

Risk Factors Associated with Needlestick Injuries among Health Care Workers in Menoufia Governorate, Egypt

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Abstract

Background: Health care workers are at high risk of job-related blood-borne diseases due to needlestick injuries (NSIs).

Objective: To assess the risk factors associated with NSIs among health care workers in Menoufia governorate, Egypt.

Methods: This cross-sectional study was conducted on 2260 health care workers of 4 randomly chosen hospitals in Menoufia governorate. Using a predesigned data collection sheet, all staff members were asked about the occurrence of NSIs in the previous 3 months. The response rate was 95.3%. Logistic regression analysis was used to assess the factors associated with NSIs.

Results: The risk of NSIs significantly increased with duration of work <15 years (OR 2.19, 95% CI 1.81 to 2.66), being female (OR 1.89, 95% CI 1.56 to 2.29), working as a paramedic (OR 1.49, 95% CI 1.03 to 2.25), working in surgical ward (OR 4.11, 95% CI 1.71 to 9.88), having more than 2 night shifts/month (OR 1.75, 95% CI 1.28 to 2.39), absence of educational sessions (OR 1.99, 95% CI 1.45 to 2.73), absence of hospital policies for NSIs (OR 2.23, 95% CI 1.99 to 2.49), absence of universal precautions (OR 1.66, 95% CI 1.10 to 2.50), recapping the needle after use (OR 2.63, 95% CI 2.12 to 3.26), recapping the needle with two hands (OR 3.08, 95% CI 2.04 to 4.65), not using protective clothes (OR 1.39, 95% CI 1.04 to 1.85), and increased working hours—8–12 hours (OR 2.14, 95% CI 1.34 to 3.44) and >12 hours (OR 2.28, 95% CI 1.17 to 4.44).

Conclusion: The risk of NSIs is still high among health care workers that underlines the importance of comprehensive educational sessions to decrease the risk of job-related blood-borne diseases.

Keywords: Needlestick injuries; Occupational exposure; Health personnel; Personal protective equipment; Blood-borne pathogens

Introduction

Thousands of health care workers are vulnerable to contracting blood-borne viral infections such as hepatitis B, hepatitis C, and HIV each year.¹ The

main cause of acquisition of such infections is job-related injuries due to injuries with needlestick and sharp objects (NSIs) contaminated with blood and body fluids of infected patients.²⁻⁵

Previous reviews of relevant studies

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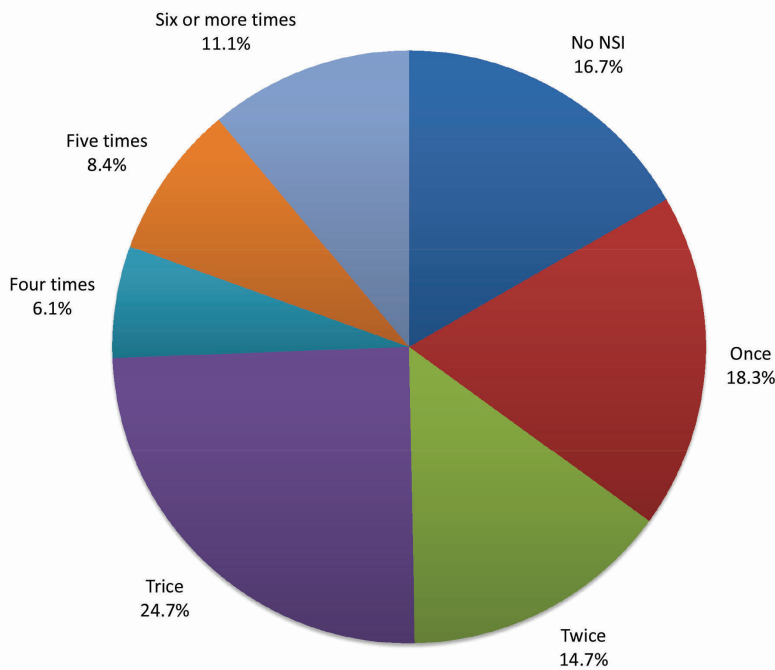


Figure 1: Frequency of NSIs/month among participants

have demonstrated that NSIs were associated with three major concerns: engineering factors including the form of sharp objects and protective devices, organizational factors including the existence of supplies and policies for reporting injuries and behavioral factors related to health care workers like recapping and disposal-related issues.^{6,7} The objective of this study was to assess the risk factors associated with NSIs among health care workers in Menoufia governorate, Egypt.

Materials and Methods

This cross-sectional study was conducted between the beginning of May 2016 and the end of August 2017. The Medical Ethics Committee at the Menoufia Faculty of Medicine approved the study protocol before starting the study.

The approved study protocol was distributed to four tertiary level hospitals within Menoufia governorate with thorough explanations of the study objectives

through personal interviews with the chiefs of the corresponding hospitals.

A total of 2260 health care workers were chosen randomly from the four hospitals—Menoufia University Hospital, Quesina Central Hospital, Menouf Central Hospital, and Shibin el-Kom Teaching Hospital. A multi-stage random sampling method was used. Three districts were chosen at random. Two hospitals in Shebin el-Kom district, the district hospital from Menouf, and the district hospital from Quesina were chosen for the study. From each hospital selected, four departments were chosen at random (General Surgery, Gynecology and Obstetrics, Internal Medicine, and Pediatrics) by simple random sampling. All staff members in the studied departments were asked to participate in this study.

Using a predesigned data collection sheet, all participants were asked about some demographic characteristics (age, sex, occupation), occurrence of NSIs during previous three months, risk factors of NSIs, and existence of hospital training programs on and policies for NSIs.

Statistical Analysis

Data were analyzed using IBM SPSS® ver 22 (SPSS Inc, Chicago, IL, USA). χ^2 or Fisher's exact test, where appropriate, was used to examine the categorical variables. *Student's t* test was used to comparison means between two groups. Logistic regression analysis was used to assess the factors associated with NSIs. A p value <0.05 was considered statistically significant. Number of NSIs (<3 times and ≥ 3 times) was a dichotomous dependent variable. The independent variables included duration of work, sex, occupation, ward, number of night shifts/month, recapping needle, method of recapping, use of protective clothes, working hours, and existence of educational sessions, hospital policies, and universal precaution.

Results

Of 2260 health care workers studied, 2156 data sheets were returned, translating to a response rate of 95.3%. The rate of NSIs was 83.3%. Almost a quarter of studied participants experienced <3 times/month NSIs (Fig 1). The mean age of those with <3 times (n=1071) was 36.0 (SD 11.6) years, not significantly (p=0.26) different from that of those with ≥3 times NSIs (35.4, SD 10.8). Based on univariate analysis, risk factors of NSIs included duration of working <15 years, being female, working as a para-medical, working in surgical ward, number of night shifts >2, absence of educational program sessions on prevention of NSIs, absence of firm hospital policies for NSIs and universal measures, recapping needles with two hand, not wearing gloves, and working >8 hours per month (Table 1). Based on binary logistic regression analysis, independent risk factors for NSIs were duration of working <15 years, being female, working as a para-medical, working in surgical ward, having more than two night shifts per month, absence of educational programs, absence of hospital policies on NSIs, absence of universal precautions, recapping needle after use, recapping needle with two hands, not using protective clothes, and increased working hours (Table 1). The model explained 70.4% of the variance and correctly classified 80.1% of cases.

Discussion

The rate of NSIs found in this study was much higher than previous reported values of 25%–58%.^{4,8-12} However, in a previous study conducted in a tertiary hospital in India, about 80% of health care workers reported they had one or more NSIs during their career.¹³ This high rate observed could be attributed to the nature of hospitals studied, being tertiary health care

TAKE-HOME MESSAGE

- Exposure to needlestick injuries (NSIs) among health care workers is still high.
- Independent risk factors for NSIs are age, sex, job title, working hours, place, and type of practice.
- Provision of sufficient staff and safety equipment, and implementation of institutional educational programs are mandatory to reduce the rate of NSIs.

centers with availability of post-exposure measures and facilities to prevent transmission of blood-borne viral infections.

In our study, less experienced health care workers were at higher risk of NSIs, which was in parallel with previous studies,^{4,14-16} but refuted by a recent case-control study.¹² Being a female nurse was associated with a higher rate of injury, which is consistent with previous studies.^{2,12,17} Nurses are responsible for injections and intravenous fluid administration, which could explain why they were at a higher risk of NSIs.

Recapping needles after use and the reluctance to wear protective gloves were independent risk factors for NSIs. Most published studies have recommended that training should be given in wearing gloves for every procedure in addition to using other protective equipment when dealing with patients to prevent occupational exposure to NSIs.¹⁸⁻²⁰

Shortage of educational program sessions and hospital policies was also found as a risk factor for NSIs in the current study. Although education reduces the rate of NSIs, it has been proved to be not as effective as provision of safety devices.^{6,10,19,20}

Increased working hours, night shifts and negligence of universal precautions were also independent risk factors for NSIs in our study. Governmental hospitals are always overloaded, especially in certain wards like emergency and labor

For more information on prediction of preventive behaviors of the needlestick injuries during surgery see <http://www.theijoem.com/ijoem/index.php/ijoem/article/view/1051>



Table 1: Results of univariate and binary logistic regression analyses of the studied risk factors for needlestick injuries among hospital health care workers

Risk factors		Number of needlestick injuries		Crude OR (95% CI)	Adj OR (95% CI)
		<3 times (n=1071)	≥3 times (n=1085)		
Duration of working	<15 year	423 (39.5%)	611 (56.3%)	1.97 (1.66 to 2.34)	2.19 (1.81 to 2.66)
	>15 year	648 (60.5%)	474 (43.5%)	1	1
Sex	Male	534 (49.9%)	467 (43.0%)	1	1
	Female	537 (50.1%)	618 (57.0%)	1.32 (1.11 to 1.56)	1.89 (1.56 to 2.29)
Occupation	Medical	691 (64.5%)	504 (46.5%)	1	1
	Para-medical	380 (35.5%)	581 (53.5%)	2.10 (1.76 to 2.49)	1.49 (1.03 to 2.15)
Ward	Medical	674 (62.9%)	333 (30.7%)	1	1
	Surgical	397 (37.1%)	752 (69.3%)	3.83 (3.21 to 4.59)	4.11 (1.71 to 9.88)
Number of night shifts/month	≤2	543 (50.7%)	464 (42.8%)	1	1
	>2	528 (49.3%)	621 (57.2%)	1.38 (1.16 to 1.63)	1.75 (1.28 to 2.39)
Educational sessions	Present	616 (57.5%)	455 (41.9%)	1	1
	Absent	455 (42.5%)	630 (58.1%)	1.87 (1.58 to 2.22)	1.99 (1.45 to 2.73)
Hospital policies	Present	562 (52.5%)	507 (46.7%)	1	1
	Absent	509 (47.5%)	578 (53.3%)	1.26 (1.06 to 1.49)	2.23 (1.99 to 2.49)
Universal precautions	Present	573 (53.5%)	525 (48.4%)	1	1
	Absent	498 (46.5%)	560 (51.6%)	1.23 (1.04 to 1.45)	1.66 (1.10 to 2.50)
Recapping the needle	Yes	384 (35.9%)	667 (61.5%)	2.85 (2.40 to 3.40)	2.63 (2.12 to 3.26)
	No	687 (64.1%)	418 (38.5%)	1	1
Method of recapping		n=384	n=667		
	One hand	214 (55.7%)	274 (41.1%)	1	1
	Two hands	170 (44.3%)	393 (58.9%)	1.81 (1.40 to 2.33)	3.08 (2.04 to 4.65)
Protective clothes	Yes	560 (52.3%)	497 (45.8%)	1	1
	No	511 (47.7%)	588 (54.2%)	1.30 (1.09 to 1.54)	1.39 (1.04 to 1.85)
Working hours	≤8	430 (40.1%)	246 (22.7%)	1	1
	>8–12	398 (37.2%)	482 (44.4%)	2.12 (1.72 to 2.60)	2.14 (1.34 to 3.44)
	>12	243 (22.7%)	357 (32.9%)	2.57 (2.05 to 3.22)	2.28 (1.17 to 4.44)

rooms. Therefore, health care workers are more likely to neglect and not to observe universal preventive measures.^{5,19}

The large sample size with the high response rate constitutes the main strength of the current study. Self-reported data collection over the past three months may be a limitation of the study as it might introduce recall bias. Not including the private sector in our study could be another limitation of this study.

In conclusion, the risk of exposure to NSIs is still high among health care workers. This underlines the importance of more comprehensive educational sessions in order to decrease the risk of acquisition of job-related blood-borne diseases. Future research should focus on the type of educational training considering the perceived benefits and threats while developing plans to decrease NSIs among health care workers as recommended by a recent systematic review.²¹

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Conflicts of Interest: None declared.

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