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Assessment of Reporting, Attitudes and Knowledge About the Stab Incidents and Professional Risk of Viral Infection among Health Care Professionals in Primary Health Care

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ABSTRACT

Goal: The goal of the research is to determine the relationship between frequency and reporting of stab incidents, attitudes and knowledge about stab incidents and occupational risk for transmission of viral infection with HBV, HCV or HIV among health care professionals employed in primary health care. **Material and methods:** Conducted is prospective, cross-section study by questionnaires in 2012. The survey included health professionals in Primary Health Care Center in Tuzla. The final sample has 131 respondents (85% women). Statistical analysis was performed using the statistical package SPSS version 20.0. **Results:** The prevalence rate of stab incidents throughout their career in our study was 66%; while the rate of reported incidents was 4.83 - 5 times lower than the actual prevalence. In 49 out of 87 cases this was a case of hollow needle prick. The most common causes of stab incidents are the time pressure, unforeseen reactions of patients and lack of concentration. **Conclusion:** Stab incidents are often not reported in in developing countries. Training in order to raise awareness and knowledge about the problem, proper procedures, good organization of work and anti-stress program, safer disposal, conducting prophylaxis before and after exposure monitored by the relevant institutions of occupational medicine should contribute to solving this problem.

Key words: incident, blood transmitted infections, occupational risk

1. INTRODUCTION

Exposure to blood and body fluids as a professional risk factor among health workers is known since 1978. That is when it was first published a case of a health professional who got an infectious disease in a causal relationship with exposure to an infectious agent in a contaminated patient's blood (1). The World Health Organization reported that 90% of all infections of health care professionals can be attributed to occupational exposure (2, 3). An incident is an unplanned, undesired event that does not cause significant injury (temporary inability to work for a maximum of 3 days), but negatively affects the performance of the assigned task. The significance of the incident is that it presents a potential future risk for infectious/occupational disease, injury and decrease work capacity. Outcome of potential disease can be even fatal (4).

Stab incidents and contact with blood, occurring every day in our health care institutions. However, awareness about the

problem is low and they are generally not reported. Lack off reporting of exposure increases the likelihood of the resulting in infection (2, 6). Developing countries like ours do not have adequate reporting system, which is why most incidents are not reported and inadequately treated (6). According to recent studies published in the World, 5-65% of all incidents of needle stab remain unreported (3, 4, 5). In Croatia, it was discovered in the 2003 that 95% of the incidents of this kind are not reported and not evaluated (9). In Bosnia and Herzegovina, the situation is slightly better, and it is estimated for the 2011 that the incident was not reported 71% of cases (6).

Reporting of the incident is the basis for prevention of viral hepatitis B and C and HIV, as well as other infectious diseases. Primary prevention involves certain techniques of preventing incidents: use in the practice of safe needles and syringes, safe equipment, staff training, which is based on the principles of safe clinical procedures and developing awareness about expo-

sure risk to contaminated blood and body fluids. Secondary prevention involves reporting system, treatment, counseling and supervision. All this implies guide directed activities that should be carried out immediately after the exposure and assessment based on the characteristics of the source-patient and/or health care professional who has had incident and the nature of the incident. Tertiary prevention involves counseling of exposed individuals about safe treatment and rehabilitation, with the suppression of relapse and recurrence of disease and rehabilitation (10, 11). One of the most important aspects of the reporting is that the sample of a patient's blood can be tested as part of the risk assessment. Even if the infection status of the patient is known, retesting at the time of the incident shows the infectivity of the patient (10).

Consistency between health information and knowledge and/or knowledge and practice is a cornerstone for the success of any health promotion or disease prevention.

2. GOAL

The goal of the research is to determine the difference in incidence rates of stab incidents and occupational exposure to blood and body fluids in health care workers in primary health care, test the causes of incidents, the characteristics of an incidental occurrence and staff attitudes and actions in terms of incidents.

3. MATERIAL AND METHODS

A cross-sectional, prospective study questionnaire was conducted in 2012 in the Primary Health Care Center, „Mustafa Sehic“ in Tuzla, on the principle of anonymity and on a voluntary bases. The purpose of the research was to evaluate the incidence rate of reporting stab incidents at the workplace, identifying the causes of incidents, the number of unreported staff incidents at the workplace with the risk of occupational exposure to blood borne infections and assessing the level of knowledge about the risks of post-exposure to hepatitis B virus (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) infection and prevention. The goal was also to evaluate this issue at the primary health care level, where it is considered less important, in largest Primary Health Care Center, in the Canton with largest number of inhabitants in the Federation of Bosnia and Herzegovina.

Inclusion factor for the study was based on the risk of jobs for blood transmitted infections (target population), and estimates based on previous findings (11-16). Research covers health professionals (doctors and nurses) working in a family medicine, dentistry, laboratory, medical imaging and emergency medical care. Sample also included cleaning ladies who handle medical waste. We distributed questionnaires to 203 respondents. For the study the consented give 131 from a total of 203 (response rate „satisfactory“ 65%) respondents. The study was approved by the Ethics Committee of the Primary Health Care Center Tuzla.

3.1. Questionnaire about exposure of hospital staff to blood and blood-borne infections

For the study was selected a questionnaire that was designed and has been used in similar studies in Croatia (9,13). Questions from the survey include general, demographic data and information about exposure to blood and body fluids of patients. The first part includes *general demographic information*: age, gender,

work experience and qualifications; Part II *data on exposure to blood*: the number and type of exposure incidents in the past year (stab incident or mucocutaneous contact), the number of incidents in the career, the number of reported incidents, questions about immunization and prophylaxis before exposure; part III consists of data on the *last exposure incident*: type of incident (stab incident or mucocutaneous contact), whether the incident was reported, whether the patient was known or unknown to the respondent (the infectious status of the patient is totally unknown, does not know with whose blood has come into contact, known infection with HBV, HCV or HIV), the probability of infection (in percent) after a needle stab contaminated with blood of infected patients with HBV, HCV or HIV. In the final 5th section of the questionnaire are provided questions about three diseases scenarios (including hepatitis B, hepatitis C and HIV) in order to assess the knowledge, attitudes and measures applicable in practice. Answers are designed as a choice of offered answers with only one that is correct. This section also asked about prophylaxis after exposure (13).

Statistical analysis was done by SPSS 20.0 (Chicago, IL, USA). Basic tests of descriptive statistics are made, showing the measures of central tendency and dispersion. Testing was done for each variable belonging to a normal distribution using the Kolmogorov-Smirnov test, and histogram presentation. Quantitative variables for comparing more than two arithmetic means were compared using ANOVA. Categorical variables were analyzed by χ^2 -test. Test for the existence of significant relationships between variables was done using both tests of correlation, the Pearson parametric and Spearman nonparametric, depending on the need. Conducted was also advanced regression analysis (ANOVA). All statistical tests were performed with the level of statistical probability of 95% ($p < 0.05$).

4. RESULTS

Reporting of stab incidents, attitudes and knowledge of stab incidents and occupational risk of transmission of viral infection with HBV, HCV or HIV among the health care staff employed in primary health care have been the subject of research conducted using a questionnaire. Total of 203 questionnaires were distributed (50% of the total number of employed health workers), and completed questionnaires were returned in 154 cases. The total sample consisted of 131 (response rate "satisfactory" 65%, 23 questionnaires were rejected due to lacking or incomplete data).

There was 112 (85%) female compared to 20 male respondents as in accordance with the trend of feminization of medicine in the world. We find that 71% of respondents were aged 36-55 years. Most of the respondents were nurses 70 and 43 doctors of the 131 respondents. There were 11 laboratory technicians, 6 cleaning ladies and 1 ambulance driver. Most respondents belong to family medicine 71 (53%), dental services 18% and 11% was from emergency medical service. In the laboratory diagnostic service was employed 16 and 6 respondents in home visits (Table 1).

Prevalence of stab incidents during total career in our sample was 66% ($n=87$), and the prevalence of stab incidents in 2011 was 30% ($n=40$). One stab incident had 22%, 23% from 2-6 times, 18% from 7-13 times, and 3% even more than 13 times. The incident is reported each time only in 18 (21%) out of 87 respondents who reported that they had stab experience. If we

Individual characteristics of respondents	No (n=131)	%	P*
Gender			0.001
male	20	15.0	
female	112	85.0	
Age groups (years)			
18-25	1	0.8	0.001
26-35	28	21.4	
36-45	53	40.4	
46-55	40	30.5	
56-65	9	6.9	
Profession			
physician	43	32.8	0.001
nurse	70	53.4	
laboratory technician	11	8.4	
cleaning lady	7	5.4	
Employment duration (years)			
< 1 year	2	1.5	0.001
from 1- 5	24	18.3	
from 6-10	20	15.3	
from 11-20	45	34.4	
from 21-30	26	19.8	
from 31-40	14	10.7	
Workplace			
Family medicine	71	54.2	0.001
Emergency department	14	10.7	
Palliative care	6	4.6	
Medical diagnostic laboratory	16	12.2	
Stomatology	24	18.3	

Table 1. Individual and demographic characteristics of the respondents (n=131)

compare the 87 respondents which had stab incident with 18 stab incidents of respondents who reported them (87/18) we can determine the rate of reporting of incidents is 4.83 ~ 5 times lower than the actual prevalence. We established a significant negative trend between the incidence rate ratio and rate of incident reporting ($z=-4874$, $p=0.001$, Wilcoxon rank nonparametric test, the result is not shown in tables).

Twenty-six of the respondents reported incident to the head nurse or head of the department and 6 to the safety officer. Neither one application was addressed to the Department of Occupational Pathology and Toxicology (Table 2).

Most common incident situation, that pose a risk of blood transmitted infections were hollow needle stabs at 49 out of 87, especially nurses (ratio nurse : doctor : other employees in contact with patients or their blood and body fluids was 7 : 37 : 5, $p=0.001$). Then type II of incidents according to the frequency of incidents are other contact of other's blood with skin of health workers (patients bites) in 23 cases with particular prevalence in doctors, but with a slightly lower prevalence among nurses (doctor: nurse: other equals. 12 : 8 : 3; $p=0.040$) (results not shown in tables).

The most common causes of stab incidents are the time pressure, unforeseen reactions of patients and decreased concentration with the negligence of health workers. Assessment of the circumstances and the time when the incident occurred revealed that most incidents occur during the injection, disposal and cleaning of the work area, during the intervention or surgical

Incident situation	No (n=131)	%	P*
Had the incident ≥ 13 times	6	3.1	0.040
Had the incident ≥ 7 times	36	18.3	
Had the incident multiple times	45	22.9	
Had the incident 1 (once)	44	22.1	
Did not have the incident	44	33.6	
The rate of incidents in 2011			
Had the incident ≥ 7 times	11	8.4	0.001
Had the incident multiple times	13	9.9	
Had the incident 1 (once)	16	12.2	
Did not have the incident	91	69.5	
The frequency of reporting incidents			
Not even once	51	58.6	0.001
Sometimes	18	20.7	
Every time	18	20.7	
Did not have the incident	44		
Person/place where the incident is reported	n= 87 ⁺		
Head nurse / Head of Department	26		0.001
Safety officer and authorized doctor	6		
Department of Occupational Pathology and Toxicology	0		
Not reported	55		

Table 2. Incidence rates of incidents that pose a risk of blood transmitted infections and reporting characteristics (n = 131)

treatment and during the care for the injured in a traffic accident. In prophylaxis after exposure is not offered testing for markers of viral infection to respondents and patients with unknown infectious status in 45 out of 87 cases. More specifically, we can say that it is not offered testing for 52 respondents experienced instrument stab incident because 7 participants was tested on their own request. Health care workers with experience of stab incidents most often, 26 of them did not report incident because they „did not had the time“, 26 did not report the incident because they did not seem that too risky and 20 of them are not aware of the risks. Even 11 respondents did not know that they should report the incident; one does not know to whom the incident should be reported and 3 health workers do not know that there is prophylaxis after exposure (Table 3).

We have found that there is a significant statistical correlation between the type of stab incident in 2011 and the number of incidents throughout the career ($p=0.001$) as well as the number of incidents throughout the career and the frequency of reporting of incidents ($p=0.001$) (Table 5, correlation matrix).

Predictors of needle stabs or the danger of transmission of viral infections and the development of occupational diseases in primary health care workers are: giving injections, disposal and cleaning work surfaces ($\beta=0.322$, 95% CI 5578-4583, $p=0.001$); unforeseen reactions of patients ($\beta=0.542$, 95% CI 0289-0574, $p=0.001$), and time pressure during the performance of tasks ($\beta=0.301$, 95% CI 0177-0425, $p=0.001$) (Table 5).

5. DISCUSSION

All health care workers who experience any form of occupational exposure to blood or other body fluids and tissues of patients, which may contain pathogens that are transmitted by blood (especially HBV, HCV and HIV), should be reported to

Incidents	No (n=87)	P*
Causes of stab incidents		
Carelessness of another person who has handled the object	6	0.001
Lack of concentration and inattention	16	
Improper disposal of medical waste	4	
Inadequate equipment for disposal of sharp objects	8	
Tiredness	5	
Rush, time limitations	23	
Unforeseen responses of patients	22	
Lack of experience	3	
The circumstances under which the incidents occur and time		
During care of injured in traffic accident	11	0.001
After disposing sharp objects	5	
During disposal of sharp objects	9	
While restoring the protective cap on the needle	8	
During the injection, disposal and cleaning	26	
During phlebotomy, restoring the protective caps and disposal	5	
Prior to medical treatment	9	
During the surgery and cleaning	14	
Type / mode of the incident origin		
Needle punctures	49	0.001
Surgical needle stab	4	
Scalpel cuts	1	
Glass cuts	3	
Cuts by medical instrument	4	
Contact of other people's blood with skin	25	
Contact of other people's blood with mucous membranes	1	
Offered testing for markers of HBV, HCV and HIV		
Not offered, personal request	7	0.001
Markers of HBV and HCV	11	
Markers of HBV, HCV and HIV	1	
HBV markers	13	
Not offered	45	
Infectious status of the patient		
Patient is known HIV infected	1	0.001
Patient is known, not infected	11	
Patient is known, unknown infectious status	17	
Patient is unknown	50	
No answer	9	
The reason why they did not report the incident		
Didn't had the time	26	0.001
Does not know to whom to report	1	
Did not know that there is a post-exposure protection	3	
Did not know that they should report the incident	11	
The incident did not seem risky	26	
Not aware of the risks	20	

Table 3. Distribution of respondents who had experience of stab incidents (n = 87) according to the causes, the circumstances under which it happened, manners of incidental exposure and attitudes and actions of the respondents after the incident

ected family medicine practitioner and responsible occupational medicine institution (11). A recent pilot study conducted

INCIDENTS	How many times have you had an incident in 2011.		
How many times have you had an incident in 2011.	1.000*	0	How many times have you had incident in the professional career
How many times have you had incident in the professional career	0.462	0.001	1.000*
Have you reported the incident	0.415	0.001	0.471
			1.000*
			0

Table 4. Correlation matrix between the number of incidents in 2001, the number of incidents throughout professional career and reporting on incidents of respondents experienced incident events (n = 87)

in Croatian hospitals (9) showed that only approximately 5% of health workers in Croatia reported stab incidents and exposure to blood or infections that are transmitted by blood, which means that approximately 95% of incidents of this kind remain unreported. A similar situation was detected in the pilot study in Tuzla Canton, Federation of Bosnia and Herzegovina in 2011. Namely 7% of hospital staff reported incident (6). In our sample the situation is slightly better 21%, but no one reported the incident to the occupational medicine institute which needs to prevent occupational hazard. It should be noted that only those who report incidents receive appropriate evaluation and treatment after the exposure, which means that the others had not even been offered to appropriate assessment and management of risks after exposure (11, 13).

So far, the investigations of stab incidents and transmission risk for HBV, HCV and HIV covered the health workers in the tertiary and inpatient care, particularly in surgical disciplines. The prevalence rate of exposure incidents to blood-borne infections in our health-care workers in primary health care throughout the career was high 66%. Similar results are reported by other authors in different subgroups of health workers including nurses (14-18). Prevalence of stab incidents in the Clinical Hospital Center in Croatia in 2003 was 77% (9), and at the University Clinical Center Tuzla in 2011 it was 73% (6). In Ethiopia, the prevalence of stab incidents in one year is 30%, as in our sample (19). Concerning is the fact that there is a significantly higher prevalence of stab incidents in primary health care—30% compared to 19% among hospital staff (6).

Will some hospital worker become infected after occupational exposure to contaminated blood, depends on several factors (20, 21). The risk is higher in the case of a greater prevalence of these infections in the general population, with some forms of exposure, failure to follow standard precautions, failure to report exposure incidents and the absence of post-exposure prophylaxis (PEP) (22). Under high risk are: units for hemodialysis, the departments of emergency medicine, departments of infectious diseases, surgical departments, intensive care units, clinical laboratories, psychiatric institutions and gynecological and obstetric departments. Most exposed staff members are nurses, physicians—surgeons and pathologists (20, 21). Con-

Predictors as independent variables	β and 95% confidence interval (95%CI)*		
	β	P	95%CI
Injections, disposal and cleaning	0.322	0.001	5.578- 4.583
Unforeseen reactions of patients	0.542	0.001	0.289- 0.574
Time pressure for the execution of the assignment	0.301	0.001	0.177- 0.425

ANOVA, linear regression analysis, Dependent variable: needle stab

Table 5. Correlation between needle stab (dependent variable) with giving injections, disposal and cleaning as the most common circumstance of incident events; unforeseen reactions of patients and time pressure for the execution of the assignment as the most common cause of the incident (independent variables) in patients which experienced the incident (n = 87)

cerning are the main causes of incidents in our sample with mean age 46.94 ± 9.18 years. They are in the stress at the health workers workplace: time pressure, unforeseen reactions of patients and lack of concentration and inattention, symptoms and signs associated with distress at work (24, 25). We conclude that the causes are entirely preventable. The exposure incidents of medical personnel shall be treated as an emergency situation in order to ensure adequate prompt post-exposure protection. Evaluation of the risk of infection with HBV, HCV and HIV and serological testing of the source patient and the exposed worker with possible post-exposure prophylaxis seems legitimate procedure after an exposure incident (19, 21). Specialist in family medicine, health care workers, inspections and specially the employer have a number of obligations in the process of care, reporting, and registering injuries at work, training for a safe and healthy work that should led to prevention of incidents and injuries. This primarily means keeping obligatory records and registers (register of occupational injuries) (23). We hope that the results of this research will stop personal initiative of health workers which experienced stab incidents to test for markers of viral infection, that the employer will take responsibility and provide pre and post-exposure prophylaxis and that the relevant institutions of occupational medicine will advise, educate, improve health and prevent hazards and risks that are associated with the risk of incidents.

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