

Epidemiology of occupational exposure to needlestick and body fluids among doctors and medical students in Rafsanjan University of Medical Sciences

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Abstract

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Background: Health care workers occupationally are exposed to blood and other body fluids which might increase their risk of acquiring blood-borne pathogens and psychological stress. The aim of the present study was to determine the lifetime occupational exposure to needlestick injuries and body fluids among doctors and medical students in Rafsanjan University of Medical Sciences (2009).

Materials and methods: In this descriptive study, 100 doctors and medical students were asked to complete a valid and reliable self-reporting questionnaire regarding their lifetime occupational exposure to needlestick and body fluids. Data were analysed using SPSS. T-test and Chi-square test were used to compare the groups.

Results: The results highlighted that 57 (60%) of the respondents had at least one lifetime occupational exposure to needlestick and 45 persons (48.4%) had exposure to body fluids. However, only in 30 (31.5%) cases the event was reported to the appropriate authorities. The highest number of needlestick injuries occurred within the emergency departments (n=29, 51%), during nightshift (n=29, 51%), and with suture needle (n=37, 65%).

Conclusion: Occupational exposures to needlestick and body fluids among doctors and medical students in our study have occurred with a relatively high lifetime incidence. Improving medical attentions might have positive effects on decreasing the incidence and prevalence of these constant occupational threats.

Key words: epidemiology, occupational exposure, needlestick, body fluids, doctors, medical students, Rafsanjan University of Medical Sciences.

Introduction

Doctors, nurses, and medical and nursing students are among the health care workers (HCW) who are occupationally exposed to blood and other body fluids (e.g. saliva, vomit, mucus, etc.) which might increase their risk of acquiring blood-borne pathogens especially human immunodeficiency virus (HIV), hepatitis C (HCV), hepatitis B (HBV), and psychological stresses. There are different studies which have investigated these types of exposures in the various settings [1-5]. Among health care workers,

evidences suggest that different health discipline students are also at a high risk of being occupationally exposed to needlestick injuries (NSI) and body fluids [6]. There are also a number of studies that have determined such occupational exposures among these high risk groups especially nursing [7-9] and medical [10-13] students. It should be noted that almost all the previous

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studies had measured needlestick injuries or body fluids exposure (BBE) in the prior year of their study, also, there is no reported study which has investigated these important issues among doctors and medical students in Rafsanjan University of Medical Sciences (RUMS). RUMS has been established nearly three decades ago in a city called Rafsanjan in the Southeast of Iran (Figure 1). This school has three affiliated hospitals (i.e. Ali-Eben-Abitaleb, Moradi and Niknafs) in which medical students spent their internship period.



Figure 1: Study location in Iran

The aim of the present study was to determine the lifetime occupational exposure to needlestick and body fluids among doctors and medical students in RUMS.

Materials and methods

This descriptive study was carried out in the year 2009 within three affiliated hospitals of RUMS. A group of one hundred respondents including 25% of the random sample of total doctors (n=25) and 100% of medical students (n=75) were asked to complete a self-administered questionnaire regarding their

lifetime occupational exposure to needlestick injuries and fluids. The questionnaire consisted of three sections: 1) demographic characteristics of the participants including age, gender, work history and job (i.e. doctors or medical students), 2) their Hepatitis B vaccination history and 3) the details of their lifetime occupational exposure to needlestick or/and body fluids. Participants were also asked whether they usually recapped the used needles or not, and whether they had reported their exposure to the appropriate authorities.

The validity of the questionnaire was supported by reviewing the existing questionnaires. Furthermore, for assessing the reliability of the questionnaire a pilot study was also carried out. The questionnaires were handed out in all the departments and the participants were asked to complete them only if they were willing to. The completed questionnaires were gathered the next day and the data were entered into SPSS (version 16) and were analysed using Fisher's Exact and Student t-tests, as well as Chi-square test.

Results

Ninety five completed questionnaires were returned giving the response rate as 95%. The results highlighted that the mean age of doctors and students under study were 33.95 ± 9.55 and 25.20 ± 1.65 years, respectively. The mean of working months for doctors and students under study were 92.29 ± 103.49 and 7.52 ± 6.06 , respectively. Demographical characteristics along with NSI and BFE of doctors and students under study are depicted in Table 1. As the table shows, 15 (%15.8) of doctors and 42 (%44.2) of students had NSI ($P=0.098$) and 13 (%14) of doctors and 32(34.4) of students had BFE ($P=0.044$).

Table 1. Some characteristics of the respondents based on their job

Variable	Job			Fisher's Exact Test
	Doctors	Students	Total	
	Number (%)	Number (%)	Number (%)	
Age				
Under 26	5 (5.4)	45 (48.9)	50 (54.3)	P = 0.003
26 and above	15 (16.3)	27 (29.4)	42 (45.7)	
Gender				
Male	9 (9.7)	25 (27.2)	36 (36.9)	P = 0.27
Female	11 (12.0)	47 (51.1)	58 (63.1)	
NSI*				
Yes	15 (15.8)	42 (44.2)	57 (60)	P = 0.098
No	5 (5.3)	33 (34.7)	38 (40)	
BFE**				
Yes	13 (14)	32 (34.4)	45 (48.4)	P = 0.044
No	6 (6.4)	42 (45.2)	42 (51.6)	

* Needlestick injuries

** Body fluids exposure

As a result, 57 (60%) of all the respondents had at least one lifetime occupational exposure to needlestick injuries and 45 (48.4%) had at least one lifetime occupational exposure to body fluids. As this table and other tables in this section depict the completed questionnaires had also some missing items. The highest number of needlestick injuries occurred within the emergency department (n=29, 51%), during nightshift (n=29, 51%) and with suture needle (n=37, 65%) and only 30 (31.5%) of the exposed cases had reported their exposure to the appropriate authorities.

Furthermore, 91 (96%) of the participants had received their Hepatitis B vaccinations and 43 (45%) of the participants reported that they always recapped used needles. Among other variables under study i.e. age, gender, job, work history and recap practicing, only two have shown the significant association with the exposure to needlestick injuries and

body fluids. First, recap practicing has significantly increased the exposure to needlestick injuries (P = 0.001) (Table 2).

Table 2. The association between practising recap with exposure to needlestick injuries among respondents

Needlestick injuries	Recap		
	Yes	No	Total
	Number (%)	Number (%)	Number (%)
Yes	39 (90.7)	16 (57.1)	55 (77.5)
No	4 (9.3)	12 (42.9)	16 (22.5)
Total	43 (100)	28 (100)	71* (100)

Chi-Square = 3.399, df = 1, P = 0.001

* The complete data on joint distribution of two variables were available for 71 out of 95 cases.

The second variable was respondent's gender as being male also significantly increased the

exposure to body fluids ($P = 0.005$) (Table 3).

Table 3. The association between gender with exposure to body fluids among respondents

Body fluids	Gender		Total Number (%)
	Male	Female	
	Number (%)	Number (%)	
Yes	23 (67.6)	21 (37.5)	44 (48.9)
No	11 (32.4)	35 (62.5)	46 (51.1)
Total	34 (100)	56 (100)	90* (100)

Chi-Square = 7.695, $df = 1$, $P = 0.005$

* The complete data on joint distribution of two variables were available for 90 out of 95 cases.

Discussion

The results of the present study revealed that 60% of the respondents had at least one lifetime occupational exposure to needlestick, which is close to the 67.9% that was reported by Hanafi et al, in 2011 [1]. Nevertheless, our figure was substantially higher than 34% that was reported by Salzer et al [10]; and 30.9% that was reported by Tadesse and Tadesse [2]; 49% that was reported by Talas [9]; 31.4% that was reported by Wicker et al. [4] and 27% that was reported by Adegbeye et al. [5]. Similarly, 48.4% of our respondents had at least one lifetime occupational exposure to body fluids, which seems to be substantially higher than 23.1% that was reported by Kessler et al. [6]. It should be noted again that almost all the previous studies measured needlestick injuries in the previous year of their study, while in this study we measured lifetime exposure.

This might partially explain why we have determined a higher exposure than most of the other studies. Higher exposure to

needlestick and body fluids in our study might also be due to less working experience of our respondents, especially among the medical students. Evidences also suggest that our respondents have a high workload, therefore, it seems that more studies are needed to determine the related factors. Based on these findings, it is recommended that further studies also try to measure lifetime exposure to determine a complete picture of these occupationally constant threats. Since such adverse events are always remembered by the affected population because of their possible considerable health consequences and psychological stress, we think that recall bias is unlikely to occur in the studies that measure lifetime exposure.

One of the other important findings of our study is that 68.5% of the exposed cases did not report their exposure to the appropriate authorities. This figure is much higher than 33.0%, the proportion that was reported by Kessler et al study in 2011 [6], and 34% reported by Salzer et al in 2011 [10]. The results of our study in accordance with the results of other studies [6-10] have determined that usually exposed cases do not report their exposure due to the following reasons: believing that their contact is not important; being too busy; not knowing how to report and/or believing that such reports might have an unfavorable effect on their job success. Therefore, such inappropriate attitudes and behaviors should be changed by improving medical curricula and/or conducting educational campaigns. We have also found that recap practicing has significantly increased the risk of exposure to needlestick. This finding has also been supported by previous studies [14-16].

In order to prevent this risky behavior, improving medical curricula and/or conducting educational campaigns are also needed. The aims of such programs are either

to diminish such risky behaviors altogether or to implement single-handed "scoop" method to recap needles. Similarly, providing safety devices for the disposal of needles are also recommended [17].

The other important finding of our study is that the risk of exposure to needlesticks is higher in the emergency departments and during nightshifts. This could be due to the fact that usually emergency departments and nightshifts suffer from higher workload and inadequate staffing. The results of the previous studies also highlighted that sufficient staffing on every shift and extra caution throughout periods of high workload are needed to avoid exposure to needlesticks [18-20]. Our results also highlighted that 96% of our participants had been vaccinated against hepatitis B, which seems to be higher than 67.7% that was reported by Talas in 2009 [9]. It is therefore recommended that before beginning clinical practice in RUMS all medical students and doctors receive full immunization against hepatitis B. Finally, as in the Vaz et al study [3], we would like to recommend establishing a monitoring system which would provide precise information on the scale and trends of exposure to needlestick and body fluids in doctors, medical students, and other health care workers of RUMS. Launching such monitoring systems would also offer an environment for implementing the effective intervention.

Conclusion

Occupational exposures to needlestick injuries and body fluids among doctors and medical students in RUMS have occurred with a relatively high lifetime incidence. Improving medical curricula, conducting educational campaigns, increasing recap needles behaviour, implementation of safety

devices and reducing the workload of the population under study might have positive effects on decreasing the incidence and prevalence of these constant threats.

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Conflict of interest: Non declared

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