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ORIGINAL RESEARCH ARTICLE

Prevalence of Needle Stick Injuries and Its Association with Workload Among Health Care Providers: a Cross sectional Study from Tertiary Care Hospital of Rohilkhand Region, Uttar Pradesh

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ABSTRACT

Introduction: Health care providers (HCPs) are prone to a variety of dangers like infections, cuts, Needle stick injuries, radiations, vaccines, serums, etc. Since this paper mainly aims to see the prevalence of needle sticks and sharp injuries (NSSIs), which are one of the occupational hazards, that occur during the handling/processing of the NSSIs in the hospital. The present study aims to find the prevalence of needle stick injuries among the HCPs and to investigate its association with work load among the HCPs in tertiary care hospitals of Rohilkhand region, Uttar Pradesh.

Materials and methods: This cross-sectional study was carried out between 2013 to 2014 in the Rohilkhand region of Uttar Pradesh; 312 registered HCPs in a tertiary care hospital in Bareilly city under the Rohilkhand region were randomly chosen and investigated through structured questionnaire. Mainly the study was based on qualitative data since data is described through frequency and percentage; also Chi-square test was used to test the association between workload and prevalence of needle stick injuries.

Results: Out of 312 HCPs127 (40.70%) participants were female, and 185 (59.30%) were male respondents. The workload of 75.6% HCPs in terms of working hours was more than 35 hours in a week, and nursing students were working less than 35 hours in the hospital. Needle stick injuries were reported by 53 % of the 312 HCPs. The association between needle stick injuries and workload among HCPs was significant ($\chi 2=55.33$, $p< 0.001$), revealing that needle stick injuries were closely linked to workload. Needlesticks injuries were found in 84 (80%) of the 104 HCPs with a high workload.

Conclusion: In this study, 53% of healthcare workers were injured by needles. The highest number of injuries occurred among HCPs with a heavy workload (worked more than 35 hours per week and night duty more than three times per week).

Keywords: Cross-sectional study, Health care providers, Needle sticks injuries.

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INTRODUCTION

Healthcare providers are working in the hospital. They are always in touch with needles and are more susceptible to needle stick injuries. This accidental injury was found to occur mostly during the handling/processing of the needles. A total of 3 million needle stick injuries occur each year among the 39.5 million healthcare workers worldwide. In this group, 40% of hepatitis B and C infections and 2.5% of human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) cases are linked to needle sticks.[1] A needle stick injury (NSI), according to the National Surveillance System for Healthcare Workers, is a wound caused by a needle puncturing or piercing intact skin.[2] Needle stick injuries and sharp injuries (NSSIs) are one of the most potential hazards. They pose a great risk of transmission of pathogens.[3] NSI are caused by hypodermic needles and blood collection needles. NSI are usually unavoidable among healthcare workers when they care for the patient.[4] NSSIs are usually found among staff nurses, surgeons, and emergency personnel.[5] Healthcare workers working in tertiary care hospitals have a high workload, leading to increased chances of acquiring these injuries due to tiredness and fatigue.[6,7] A study on a nationwide nurse survey in Taiwan concludes chronic insomnia and long working hours of healthcare workers to be the primary cause of needle stick injury.[8] In a country like India which has a rapidly ticking population clock, the health system always suffers from a paucity of manpower. Healthcare

Table 1: Profile of health care providers

Characteristics	Frequency	%
Sex		
Female	127	40.70
Male	185	59.30
Age (years)		
Below 19	17	5.40
20–24	145	46.50
25–29	90	28.80
30–34	37	11.90
35–39	13	4.20
40 and above	10	3.20
Working of HCPs (in years)		
Below 1	152	48.70%
1–4	101	32.40%
5–9	49	15.70%
10–14	5	1.60%
15–19	5	1.60%

providers are almost always overburdened and reducing this burden could be of prime importance in bringing down episodes of needle stick injury.[9] Experiences from developing countries demonstrate that national health policy plans consist of safety protocols and mandatory training programs for HCPs to reduce the occurrence of NSSIs. Through this paper, we found the following objective. this burden could be of prime importance in bringing down episodes of needle stick injury.[9] Experiences from developing countries demonstrate that national health policy plans consist of safety protocols and mandatory training programs for HCPs to reduce the occurrence of NSSIs. The present study was done to investigate the prevalence of needle stick injuries among the HCPs in a tertiary care hospital of Rohilkhand region, Uttar Pradesh and to investigate the association between the prevalence of NSI and workload among the HCPs in tertiary care hospital of Rohilkhand region, Uttar Pradesh.

MATERIAL AND METHODS

Study Setting and Period: This study is mainly based on primary data of HCPs like doctors, M.B.B.S. Interns, nursing staff, nursing students, operation theatre (OT) technicians, and lab technicians working in tertiary care hospital in the city Bareilly situated Rohilkhand region which is in the western part of Uttar Pradesh. This study was carried out between 2013 to 2014. The studied population was all registered HCPs in tertiary hospitals in the Bareilly city of Rohilkhand region.

Study Design: Cross-sectional study design was used.

Sample Size: The required sample size was calculated by using the following formula

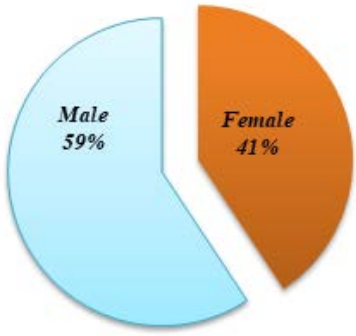

Figure 1: Distribution of health care providers gender wise

Where "P=Prevalence of NSI taken as 85%, Q =(100-P) %d = Relative error taken as 5% of P".[10]

The Sample size (n) was calculated as 282, an additional 10 % for non-response was added to give a sample size; thus, sample size chosen for the study was 312.

Sampling Procedure: Stratified random sampling technique was used to collect data, considering job title categories as strata to reduce the heterogeneity of data. Total 52 participants draw from each stratum using simple random sampling techniques. HCPs categories were staff nurse, nursing students, lab technicians, OT technicians, MBBS interns, and resident doctors.

Statistical Analysis: Further, frequency and percentage were used to describe general subject characteristics. To set the boundary for statistical analysis, a significance level of 0.05 is used for 2-tailed approaches. Chi-square test was used to check the association between NSI and the workload on health workers. Data analysis was done through Microsoft excel.

RESULTS

The demographic variables from the questionnaire have been explained in Table 1. Out of 312 HCPs 127 (40.70%) participants were female, and 185 (59.30%) were male respondents (Refer Figure 1), age group of 20 to 24 years

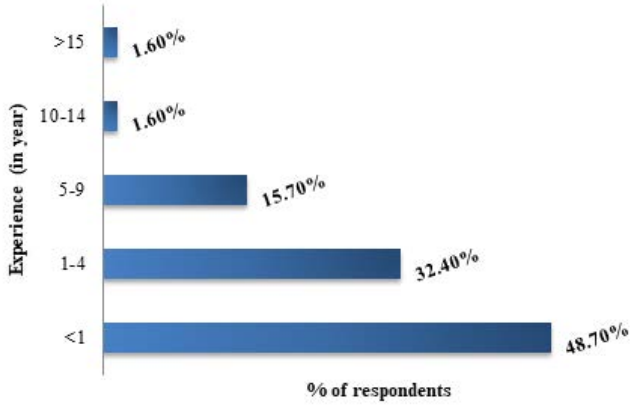

Figure 2: Distribution of health care providers on working experience .

Table 2: Distribution of health care providers according to night shift per week

HCPs	Frequency of night shifts per week				Total
	0 per week	1 per week	2 per week	≥3 per week	
Nursing Staff	3 (5.8%)	9 (17.3%)	22 (42.3%)	18(34.6%)	52 (100.0%)
Nursing student	8 (15.4%)	4 (7.7%)	18(34.6%)	22(42.3%)	52 (100.0%)
Intern	2 (3.8%)	13 (25.0%)	30(57.7%)	7(13.5%)	52 (100.0%)
Lab technician	29 (55.8%)	1 (1.9%)	14(26.9%)	8(15.4%)	52 (100.0%)
O.T.Technician	2 (3.8%)	3 (5.8%)	11(21.2%)	36(69.2%)	52 (100.0%)
Doctor	10 (19.2%)	9 (17.3%)	17(32.7%)	16(30.8%)	52 (100.0%)
Total	54 (17.3%)	39 (12.5%)	112(35.9%)	107(34.3%)	312 (100.0%)

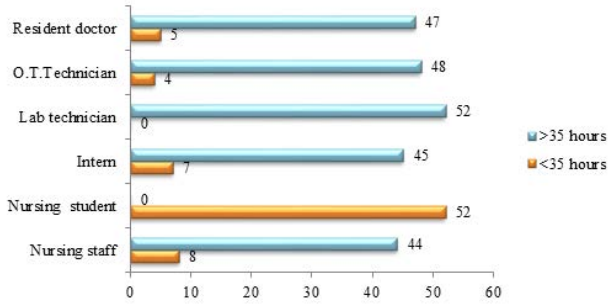

Figure 3: Distribution of health care providers according to weekly working hours.

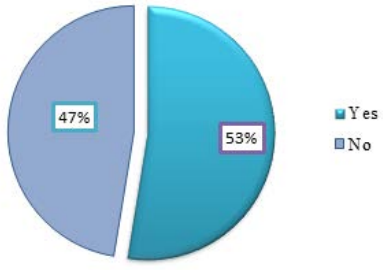

Figure 4: Prevalence of needle stick/sharp injuries to the health care providers

participated most commonly in the study, also below 19 and above 40-year HCPs were 17(5.40%), and 10 (3.20%) participate respectively. Among HCPs working experiences, 152(48.7%) had service periods were less than one year, (32.4%) HCWs had one to four years and rest other of the worker were having five or more the five years of the service period (Refer to Table 1 and Figure 2). The workload of 75.6% HCPs in terms of working hours was more than 35 hours in a week, in which nursing students were working less than 35 hours in the hospital (Refer to Figure 3). Approx. 70% of the health care providers were doing more than twice the night shift weekly (Refer to Table 2). Figure 4 shows that there is a 53% prevalence of needle stick injuries among the HCPs in the study population. The association between needle stick injuries and workload among the HCPs comes out to be significant ($p < 0.001$) (Refer to Table 3).

Table 3: Association between prevalence of needle stick injuries and work load among the HCPs

HCPs workload status	*Needle stick/sharp injuries*			*χ^2 test statistic*	*p-value*
	Yes	*No*	*Total*		
High	84	20	104	55.33	0.00
Medium	45	50	95		
Low	35	78	113		
Total	164	148	312		

DISCUSSION

This study has been done to determine the prevalence of needle stick injuries and its association with workload among the HCPs. The study conducted by Sharma *et al.* [11] and shah et al.[12] found a large percentage of female HCPs (49.7 %) compared with the present study(40.7%). Sharma *et al.*[11] study, 68.9% of participants belonged to the age group of 20–25 years, and the working period of most of them (35.7%) was 1–2 years which is less than our study (75.3% and 4.8.7% respectively). The working hour of most HCPs (75.6%) were more than 35 hours/week except for nursing students, who worked mostly in the morning shift. This is in accordance with studies conducted by Alnoumas *et al.* (13)in Kuwait and Rogers et al.[14] study in Philadelphia (42.7 + 6.1 & > 40 hour, respectively). Approx. 70% of the health care providers were doing the night shift more than twice a week (Refer to Table 2), while in Kakizaki *et at*[15] study in Mongolic, this percentage was relatively low (20.1 and 27.6% respectively). The leading cause of needle stick injury was an overload of work. Figure 4 depicted a 53% prevalence of NSI among the HCPs in the study population, which is comparatively lower than the study conducted by Musa[16] (57.1%) among HCPs of Nigeria. However, this percentage is much higher than 23.5 % reported by Rampalin Malaysian,[17] 24.9% by Lee and Hassim[18] in Malaysia, 34.8% by Salelkar in Goa,[19] and 39.4% by Hofranipour et al in Iran.[20] Higher prevalence of NSIs as compared to our study was reported by various other studies.[21,22] Furthermore, to validate our findings are classified HCPs on the basis of workload status as, High who worked more than 35 hours

in a week with more than three-night shifts; medium, who worked between 25–35 hours in a week with one to two-night shifts and consider low who worked below 25 hours in a week with no night shifts. Moreover, the association between needle stick injuries and workload among the HCPs was checked through a chi-square test comes out significant ($p < 0.001$), which indicated that there is a strong association between NSI and workload, it could be seen through the distribution that in high workload category having the highest number of needle injuries to the HCPs (Refer Table 3).

CONCLUSION

In this survey, most healthcare providers were male and the majority were between the ages of 20 and 24. The most injuries were identified in HCPs who had been high workload, worked more than 35 hours in a week with and did night duty more than thrice in a week. In this study, 52.6% of healthcare providers suffered a NSI. Among all HCPs, OT staff and nursing students had the highest rate of NSI (69.2%).

RECOMMENDATIONS

Maintaining records and monitoring needle sticks or sharp injuries. Injuries should be an important and necessary aspect of preventing infection in all hospitals. The hospital should supervise the treatment and follow-up following exposure. As a result, training on how to handle needles properly was given. The personnel of the operating theater was educated because it was the most affected location. Adjust shift work schedule, especially to minimize working hours and the frequency of early shifts, and recruit enough people to reduce the burden.

CONFLICT OF INTEREST

There is no conflict of interest.

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