laboratory technicians and dental technicians), Level III- the choice of subjects or clusters depending on the number of health facilities, and Level IV – random health workers encountered during the investigation, until the required number. Strata were determined by the regional distribution of health facilities, which provided geographical coverage of the entire territory of the Federation of Bosnia and Herzegovina.

Survey questionnaire

54-item questionnaire specifically made for the purpose of this study, based on similar studies in the region and the world, was used as a research instrument. The questionnaire was adapted to the situation and needs of the Federation of Bosnia and Herzegovina. The questionnaire contains questions

covering the following areas: training of health workers; prevention measures in the workplace, knowledge, attitudes and practices about HIV with an emphasis on HIV stigma and discrimination, as well as the general socio-demographic characteristics of respondents. In the questionnaire, particular attention was given to issues related to attitudes and beliefs of health professionals about persons living with HIV as well as the basis of any stigmatizing behaviour of health workers towards such persons. Attitudes and beliefs were assessed by provided responses of “agree”, “not sure” and “disagree”. To test the applicability of the questionnaire and to avoid ambiguities, as well as to assess the time needed to complete the questionnaire, the questionnaire was tested in a medical institution.

Fieldwork

The study lasted three months, with fieldwork covering a period of one month. The Institute of Public Health of the Federation of Bosnia and Herzegovina conducted the study. Coordinators for fieldwork and survey's administrators were appointed persons from the Cantonal PHIs in Federation of Bosnia and Herzegovina. The fieldwork was carried out in the second half of June and first week of July. The survey field administrators were employees of institutions responsible for conducting research who had previous experience in this type of work. Fieldwork was realized with assistance from employees of Cantonal PHI, who were in charge of taking the questionnaires from the survey's administrators organize the survey (distribution of questionnaires to health workers in health institutions and collecting completed-questionnaires). Participation of health workers in the survey was voluntary. The questionnaire was self-administered and returned sealed in an unmarked envelope. Before the research began, assistants and administrators of research attended one-day training

program for research. During the fieldwork the research team carried out supervision of implemented activities.

Statistical analysis

For a description of the sample, demographic and working characteristics of respondents, the level of health care and category of health workers, personal contact with PLWHA and education in the field of HIV/ AIDS we calculated: the frequency and percentages, mean and standard deviation and 95% confidence intervals.

The significance of differences between subsamples, or different categories of respondents, is calculated using student's t-test and analysis of variance (ANOVA) with post-hoc Tukey's test, when it comes to variables measured at the interval level, or by using Pearson's chi-square test when it comes to nominal variables. Statistical significance was defined as $P < 0.05$. Analyses were done using the specific procedures for complex patterns in the statistical package SPSS 17 (SPSS, Inc., 2007, Chicago, IL, USA).

Results

Characteristics of respondents

A total of 1118 health professionals participated in the survey. Majority of health care workers (997 or 89.3%) works in public health facilities, and the response rate was 90.4%. Most of the respondents were female (76.4%). Half of the samples were medical nurses, 21, 1% was medical doctors-specialists. At the primary level of health care, works 41.8% of health workers, at secondary level 30%, and the lowest percentage of health workers in the sample belongs to tertiary level of care (Table 1). Most respondents reported having some education on HIV/ AIDS. 66% of health professionals considered that the knowledge gained during the training was useful 3.2% said that it was partially useful and 24.9% responded that it wasn't useful.

Table 1. Characteristics of respondents

	Category	Percent (Number)
Gender (n=1112)	Male	23,6 (262)
	Female	76,4 (850)
Mean age (n=1097)		42,3±10,2
Profession (n=1118)	Medical doctor-specialist	21,1 (236)
	Medical doctor-general practice	4,7 (53)
	Doctor of stomatology	5,5 (62)
	Medical nurse (with 4 additional years)	7,2 (81)
	Medical nurse (with 3 or without add. years)	48,2 (539)
	Dental nurse	5,5 (61)
	Lab. nurse	7,7 (86)
Years of working experience Mean (range) (n=1087)	≤ 10	35 (380)
	11 – 20	30,3 (329)
	21 - 30	24,4 (265)
	≥ 31	10,4 (113)
Level of Health Care (n=1118)	Primary	41,8 (467)
	Secondary	30 (335)
	Tertiary	28,3 (316)
Type of ownership of health facilities (n=1112)	Public	89,3 (993)
	Private	10,7 (119)
Training on HIV/AIDS (n=1075)	Yes	71,2 (765)
	No	28,8 (310)

Knowledge of health workers on modes of HIV transmission and general knowledge of health workers about HIV/AIDS

The highest percentage of correct answers was given to the question: HIV is transmitted through blood - 99.1%, with seminal fluid - 90.6%, and 89.2% through other body fluids containing blood (Table 2).

Average of correct answers on the modes of transmission of HIV in healthcare workers indicates the following: medical doctors – specialists (mean 5.67) know significantly more than nurses/ technicians and dental nurses/ technicians and laboratory technicians. Doctors of medicine-general practitioners (mean 6.23) know significantly more than nurses/ technicians, dental nurses/ technicians and laboratory technicians. Graduate nurses/ technicians (mean 5.74) know considerably more than dental nurses/technicians ($F=6.577$, $P<0.001$). The most accurate answer about HIV transmission was provided by health workers employed in the

secondary health care level. The difference in knowledge was statistically significant in relation to health workers of primary health care level ($F=5.608$, $P=0.004$).

That people cannot get HIV by the mosquito bite, knew 49.4% of health workers. That all pregnant women who are HIV-infected will not give birth to babies with AIDS, knew only 40.4% of health workers. Health care professional's best responded to questions: even a single unprotected sexual intercourse can lead to HIV infection (94.6%) and that the person who looks healthy can transmit HIV (93.3%).

Medical doctors-specialists have significantly higher average of correct answers (6.42) on the general knowledge about HIV/ AIDS than nurses/ technicians, dental nurses/ technicians and laboratory technicians. Doctors of medicine-general practitioners (mean 6.80) know significantly more than nurses/ technicians, dental nurses/ technicians and

laboratory technicians. Dentist (mean 6.15) knows considerably more than a laboratory technician. Graduate nurses/ technicians have a significantly higher average of correct answers (mean 6.63) than nurses/ technicians, dental nurses/ technicians and laboratory technicians (F=16.532, P<0.001). Health professionals on secondary levels of health care have

significantly higher average of correct answers on general knowledge about HIV/ AIDS than health workers of primary health care level (F=4.503, P=0.011).

When it comes to knowledge of health workers about basic measures to prevent HIV infection in the workplace, 89.2% of respondents knew that caution

Table 2. Knowledge of health workers on ways of HIV transmission and general knowledge of health workers about HIV/AIDS

Type of knowledge	Question	Percentage of correct answers
Knowledge of transfer	Semen	90,6 (905/999)
	Blood	99,1 (1086/1096)
	Vaginal fluid	88,6 (875/988)
	Breast milk	61,3 (564/920)
	Other body fluids containing blood	89,2 (884/991)
	Saliva	45 (425/944)
	Sweat	66,1 (595/900)
	Tears	64,3 (581/904)
	General knowledge	Can people get HIV from mosquito bites?
Standard sterilization procedures are sufficient to sterilize instruments used in HIV-positive patient.		59,5 (646/1085)
Is it possible that a healthy-looking person can transmit HIV?		93,3 (1024/2097)
All pregnant women who are HIV-infected will give birth to babies with AIDS		40,4 (440/1090)
Sure diagnosis of HIV infection is achieved by detecting specific antibodies		
ELISA test		42 (407/968)
Vestern blot test		45,3 (389/859)
HIV infection can be detected with certainty 6-8 weeks after infection		52,8 (567/1074)
A person can be infected with HIV for more than 10 years without symptoms of AIDS		82,4 (903/1096)
Even a single unprotected sexual intercourse can lead to HIV infection		94,6 (1047/1107)
General measures to prevent HIV infection in the workplace	Person can get HIV from sharing utensils or food with a person who has HIV or AIDS?	59 (647/1096)
	Wearing gloves	86,1 (920/1069)
	Wearing protective glasses and masks	56,1 (561/1000)
	Being careful in all dealings with patients and their material	89,2 (951/1066)
	Mandatory testing of all patients prior to surgical intervention	16,4 (158/964)
Good knowledge and application of standard precautions to protect against infection	85,1 (885/1044)	

in all dealings with patients and his material is a good measure of protection. Only 16.4% of health workers knew that the testing of all patients before surgical intervention is not a measure of protection against HIV infection in the workplace (Table 2).

Accidents in the workplace, the application of the basic measures for infection prevention and disposal of medical waste

In the past 12 months, 29.3% of health workers had needle-stick accident while working with patients, 33.3% were in contact with patient's blood through damaged skin, and 26.3% of health care workers were exposed to blood spatters from patients onto eye or other mucous areas.

Health workers of secondary and tertiary levels of care generally referred to needle-stick injuries in the

last 12 months (73.4%). While 72.9% of health workers always dispose of medical waste in special containers of solid walls (Table 3).

Sixty-five percent of health workers responded that they always wear gloves, and 36.4% of health workers responded that they always use a mask. 66.6% of health workers never use protective glasses (Table 3). Among health workers who use protective gloves in the lowest percentage ever are the laboratory technicians (52.3%). Dentists most frequently use masks (63.9%), and laboratory technicians use a mask the least (11.3%, $P < 0.001$). Masks are more often always used by health care workers in the secondary (43.8%) and tertiary care (47.2%) compared to the primary care (28%, $P < 0.001$). The difference was not statistically significant in the use of gloves among different levels of health care.

Table 3. Accidents in the workplace, the application of the basic measures for infection prevention and disposal of medical waste

		Yes % (n)	No % (n)	
Type of accident in the last 12 months	To be pricked on a needle	29,3(326)	61,6 (684)	
	To be hurt by sharp object	24,5(272)	62,8 (689)	
	To be in contact with the patient's blood through damaged skin	33,3(370)	57,9 (643)	
	To get patient's blood in the eye or other mucous membrane	26,3(292)	63,9 (710)	
		always	sometimes	never
Disposal of medical waste	With other garbage in the basket and/or plastic bags	54,8 (609)	7,2 (80)	11,4 (127)
	In the basket and/or plastic bags separately from other garbage	27,7 (308)	13,1 (145)	38,1 (423)
	In separate bowl with solid walls (impervious containers)	8,2 (91)	10,1 (112)	72,9 (810)
In interventions in which it is possible to get in contact with patients blood or his bodily fluids, do you wear?	Gloves	2,6 (29)	31,1 (348)	64,8 (724)
	Double gloves	45,2 (505)	34,3 (383)	4,5 (50)
	Mask	10,4 (116)	48,4 (541)	36,4 (407)
	Protective glasses	66,6 (745)	16,3 (182)	5,4 (60)

47.7% of health workers responded affirmatively to the question: "Have you ever been tested for HIV?". More than half of health workers, precisely 60.2%, agree that the most frequent mode of contracting HIV among health care workers is through work place exposure.

Attitudes

Table 4 shows the distribution of responses given by health professionals on any single issue, i.e. whether they agree with the stated claims. The results pertain to the overall sample and are presented in percentages.

Table 4. Health provider attitudes

	Agree % (n)	Not sure % (n)	Disagree % (n)
I am comfortable providing health services to clients who are HIV-positive.	67,6(746)	27,9(308)	4,4 (49)
I avoid touching the clothing and belongings of clients known or suspected to have HIV for fear of becoming HIV-infected.	18,5(204)	22,5(248)	59 (651)
Persons at risk (sex workers, injections drug users, men who have sex with men) deserve to receive the same level and quality of health care as other clients.	84,3(932)	8,1 (90)	7,5 (83)
Health workers who are HIV positive should not be allowed to work with patients.	35,4(392)	29,6(327)	35 (387)
On patient medical charts and histories HIV positive status should be clearly indicated.	72,5(803)	10,9(121)	16,5(183)
Patients should be tested for HIV without their consent prior to surgery or other interventions.	66,9(740)	16,8(186)	16,3(180)
HIV-positive women should not get pregnant.	55,4(604)	29 (316)	15,6(170)
Patients with HIV/AIDS should be made to pay for gloves, AIDS kits, and other infection control supplies	7,1 (78)	15,7(173)	77,3(853)
Most people who are infected with HIV or have AIDS are blame for it.	22,5(249)	26,2(290)	51,3(567)
Promiscuous men are the ones that spread HIV in our community.	48,6(529)	34,5(375)	16,9(184)
Intravenous drug users spread HIV infection.	83,5(918)	10,6(117)	5,8 (64)
If you knew that your work colleague is HIV positive would you work with him.	57,6(634)	36,1(398)	6,3 (69)
I would feel ashamed if someone in my family had HIV/AIDS.	16,4(181)	31,4(347)	52,3(578)
I would share eating utensils and food with HIV positive person	16,7(183)	38,5(423)	44,9(493)
Patients who are test positive have the right to decide whether or not their relatives should be informed	56 (615)	17,2(189)	26,8(294)

Almost two thirds of respondents are comfortable providing health services to clients who are HIV-positive, and 16.4% would feel ashamed if a family member was diagnosed with HIV. On the other hand, 83.5% of health professionals agree with the statement that injection drug users spread HIV, 72.5% of health workers believe that HIV-positive status should be clearly indicated on patients records and in personal histories of people living with HIV, and 66.9% of health workers believe that patients should be tested for HIV without their consent prior to surgery or other interventions.

The differences in attitudes between different types of health care workers were tested by Pearson χ^2 test. A statistically significant difference in the distribution of responses was observed in nine attitudes.

Medical doctors - specialists and general practitioners, and graduate nurses/ technicians in the greater number would, without any discomfort, provide health services for people living with HIV. Dental nurses/ technicians in significantly higher degree than other health workers agree with the statement that they avoid touching clothes and belongings of persons living with HIV. Medical doctors-specialists and general practitioners in a smaller percentage agree with the statement that health care professionals living with HIV should not be allowed to work with patients. Dental nurses/ technicians, laboratory technicians, physicians-general practitioners and dentists mostly agree that medical charts and history of patients with HIV should be marked. Nurses/ technicians and laboratory technicians in a greater percentage agree with HIV testing without patient's consent before surgery or other interventions, and with the statement that HIV positive women should not get pregnant. A smaller percentage of dental nurses/ technicians compared to health workers of other occupations, considers that promiscuous people spread HIV. Medical doctors-specialists and general practitioners in a larger percentage agree with the statement that intravenous drug users spread HIV (Table 4).

When it comes to agreement with the claims of health workers by the level of health care, statistically significant differences were observed on two issues: HIV-positive women should not get pregnant (I - 49,8%, II - 65%, III - 53,7%) and sharing eating utensils and food with a person living with HIV (I - 13,9%, II - 18,3%, III - 19%).

Discussion

Results of survey show that 47.8% (533/ 1115) of health care professionals appeared to be providing health care to persons living with HIV. Eight percent of health care providers said that they knew a health worker who has HIV/ AIDS or died of the disease. Such knowledge did not affect willingness to provide health care, compared the other group of health workers.

Answers of health providers in the Federation of Bosnia and Herzegovina on questions about transmission of HIV indicate a higher level of knowledge of physicians-specialists and general practitioners in relation to the level of knowledge of nurses, dental nurses and laboratory technicians. Health care workers with length of service up to 10 years had the highest average of correct answers, but difference was not statistically significant. Health care workers are confident that HIV is transmitted through blood, sperm and other body fluids containing blood, but not so through other body fluids (saliva, sweat and tears). General knowledge about HIV shows a similar distribution of the average correct answers among the various professions of health workers as well as in the case of answers to questions about HIV transmission.

That people can become infected with HIV through mosquito bites considered 49.4% of respondents. A lack of knowledge is demonstrated also on the question of vertical transmission of HIV, from mother to child.

Health workers at the secondary level of care know considerably more than health workers in primary health care, with no significant effect of the length of service of health workers.

These results lead to the conclusion about necessity of training for all medical staff, especially nurses/ technicians, and providers on the primary health care level.

More than two-thirds of respondents (71.2%) had some previous training in the field of HIV/ AIDS. The relationship between the level of knowledge about HIV transmission and previous training of health workers did not show a statistically significant difference. On the other hand, previous education has influenced the level of general knowledge about HIV in health care workers.

29.3% of health workers in Federation of Bosnia and Herzegovina had needle-stick injuries in the last 12 months, while 33.3% of health workers were in

contact with patient's blood through skin. According to a report by the World Health Organization, percentage of health workers who have had one or more needle-stick injuries/ per year for different countries are as follows: Kenya 75%, Uganda 44%, Burkina Faso (at 2000.- 55%, and at 2003.- 17%), Cambodia 47%, and drastic data of 91% of junior doctors in South Africa who have experienced accidental needle-stick (6,7).

Accidental injury of health workers increases the risk of infections that are transmitted through blood. With regard to HIV, research shows that the average risk of infection by exposure to infected blood, needle-stick or cut is 0.3% (1:300). The risk after exposing eyes, nose and mouth to HIV infected blood, is an average of 0.1% (1: 100), while the risk after exposing undamaged skin to HIV-infected blood is estimated to be less than 0.1%. There were no reported cases of HIV transmission due to exposure of uninjured skin to small amounts of blood (a few drops of blood on the skin for a short period time) (2).

The risk of transmission of infection from an infected patient to health worker through a needlestick injury when it comes to other blood-transmitted diseases is higher: 3-10% for hepatitis B and 3% for hepatitis C.

Percentage of health workers who were tested for HIV was 47.7%, and more than half of health workers (60.2%) believed that the greatest risk of HIV infection was exactly in the workplace. Consequently, protection measures for health care workers in the workplace are important. The vast majority of respondents knew that being cautious in all dealings with patients and their material is a good measure of protection. Only 16.4% of health workers know that the testing of all patients before surgical intervention is not a measure of protection against HIV infection in the workplace.

Dentists in the greatest percentage applied protection measures where contact with blood of a patient was possible. Laboratory technicians, when compared to other health care workers, use gloves, masks and protective glasses in the smallest percentage. If patient is HIV positive, 64.3% of health workers would apply greater precautions.

Just after the outbreak of HIV/ AIDS, in the 1980s a guide was developed to protect healthcare

workers from HIV infections and other blood-borne infections, known as "universal precautions". In the following years it was somewhat modified, but the essence remained the same, and a set of measures for prevention of infections that can be applied to all patients, regardless of the assumptions and speculation about some health workers health status (8).

Disposal of medical waste is a very important segment of the work process and precautions, and 11.4% of health workers always dispose of medical waste with other garbage.

Lack of knowledge about ways of HIV transmission is usually associated with stigmatizing attitudes, and cause fear of infection and rejection of contact with people living with HIV. That was the basic domain where the initial studies attempted providing stigma.

According to this survey 67.6% of health workers in Federation of Bosnia and Herzegovina are comfortable to providing health services to persons living with HIV.

There is another form of stigma and discrimination, morals or value-driven stigma (8). Numerous studies confirm that at least three key dimensions are important for measuring in this domain: shame, blame and judgment (4). Health workers are members of the community in which they work their views reflect the prevailing stigma that exists in the community, especially toward the marginalized groups, such as sex workers. Attitudes of health workers that are related to shame and guilt, as the main causes of stigma and discrimination, were obtained through different answers.

Small percent (4.4%) of health workers in Federation of Bosnia and Herzegovina would feel uncomfortable providing health services to clients who are HIV-positive. Survey in Tanzania reported 3% of health providers. Health workers in the most agree that injection drug users spread HIV infection (83.5%). That promiscuous people spread HIV agrees 48.6% of health workers.

When it comes to the rights of people living with HIV, more than half of health workers in the Federation of Bosnia and Herzegovina believe that women who are HIV positive do not need to remain pregnant. Literature, however, shows that the overall risk can be reduced to less than 2% by a

package of evidence-based intervention (9).

Although the patient's right to confidentiality is guaranteed by the rights, duties and responsibilities of patients, some health professionals have different opinions when it comes to patients living with HIV (26.8%). UNAIDS and WHO encourage voluntary disclosure. The disclosure that is voluntary, respects the autonomy and dignity of infected persons, support for confidentiality, by a person and her family, his/her sexual and injecting partners, leads to a larger opening in the community on issues of HIV/AIDS has created an ethical imperative to help the uninfected and infected persons (10).

Two thirds of health workers in Federation of Bosnia and Herzegovina agree with claims that patients must be tested for HIV before surgery and that the medical charts and personal histories of HIV-positive status should be clearly defined. Survey in India 86%, Serbia 64.3% (11,12). With this regard, the low percentage of correct answers to the question of mandatory testing as a measure of protection, or the knowledge of HIV status of the patient.

The terms discrimination and stigma are used to encompass a broader set of activities that are associated with discrimination. Discrimination often implies unlawful acts of exclusion or abuse that occur in formal institutional settings. The broader term that is used here includes important stigmatizing actions that are not normally associated with the term discrimination including gossip, as well as social and physical isolation of people with HIV status (4).

This study among health care workers provided an opportunity to assess the presence of different forms of stigma and discrimination among health workers in Federation of Bosnia and Herzegovina. In low prevalence settings, such as Federation of Bosnia and Herzegovina, where it is likely that most of respondents do not personally know persons living with HIV, question on observed stigma was presented more broadly, asking if respondent ever heard of anyone who has experienced a specific form of stigma. 80.1% of health workers in Federation of Bosnia and Herzegovina have seen or heard at least one form of discrimination against HIV/AIDS positive patients in their health care institution. The most common are the additional

measures of sterilization and using latex gloves for performing non-invasive exams on clients suspected of having HIV.

Stigma is phenomenon associated with many chronic health conditions: HIV/AIDS, leprosy, tuberculosis, mental illness, epilepsy and disability. Van Brakel selected 63 papers that addressed the issue of measurement of stigma or related constructs, for HIV/AIDS 14 instruments (10 were developed for use in United States) (13).

As Goffman wrote, stigma "constitutes a special discrepancy between virtual and actual social identity" (14).

There are some limitations to the present study: some questions are hypothetical, they may suffer from social desirability bias, as experience from other countries confirms the complexity and multi-dimensionality of the problem of stigma and its measuring.

In conclusion, this survey has shown that knowledge of health workers on the mode of HIV transmission and on general issues, as well as knowledge and application of safety measures is not satisfactory. Such results are reflected in the attitudes toward persons who are living with HIV.

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