

Needle stick injuries among nurses of secondary care hospital: A cross-sectional study from Gaza Strip.

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ABSTRACT

Background: Nurses are among the most highly prone professionals for needle stick injuries. The aim of this study was to determine the rate of needle stick injuries as well as the prevalence of vaccinating nurses against HBV. **Methods:** A hospital based cross-sectional study was conducted at all Shifa medical complex wards. A total of 634 nurses were eligible for participation and data were collected during working hours for three consecutive weeks in March 2014 using self-developed questionnaire. Chi square and univariate analysis were applied. **Results:** Ninety nine percent (628 out of 634) of nurses positively responded. The mean age of nurses was (35,54±10,12) and 222 nurses (35,7%) were from surgical, 191 (30,7%) from Internal medicine and 209 (33,6%) from Obst/Gyn hospital. Only 7% (43) have not received any dose of hepatitis B vaccine, 8,3% (51) received one dose, and 17% (104) received two doses. Whereas, 67,6% (413) completed the vaccination schedule of three doses. Regarding needle stick injuries, 54,1% (333 out of 615) of nurses reported at least one exposure in the last 6 months distributed as follow: 47.5%, 48.6%, and 66.3% in surgical, internal medicine and Obst/Gyn hospital respectively. **Conclusion:** The rate of NSIs among Shifa hospital nurses are relatively high and nurses should be aware of infection prevention and control standards to prevent further preventable injuries. The culture of reporting should be promoted and much efforts must be done to widening the hepatitis B vaccination coverage. Employer mandated vaccination policy to improve vaccination coverage.

Keywords: Needle stick Injuries, Nurses, Incidence, Hospitals, Survey.

INTRODUCTION

Needle stick injuries (NSIs), which are mostly preventable, are percutaneous penetrating wound that typical occur by the needle point. They can also be by sharp objects or instruments. They are common events in the environment of health care settings. These injuries happen when recapping the needle, administer intravenous or intramuscular injections and/or failure to through the needles in their appropriate containers. Health care providers, especially nurses, appear at risk not only because of piercing wound but also the risk of transmission of blood borne diseases like: Hepatitis B, hepatitis C and Immune Deficiency Virus (HIV) which causes AIDS.^[1] According to World Health Organization (WHO), 2 million out of 35 million health care workers experienced exposure to communicable diseases because of NSIs and 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in Health-Care Workers (HCWs) globally are because of NSIs.^[2] The risk of infections acquired for HCWs from blood borne pathogens depends on the prevalence of pathogens among population patients and the nature and frequency of exposure.^[3]

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Needle stick injuries, if occurred, are considered cost burden to health care system through

increasing laboratory tests, treatment of these conditions as well as the costs associated with post-exposure prophylaxis.^[4] Other inconsiderable impacts in the long run are the psychological consequences and co-morbidities accompanied such as Depression, Post-Traumatic Stress Disorder (PTSD) and Adjustment Disorder (AD) resulting in frequent missed work days and altering of health services quality.^[5,6]

Results from related studies showed injections and drawing blood comprised significant proportion of NSIs.^[7,8] Studies around NSIs targeted different categories of HCWs: Physicians, nurses, medical student and prevalence varied accordingly. Nurses are more prone to NSIs due to frequent and direct dealing with patients and the frequent use of sharp instruments like needles and knives. Factors influencing the incidence of stick among nurses vary and are categorized under organizational characteristics. Nurses who work in hospital with poor organizational climate or low adequate resources, low staffing rate and high stress environment are more likely to have higher rate of NSIs.^[9,10]

In Middle East region, many studies target HCWs in their epidemiological studies and results from Egypt^[11,12], Saudi Arabia^[13], Turkey^[14] and Yemen^[15] varied significantly.

Despite this fact, very rare studies investigated NSIs among nurses in Palestine. However, the comprehensive NSIs status among nurses is unknown because none of the hospitals have launched surveillance research, and if they do, they don't report the data information system. Only one

published study revealed 40% of medical students had experience of exposure to needle stick.^[16]

Quality Improvement and Infection Control Office at Shifa medical complex is the accountable and responsible body to take actions within the hospital to prevent the spread of infection as well as protect employees from occupational hazards through vaccination, awareness and other accredit strategies.

The objectives of this study was to determine the rate of accidental NSIs among nursing professionals as well as the prevalence of vaccinating nurses against HBV Shifa medical complex wards in Gaza Strip.

MATERIALS AND METHODS

This study was descriptive cross-sectional (hospital based). The study conducted in Shifa medical complex, which locates in Gaza City, in all hospital wards form three main hospitals: surgical, internal medicine and Obs/Gyn hospital. Shifa medical complex is the largest public hospital in Gaza strip and the main referral hospital serves more than half million inhabitants and provides diversity of services from general services to very specialize one. It had first been established in 1946, and has now 1440 employees. Nurses comprise more than one third of them. They are 634 distributing in three main hospitals as follow: 226 nurse in surgical hospital, 195 in internal medicine hospital and 213 nurse and midwifery in Obst/Gyn wards.

The total number of nurses was 634 and those were formal employees and have been employed by the Employee General Council. All nurses (census sample) have been invited to fill the questionnaire and participate in a voluntary base.

Inclusion criteria:

- Formal employee nurse by General Employees Council, but no limitation to date of employment

Exclusion criteria:

- Volunteer nurses, nurses' work on intern program, nurse with special contract, internship nurse

A draft version of a self-administered questionnaire developed. The draft was given to 15 health care workers for pretesting and to determine if the questions were understandable. The questionnaire was self-developed by the Quality Improvement and Infection Control team at Shifa medical complex in Arabic language and approved by hospital board management. A structured questionnaire was used to gain information on socio-demographic profile, questions about previous vaccination against hepatitis B virus and how many doses received, previous exposure to needle stick in the 6 months, and if yes exposed, had he/she reported it, received consultation, and received post exposure prophylaxis.

Data was collected, over three consecutive weeks in March 2014 and nurses were invited to complete and return the questionnaires during working hours. Data was entered and analyzed using SPSS software version 20. Chi square test was used to determine statistical significances with regard to independent variables. The statistical analysis was conducted with 95% confidence interval and a p-value of <0.05 as threshold of statistical significance.

Dependent variable:

A-Needle stick injury: An injury with a needle, or other pointed object used for any invasive procedure and was contaminated with blood or body fluids.

B. Vaccination coverage

Independent variables: gender, age, hospital, position, years of experience

This study approved by committee members of the institutional review board of Shifa medical complex (No: MOHSMC, 2014-21A). Purpose of study explained to each participant and verbal informed consent obtained before getting enrolled in the study. Participants have been told that they have the right to withdraw whenever, they feel uncomfortable. Furthermore, each collected questionnaire was given a code to ensure anonymity. To ensure maximum participants' confidentiality, questionnaires were placed in a closet at the quality improvement and infection control office.

RESULTS

Six hundred thirty four (634) nurses comprised the total number of nurses in Shifa medical complex were asked for voluntary participation. A tremendous response rate this study had. Ninety nine per cent (99%) of nurses involved and participated. More than half of participants were male representing 56.1%. The mean age of study population was 35.54 years (35.3 for male and 35 for female) in which the youngest was 23 and the oldest was 60 years old. Seventy per cent (70%) of nurses had less than 10 years' experience, while 15.6 % between 11-20 years and 14.5% had more than 21 years. Males were dominant in surgical and internal medicine wards. In return, females' nurses represented 64.1% of Obst/Gyn sample [Table 1]. Vaccination doses were distributed according to place of work. No differences in distribution, but surgical departments had more vaccination prevalence [Table 2].

Approximately 54.1% of nurses reported to have at least one needle injury within the last 6 months [Table 3] and the higher rate was in Obst/Gyn wards.

Table 1: Socio-demographic characteristics of responded nurses (N = 628)

characteristic	n* (M±SD)	Surgical hospital N/(M±SD)	Internal Medicine hospital N/(M±SD)	Obst/Gyn hospital N/(M±SD)	Total	P-value
Age for all	597/35.54±10.12					
M		177/(35.23±10.31)	130/(37.42±11.83)	34/(33.34±9.96)		
F		44/(34.86±7.72)	49/(35.21±9.83)	163/(35.06±8.74)		
Gender		n*(%)	n*(%)	n*(%)		
M		178(51)	137(39.2)	34(9.7)	349	.000
F		44(16.1)	54(19.7)	175(64.1)	273	.000
Years of experience		n*(%)	n*(%)	n*(%)		
< 10 years		154(37.4)	106(25.7)	151(36.7)	411	.008
11-20 years		28(30.4)	33(35.8)	31(33.7)	92	.008
> 21 years		37(43.5)	32(37.6)	16(18.8)	85	.008

Notes: n* varies due to multiple responses; M= mean; SD= standard deviation; P ≤ 0.05

Table 2: Distribution of nurses based on place of work, years of experience and vaccination dose (N = 628)

Vaccine Variables	No dose	1 dose	2 doses	3 doses	p-value
Surgical	10	10	38	164	
Int. medicine	16	23	30	130	
Obst/Gyn	17	18	36	136	
Total n*(%)	43(7)	51(8.3)	104(17)	413(67.6)	.036
< 10 years	22(5.4)	29(7.1)	78(19.1)	278(68.3)	
11-20 years	7(7.7)	12(13.2)	12(13.2)	60(65.9)	
> 21 years	12(14.4)	6(7.2)	10(12)	55(66.2)	
Total n*(%)	41(7)	47(8)	100(17.2)	393(67.6)	.023

Notes: n* varies due to multiple responses; P ≤ .05

Table 3: Distribution of nurses based on years of experience, place of work, gender and needle exposure (N = 628)

Variables	Exposure to needles		p-value
years of experience	Yes N (%)	No N (%)	
< 10 years			
11-20 years	245 (59.9)	164(40)	
> 21 years	45(49.9)	46(50.5)	
Total	29(34.9)	54(65)	.000
Place of work			
Surgical	319(54.7)	264(45.2)	
Intern. Medicine			
Obst/Gyn			
Total	105(47.5)	116(52.5)	.000
Gender	92(48.6)	97(51.4)	
M	136(66.3)	69(33.7)	
F			.044
	333(54.1)	282(45.9)	
	175(50.5)	171(49.2)	
	158(58.7)	111(41.3)	

Notes: n* varies due to multiple responses; P ≤ .05

Table 4: Distribution of nurses in regard to incident report, consultation and vaccination post exposure

Characteristics	Surgical hosp.		Internal med hosp.		Obst/Gyn hosp.		p-value
	yes n*(%)	No n*(%)	yes n*(%)	No n*(%)	yes n*(%)	No n*(%)	
Incident report	1(0.3)	104(33)	5(1.8)	88(31.6)	3(.07)	132(32.6)	.144
Post exposure consultation	17(5.3)	88(27.9)	19(6.8)	74(26.6)	19(4.7)	116(28.6)	.434
post exposure vaccination	3(0.9)	102(32.3)	7(2.5)	85(30.5)	4(1)	131(32.3)	.163

n* varies due to multiple responses; P ≤ .05

Although high rate of needle injury, very few seek consultation or reported the incidence to Infection Prevention and Control Office. Moreover, none of them deserved the post- exposure prophylaxis based on the recommendations post exposure protocol [Table 4].

Using univariate analysis, significant differences between genders, place of work, years of experience and needle stick exposure were observed (p = 0.000; p = 0.044) [Table 3]. The more experience at work, the less exposure [Table 3]. Nurses with 10 years' experience or less had

high vaccination rate (one dose, two doses, three doses) compared with those who had 21 years or more of experience ($P = 0.023$) [Table 2]. Only 14 nurses (4%) received vaccination against hepatitis B virus according to the recommended protocol from Ministry of Health [Table 4].

DISCUSSION

Needle stick injuries are potential threats to serious blood borne infectious diseases including HIV, HBV, and HCV. Our study estimated the rate of NSIs among nurses to be 54.1% with at least one needle injury within past 6 months. This percentage is considered high since there are no benchmarking studies. Only one study estimated NSIs to be 40% among Palestinian medical student.^[16] Our study had similar results with Gu and his colleagues study. Significant associations were found between years of experiences, gender, place of work and exposing to needle stick injuries.^[17]

Regionally, Galougahi study revealed 22.15% of nursing workers had at least one exposure to NSIs in last year, 46.2% during the last 5 years, and 57% during professional life.^[18] Mantel and his colleagues surveyed the staff of 120 health facilities in Syrian Arab Republic and showed 14% of the staff reported needle stick injuries in the previous 12 months.^[19] The rate of NSIs in this study was less than our results. Talaat and his colleagues reported 35.6% of nurses sustained a NSIs in the previous three months.^[20] In return, our study's results is quite near to Askarian findings which showed 49.6% of nurses work in Iran Fars province hospitals have exposed to at least one stick injury.^[21] Globally, many researches have been conducted targeting nurses, doctors, and all of health care workers. The results varied significantly, but still our findings considered high. Bhardwaj and his colleagues reported 20.9%^[22], 24% by Lee and Hassim^[23], 23.5% by Rampal and his colleagues^[24] and 38% from Australia^[25]. This result was; however, lower than some other research conducted among Taiwanese hospital support personnel (61%)^[26], Chinese nurses (82%)^[27], Taiwanese healthcare workers (87%)^[28] and Korean nurses (79,7%)^[29].

Furthermore, our study revealed 65.7% of nurses had completed the vaccination schedule. This result is quite reasonable and acceptable when compares with relevant recent and old published literature. The coverage rate among nurses varied widely. The lowest rate reported by Flores-Sánchez and his colleagues to be 5.5%.^[30] In return, the highest rate reported was 93% by Lourergue and his colleagues.^[31] Taalat et al.,^[20] De Souza and Teixeira^[32], Fortunato et al.,^[33] Simard et al.,^[34] and Attaullah et al.,^[35] who reported 15.8%, 48.9%, 70%, 81% and 73.42% respectively. The

differences in vaccination coverage rate can be understandable due to reported determinants and barriers.^[35-38]

This study is subjected to several limitations. Vaccination status was self-reported and not verified by vaccination records. Rare studies examined the validity of self-reported HBV vaccination compared with staff medical. One study revealed 70% agreement between self-report and serologic evidence of vaccination.^[39] Records Recall bias could have led to overestimation or underestimation of coverage although 6 months was not long period for memorizing exposure to needle stick and vaccination coverage.

CONCLUSION

This study suggests that NSIs occur among nurses at reasonably high rates when compared internationally. Moreover, underreporting rate of these injuries is high which requires a promotional and awareness program to reinforce the culture of reporting among nursing professionals. We recommend employer mandated vaccination policy to improve vaccination coverage.

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