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CAUSES OF NEEDLE STICK AND SHARP INJURIES AMONG NURSES AT FAISALABAD INSTITUTE OF CARDIOLOGY, FSD

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ABSTRACT

Background: Objective: To measure the causes of needle stick and sharp injuries among nurses in Faisalabad Institute of Cardiology, Faisalabad. **Study Design:** Cross sectional study. **Setting:** Faisalabad Institute of Cardiology. **Period:** Jan 2018 to Mar 2018. **Material and Method:** This research was quantitative; a self-administered questionnaire was the tool to analyze the causes of needle stick and sharp injuries among nurses of Faisalabad Institute of Cardiology, Faisalabad. The sample of current study was comprised of 150 nurses. A self-administered questionnaire was used to collect the data. Cross Tabulation and Frequency Distributions were used for the description of trends in the data. **Results:** It was found that 84% (N=126) nurses working at Faisalabad Institute of Cardiology workers experienced needle stick injuries in their professional life. Emergency department workers were most frequently affected followed by those working in different wards and ICU. In this study only 73.3% (N=110) nurses were aware about safe medical practices regarding needle stick injuries i.e. Universal precaution guidelines. This research found majority of the nurses having Diploma (35.67%) were having the knowledge about the NSSIs and 46% were trained as well. It was also found that nurses working in emergencies were major victims of NSSIs as 34 percent (N=51) were affected with the NSSIs. **Conclusion:** Awareness should be developed among nurses about risk factors of needle stick and sharp injuries to prevent them from these injuries and further studies are recommended in this sense.

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INTRODUCTION

A needle-stick injury (NSI) is defined as "A penetrating wound with an instrument that is potentially contaminated with the body fluid of another person". NSSIs represent a major occupational hazard in the health care industry, with professional nurses incurring a large proportion of the total burden particularly with items that have been previously used on patients. Needle-stick and other percutaneous injuries pose the greatest risk of occupational transmission of serious blood borne infections such as hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) to health care workers (HCW) and patients.[1,2,3]

Injuries caused by needles and sharp and cutting objects include wounds, cuts, or abrasions caused by medical devices that may have already been contaminated with blood or other body fluids.[4] In most studies on injuries caused by needles and sharp objects, the injuries are introduced as an important occupational hazard for nurses. There are about thirty-five million healthcare workers in the world who make up 12% of the world labor force. More than 90% of infections caused by sharp tools among healthcare workers occur in low-income countries where these injuries are preventable.[5]

According to the World Health Organization (WHO), 16000 HCV, 66000 HBV and 1000 cases of HIV may have occurred worldwide in the year 2000 among health care workers through their

exposure, to NSSIs. In Turkey, about four million people are estimated to be carriers of chronic HBV between 0% and 2% of the blood donor population were found to be HCV antibody positive. The numbers of patients with HIV reported is relatively low; rates have been increasing steadily in recent years, whereas this number reached a total of 1325 in 2001. WHO reports that the number of sharp and needle stick injuries per person among health care staff are 4 per year in Africa, Western Mediterranean and Asia.

In Pakistan a study done in 300 health care workers at Holy Family Hospital Rawalpindi, revealed their inadequate knowledge about the risks associated with needle stick injuries.[6] While another study from Rawalpindi Medical College concluded that needle stick injuries due to syringe recapping and surgical stitch needle were the frequent causes of injury in doctors working in tertiary care hospitals of Rawalpindi who work under stressful and overworked circumstances. The present study was done to find out the knowledge, attitude and practices of needle stick injuries amongst health care workers in our set up (Khurramet al., (2011).

In Pakistan, a number of factors for the underreporting of NSIs are presented in the literature and include lack of awareness that NSIs need to be reported, lack of awareness of where to report, the belief that there is no point in reporting incidents, and unwillingness to report the incident. The fear of getting blamed was also found to be a common reason among dental students. There is, however, a dearth of information on the prevalence, risk factors, and reasons for underreporting NSIs among dental-HCWs in Pakistan despite the high NSI prevalence. Synthesizing existing evidence on the prevalence and risk factors of NSIs and the rate and reasons of underreporting of NSIs among dental-HCWs in Pakistan can potentially underline the existing gaps in the available literature and dental practices that may require further consideration.

Significance of the Study:

As most of the cases of NSSIs are under reported in developing countries and Pakistan is one of these countries, so this study aims to collect data of NSSIs among nurses in a tertiary care hospital of Faisalabad city and to determine factors, circumstances, affected sites, most common equipment and other important reasons of NSSIs among health care providers. It is clear that serious consequence of NSSIs can be markedly reduces by increasing awareness of safe needle practice. Therefore in this the assessment of causes of needle stick injuries among nurses was be studied. The various factors associated with knowledge and practices gaps among study participants were also be identified in this research. The complimentary roles and functions of knowledge, attitude, and continued nursing education in a clinical setting is the significance of the study. The long term goal of creation of awareness on dangers of a needle stick injury with abolition of social stigmas in reporting, also inculcating safe practices with need for continued medical education was demonstrated.

Research Questions:

1. What are the causes of needle stick and sharp injuries among nurses in Faisalabad Institute of Cardiology, Faisalabad?

2. What is the level of knowledge regarding causes and risk factors, incidence, management, consequences and prevention of needle stick and sharp injuries among nurses in Faisalabad Institute of Cardiology, Faisalabad?

MATERIAL AND METHOD

This research was quantitative; a self-administered questionnaire was the tool to analyze the causes of needle stick and sharp injuries among nurses of Faisalabad Institute of Cardiology, Faisalabad. This research was based on cross-sectional survey to assess the causes of

and needle stick and sharp injury among nurses of Faisalabad Institute of Cardiology, Faisalabad. All nurses contacted during the study period were included in the study. The sample of current study was comprised of 150 nurses at Faisalabad Institute of Cardiology, Faisalabad. A self-administered questionnaire was used to collect the data.

The questionnaire elicits information on nurses' demographic characteristics frequency/nature of exposures, and the causes of needle stick and sharp injuries. The questionnaire was constructed in English. The questionnaire was pre-tested before the actual data collection. Four clinical nurses were recruited to facilitate the data collection process and one day training was given. The questionnaires/Data collection tool was distributed amongst all 200 nursing staff. The data tool was given to the staff attending duty in their respective shifts. After completion, the completed questionnaire was collected and returned immediately to the principal investigator. Incomplete forms were also taken as dropouts. The data of current research study was analyzed with the help of statistical software which known as SPSS (Statistical Package for Social Sciences) version 21. Descriptive statistics i.e. Cross Tabulation and Frequency Distributions were used for the description of trends in the data.

RESULTS

In table 4.l, dem0graphic characteristics 0f the nurses are given, i.e., marital status, educati0n, shift r0tati0n etc.

Table 1. Demographic Characteristics of the Nurses

Marital Status	**Single**	**Married**	**Total**		
	61 (40.7)	89 (59.3%)	150 (100.0%)		
Education	**Diploma**	**Bachelor**	**BSN**	**Total**	
	81 (54%)	44 (29.3%)	25 (16.7%)	150 (100%)	
Work Shift	**Morning**	**Evening**	**Night**	**Rotation**	**Total**
	59 (39.3%)	44 (29.3%)	41 (27.3%)	6 (4.0%)	150 (100%)
Ward	**Medical**	**Surgical**	**ICU**	**Emergency**	**Total**
	20 (13.3%)	29 (19.3%)	52 (34.7%)	49 (32.7%)	150 (100%)
Knowledge about Needle Stick & Sharp Injuries	**Yes**	**No**	**Total**		
	135 (90.0%)	15 (10.0%)	150 (100%)		
Training of from Needle Stick & Sharp Injuries	121 (80.7%)	29 (19.3%)	150 (100%)		

Table 2. Causes of NSSIs among Nurses

Causes of NSSIs among Nurses	Yes	No	Total
NSSIs happened while recapping a used needle	121 (80.7%)	29 (19.3%)	150 (100%)
NSSIs happened withdrawing a needle from rubber or other resistance	75 (50%)	75 (50%)	150 (100%)
NSSIs happened after use, before disposal	98 (65.3%)	52 (34.7%)	150 (100%)
NSSIs happened while putting the item into disposal container	102 (68.%)	48 (32.0%)	150 (100%)
NSSIs happened while restraining patient	104 (69.3%)	46 (30.7%)	150 (100%)
NSSIs happened when device left on floor, table, bed or other inappropriate place	132 (88.0%)	18 (12.0%)	150 (100%)
NSSIs happened due to pressure of work	104 (69.3%)	46 (30.7%)	150 (100%)
NSSIs happened due to collision with other person	65 (43.3%)	85 56.7%)	150 (100%)
NSSIs happened due to removing the cap of a needle	110 (73.3%)	40 (26.7%)	150 (100%)
NSSIs happened while administering IV medication	115 (76.7%)	35 (23.3%)	150 (100%)
NSSIs happened while opening ampules	112 (74.7%)	38 (25.3)	150 (100%)
NSSIs happened due to tiredness and lack of sleep	86 (57.3%)	64 (42.7%)	150 (100%)

Table 3. Impact of Ward on the happening of NSSIs

Occurrence of NSSIs	Yes	No	Total	Mean	SD	Sig
Medical	18 (12%)	2 (1.33%)	20 (13.33%)			
Surgical	25 (16.67%)	4 (2.67%)	29 (19.33%)	20.88	1.839	.000**
ICU	32 (21.33%)	17 (11.33%)	49 (32.67%)			

Causes of Needle stick and Sharp Injuries in Nurses

Statistical Analysis

** Highly significance

Table 3 shows the impact of working ward on the occurrence of NSSIs among nurses. It shows that the nurses working in emergencies were major victims of NSSIs as 34 percent (N=51) were affected with the NSSIs. The Mean value was 20.88, standard deviation was 1.839 which shows highly significant relation between ward and the occurrence of NSSIs.

DISCUSSION

In this study 84% (N=126) nurses working at Faisalabad Institute of Cardiology workers experienced needle stick injuries in their professional life. Emergency department workers were most frequently affected followed by those working in different wards and ICU. All individuals who have occupational exposure to blood are at increased risk for acquiring blood-borne infections. The level of risk depends on the number of patients with that infection in the health care facility and the precautions that the health care workers observe while dealing with these patients. Occupational health and safe medical practice is coming up as an issue in developing countries including Pakistan. Needle stick injury is one such issue that should be addressed to prevent blood borne diseases in health care workers in Pakistan.

Studies have shown that the risk of needle stick & sharps injuries exists not only after use of the sharp and during its disposal but also during the transportation of used sharps.

Belachew et al., conducted a census among 318 nurses working in public hospitals to know the causes of NSSIs. Data were collected by using pretested self-administered questionnaire. SPSS were used for data entry and analysis, respectively. Descriptive statistics were done. Bivariate and inter multivariate logistic regression analysis was also carried out to identify predictors of occupational hazards. The overall prevalence of blood/body fluid exposure and needle stick/sharp injury was found to be 249 (78.3%). Blood/body fluid exposure and needle stick/sharp injury incidents were reported by 62.6 and 58.8% of respondents, respectively. Majority of the hazards occurred during morning shift. It was exposed tat prevalence of blood/body fluid exposure and needle stick/sharp injury was high among the nurses.

d'Ettorre investigated the relationship occurring between consecutive workdays, nightshifts, cumulative hours, forward-rotating shift schedules (morning–afternoon–night), and occupational NSSIs frequency. He conducted a cross-sectional nested case–control analysis from staffing data concerning 765 RNs and NSSIs occurred during a period of 48 months. NSSIs were more frequent among RNs working 3 or more night-shifts compared to RNs working less than 3 night-shift in the 7 days prior occurrence of NSSI; moreover, NSSIs were more frequent among RNs working 9 or more night-shifts compared to RNs working less than 4 night shifts in the 28 days prior to NSSIs occurrence. Constant forward-rotating shift schedules showed a protective effect in preventing NSSIs compared to irregular forward-rotating shift schedules in the last 28 days (odds ratio = 0.45; 95% confidence interval = 0.22–0.91; $P < 0.05$). Conclusions: In this study, the author observed an association between NSSIs and shift-work schedules, including night-shifts. The findings supported the need for organizational interventions targeted on implementing forward-rotating shift-work schedules and minimizing night-shifts as part of the overall NSSIs prevention efforts in healthcare facilities.

Kandeel & El-Gilany estimated the frequency of NSSIs among housekeeping workers compared with other healthcare workers and evaluated the effect of preventive measures to reduce these injuries in housekeeping workers. The study was conducted in one Saudi Arabian hospital between 2011 and 2013. NSSIs were analyzed retrospectively and an intervention for housekeepers that included 43 sessions of education and increased resources and supervision was implemented in 2012. Evaluation measures included monitoring sharp disposal compliance, reports of improperly disposed sharps, use of heavy duty gloves, hepatitis B vaccination, and the frequency of NSSIs during 2012 and 2013. Chi square and Fisher's exact tests were used for comparison between groups and pre-post intervention.

In 2011 NSSIs rates were 17.8% for housekeeping staff, 3.7% for nurses and 1.3% for doctors, although injury frequency varied by department. Also, 15% of housekeepers were immune to HBV and 21% used heavy duty gloves during waste management. During 2012 and 2013 NSSIs rate dropped significantly to 9.6% and 2.7% respectively, and HBV immunization increased to 78.1% and 100%, respectively. Heavy duty gloves usage improved to 100%. Improper sharp disposal reports decreased from 15.1% in 2012 to 5.5% in 2013. Sharps disposal compliance improved from 35.6% to 78.1% in 2012 and 2013, respectively. Continuous education of housekeepers about all measures for prevention of NSSIs is the responsibility of infection control team. However, continuous monitoring along with continuous training programs and resources adequacy is needed to maintain this improvement.

Akyol & Kargin.[7] determined the determine the causes of sharp and needle stick injury in nurses working in a hospital, the use of safety practice exposure, to blood and blood containing material and contributing factors. A self-report questionnaire was completed by 201 nurses working at three Turkish hospitals. The most frequently encountered source of injury was injection needles (35.8%) followed by branules (5.5%), and suture needles (3.0%). Injuries occurred most frequently when the nurses were withdrawing a needle from rubber or other resistant material; recapping a used needle and disassembling a device or equipment. The majority of the nurses (74.6%) wear gloves and protective glasses. They indicated that emphasis on work practice, disposal systems, education strategies and infection control precautions should be employed to reduce NSIs and contributing factors.

Legesse et al., determined the causes of sharp and needle stick injury in nurses working in a hospital, the use of safety practice exposure, to blood and blood containing material and contributing factors. A self report questionnaire was completed by 201 nurses working at three Turkish hospitals. The percentage of nurse's “44.3% of the nurse's experience a sharp or needle sticks injury during their professional life”. The most frequently encountered source of injury was injection needles (35.8%) followed by branules (5.5%), and suture needles (3.0%). Injuries occurred most frequently when the nurses were withdrawing a needle from rubber or other resistant material; recapping a used needle and disassembling a device or equipment. The majority of the nurses (74.6%) wear gloves and protective glasses. The study indicates that emphasis on work practice, disposal systems, education strategies and infection control precautions should be employed to reduce NSIs and contributing factors.

Zhang et al.,[8] aimed to report the prevalence and risk factors of NSIs among nurses working at a Chinese teaching hospital. From 463 nurses, 402 completed questionnaires were obtained. A total of 261 (64.9%) nurses reported needlestick or sharps injuries. NSIs were more common among females, young nurses, surgical nurses, and junior nurses. Logistic regression analysis suggests that age and work department were independent risk factors for NSIs. By type of devices, syringe needles accounted for the highest proportion of all NSIs (59%), followed by glass items (22%), and trocar core/ catheter wires (4%). NSIs remain an important occupational hazard issue or Chinese nurses. They suggested that programs must be developed to prevent injuries caused by needle stick and sharps.

Khraisat et al.,[9] conducted a systematic review on the published scientific literature to provide accurate assessment of needle stick and sharp injuries among healthcare workers including prevalence, risk factors, predictors, reporting, and interventions. They included the research studies published in English language between

2011 and 2014, targeted population was the healthcare workers providing direct care to the patients in the hospitals. The search was limited to cross-sectional studies, retrospective studies, and randomized controlled trials conducted in the hospital.

The criteria to select articles were limited to peer-reviewed scientific publications and review articles were excluded. The included studies consisted of 10 cross-sectional, 7 retrospective, and 1 intervention study. In general, higher NSSI rates were found in nurses (average reported between 64.1% - 44.3%) compared to other occupational groups (average NSSI rate reported were first year resident physician 45%, interns 26% and housekeeper 12.3%). They revealed that NSSIs was an important occupational hazard among health workers in their daily working. More emphasis must be put on investigating methods and strategies to reduce NSSIs. Safety devices must be used more by HCWs to reduce NSSIs along with planning educational and training programs with close monitoring to practices.

Lulie et al.,[10] conducted a cross-sectional survey to evaluate the factors associated with needle stick and sharp injuries among health care workers. All healthcare workers contacted in the study period were included. Data was analyzed using SPSS version 16.0. Binary logistic regression was used to identify factors associated with needle stick and sharp injuries. From the total 332 healthcare workers enrolled, 216 (65.1%) were females. Nearly 2/3rd were diploma holders, and Nurse by profession. Hundred three (31.0%) had needle stick and sharp injury at least once in the previous 12 months. Three fourth of the injuries were due to needle stick. Those whose monthly income was >=1000.00Eth Birr, satisfied on their job, and worked in waste handling unit were likely u 4.1, 2.8, and 4.1 more likely to get injured than their counterparts respectively (Adjusted Odds ratio [AOR] =4.1, 95% Confidence Interval [CI] 1.27-13.14, AOR=2.78, 95% CI 1.01-7.63, and AOR=4.1, 95% CI 1.27-13.14). Those who worked in maternity unit were 80% less likely to get injured than those who worked in Emergency units (AOR= 0.20, 95% CI 0.05-0.78). Nearly 1/3rd of participants had needle stick and sharp injury at least once in the previous year. Suboptimal practices and behaviours that put them at risk to the injury were identified. Authorities should give on job training, and regular supportive supervision. Further research is needed to determine the incidence of the injury, and the type of disease they would acquire.

Cheung et al.,[4] conducted a cross-sectional survey study using a questionnaire confirmed to be valid and reliable, with a content validity index of 0.96 and reliability index of 0.82. NSIs/SIs, NSIs, and SIs were significantly increased by year of study ($P < .001$) in both the study period and 12-month prevalence. Four predictors for NSIs/SIs were final-year study (odds ratio [OR], 11.9; 95% confidence interval [CI], 3.9-36.7), perception of not receiving prevention training (OR, 2.8; 95% CI, 1.1-7.5), perception of not using a kidney dish to contain used needles and sharps (OR, 4.2; 95% CI, 1.7-10.3), and perception of not immediately discarding used needles and syringes into a sharps box (OR, 2.9; 95% CI, 1.2-7.4). They revealed that preclinical training, reinforcement of kidney dish use, immediate discarding of used needles, and adequate clinical supervision are essential elements in reducing the risk of NSIs and SIs.

Kakizaki et al., examined the current situation of NSSIs among health care workers at public tertiary hospitals in an urban community in Mongolia and explores strategies for the prevention of these injuries. A survey of 621 health care workers was undertaken in two public tertiary hospitals in Ulaanbaatar, Mongolia, in July 2006. A semi-structured and self-administered questionnaire was distributed

Emergency	51 (34%)	1 (0.67%)	52 (34.67%)			
Total	**126 (84%)**	**24 (16%)**	**150 (100%)**			

to study injection practices and the occurrence of NSSIs. A multiple logistic regression analysis was performed to investigate factors associated with experiencing NSSIs. Among the 435 healthcare workers who returned a completed questionnaire, the incidence of NSSIs during the previous 3 months was 38.4%. Health care workers were more likely to report NSSIs if they worked longer than 35 hours per week (odds ratio, OR: 2.47; 95% confidence interval, CI: 1.31-4.66) and administered more than 10 injections per day (OR: 4.76; 95% CI: 1.97-11.49).

The likelihood of self-reporting NSSIs significantly decreased if health care workers adhered to universal precautions (OR: 0.34; 95% CI: 0.17-0.68). NSSIs are a common public health problem at public tertiary hospitals in Mongolia. The promotion of adequate working conditions, elimination of excessive injection use, and adherence to universal precautions will be important for the future control of potential infections with blood-borne pathogens due to occupational exposures to sharps in this setting.

CONCLUSION

The basic objective of this research was to measure the occurrence of needle stick and sharp injuries among nurses in Faisalabad Institute of Cardiology, Faisalabad and to determine the causes of NSSIs among nurses at FIC, Faisalabad. It was found that 84% (N=126) nurses working at Faisalabad Institute of Cardiology workers experienced needle stick injuries in their professional life. Emergency department workers were most frequently affected followed by those working in different wards and ICU. In this study only 73.3% (N=110) nurses were aware about safe medical practices regarding needle stick injuries i.e. Universal precaution guidelines. This research found majority of the nurses having Diploma (35.67%) were having the knowledge about the NSSIs and 46% were trained as well. It was also found that nurses working in emergencies were major victims of NSSIs as 34 percent (N=51) were affected with the NSSIs.

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