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NEEDLE STICK AND SHARPS INJURIES;

FREQUENCY AND THE FACTORS CONTRIBUTING AMONG HEALTH CARE WORKERS OF A TERTIARY CARE PRIVATE HOSPITAL OF LAHORE

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ABSTRACT… Background: This study, therefore aims to assess the frequency and the factors contributing to the needle stick injuries among health care workers of a tertiary care private hospital of Lahore. **Setting:** Shalamar Hospital Lahore, Pakistan a tertiary care private institution. **Period:** July and August 2015. **Study Design:** Cross-sectional study. **Methods:** A modified structured pre-tested questionnaire containing both open and close-ended questions was administered to 160 study participants. The selected candidates were thoroughly briefed about the study and informed consent was obtained. Confidentiality and anonymity of the participants was maintained. Data entry was done on SPSS version 20 for Microsoft Windows. **Results:** The response rate was 97%. Among all respondents (n=122), almost 41% (n= 63) were medical doctors and 34% (n= 53) were nursing staff. A small proportion of 4% (n= 6) belonged to the dental surgical background as well. Of all the surveyed participants, 45% (n=69) had ever suffered from needle stick/ sharps injury during their medical job and career, whereas, 34% (n=53) had suffered from a needle stick injury during the last year. Nearly 63% (n=47) reported that the cause of injury was accidental, 16% (n=25) acknowledged lack of awareness, 7% (n=10) acknowledged improper equipment and 4% (n=6) accused lack of training as the major cause of needle stick injuries. A hefty 34% (n=53) believed that there existed no protocols in the institution regarding needle stick injuries, while another 50% (n=78) stated that they were not aware of the hospital protocols regarding needle stick injuries if there existed any. A disturbing 34% (n=53) assume that they should recap the needles after using them. There was a strong statistical association p<.001 between establishment of hospital protocols regarding needle stick or sharps injury and an event of needle stick injury suffered by the health care workers during last year. **Conclusion:** The needle stick injuries can be prevented by the eradication of hazard causing equipment's, prevention through engineering measures, administrative controls and last but not the least personal protective measures.

Key words: Needle Stick Injury, Sharps Injury, Health-Care Workers (HCW).

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INTRODUCTION

The World Health Organization (WHO) reports that a couple of million healthcare workers across the world, suffer from the distressing event of per cutaneous contact to infectious agents annually.[2] The inadvertent, unintentional accidental and non deliberate penetration skin injury in a medical setting by needles (hollow-bore or hypodermic) or catheter stylets, surgical scalpels or even broken glass is described as a needle stick injury.[3] Apart from blood borne, droplet and other contagious infections[4] health care workers including physicians and nurses in particular are at a considerable threat of needle stick injuries resulting in contraction of infectious agents like human immunodeficiency virus, hepatitis B and C viruses, the three of which can cause early fatality and morbidity.[3,4,5] Additionally, more than twenty different causative agents of different diseases have been described in literature to transmit diseases after needle stick injuries.[6] The chance of infection after a single deep trenchant needle stick or sharps injury with evident infected blood has been estimated as 33% for hepatitis B virus, 3.3% for hepatitis C virus and 0.3% for human immunodeficiency virus transmission.[7] It has been explored that almost every American surgeon during their training had suffered from a

needle stick or sharps injury.[3] The reasons behind sharps or needle stick injuries include numerous factors like practice of recapping the needle, improper disposal of needles and the type or design of needle.[7] This occupational hazard can be reduced by efficient preventive and control strategies aimed at a diminution of infected sharps' contact with healthcare workforce.[7] The World Health Organization advocates to its member nations to improve the occupational health of healthcare personnel.[8] Developed countries reduce the risk of diseases that can be transmitted to health personnel by continuous occupational surveillance where as the developing countries rarely monitor such events.[4] An estimate in 2007 affirmed that out of almost 40 million global workforce 3 million suffer from a needle stick or sharps injury annually.[5] Among all the needle stick injuries to the health care workers, 40% result in hepatitis B and C, whereas 2.5% ascribe HIV/AIDS.[5] A large fraction of health care personnel when interviewed in tertiary care setting of Karachi, Pakistan had suffered from a needle stick injury.[1] The information on actual burden of the phenomenon is scarce in Pakistan.[1] This study, therefore aims to assess the frequency and the factors contributing to the needle stick and sharp injuries among health care personnel of a tertiary care private hospital of Lahore.

METHODS

This was a cross-sectional study conducted on sample of 160 conveniently available health care workers at random currently working in Shalamar Hospital, Lahore. A modified structured pre-tested questionnaire containing both open and close-ended questions was administered to the study participants. The research was conducted during two months period of July and August 2015. The sample size was calculated based on the estimation by Pruss-Ustun et al that more than three million health care workers experience the stressful event of per cutaneous injury with a contaminated sharp object each year.[4] Overall the number of health care workers was estimated to be 35,702,000 worldwide.[4] This makes the prevalence of needle stick injuries to be 9% and hence the sample size of 151 on 95% confidence level. Assuming the design effect 1.5 for convenience sampling the data was entered in SPSS version 20 for statistical analysis. The selected candidates were thoroughly briefed about the study and informed consent was obtained. Confidentiality and anonymity of the participants has been maintained.

RESULTS

The questionnaire was given to a sample of 160 participants and 155 were returned, hence the response rate was 97%. An estimated 43% participants were males (n= 67) and 57% were females (n= 88). Among all respondents (n=122), almost 41% (n= 63) were medical doctors and 34% (n= 53) were nursing staff. A small proportion of 4% (n= 6) belonged to the dental surgical background as well.

Among all participants, 12% (n= 18) doctors and nurses had done post-graduation, where as 88% (n=137) had not yet been post-graduated and were house officers, medical officers, staff nurses or nursing students. Only 36% (n=55) of all the participants had ever attended an Occupational Health and Safety workshop. Almost 89% (n=123) of participants had been working in the institution for less than 3 years at the time of data collection. About 57% (n= 88) of all participants admitted of using sharps daily on high risk patients including those suffering from HIV, HBV and HCV, whereas, 30% (n=46) reported using sharps on high risk patient rarely. Almost 38% (n=59) of participants instill 5-10 injections per day. Of all the surveyed participants, 45% (n=69) had ever suffered from needle stick/ sharps injury during their medical job and career, whereas, 34% (n=53) had suffered from a needle stick injury during the last year. Among all the needle stick injuries 13% (n= 20) were abrasions, 28% (n=43) were skin ruptures and 6% (n=9) were deeper or penetrating.

Barely 25% (n= 38) got tested after the latest needle stick injury. Although 66% (n=102) agreed that needle stick injury should be reported immediately, only 12% (n=19) reported such an incident to supervisor and concerned authorities. Nearly 63% (n=47) reported that the cause of injury was accidental, 16% (n=25) acknowledged lack of awareness, 7% (n=10) acknowledged

improper equipment and 4% (n=6) accused lack of training as the major cause of needle stick injuries. A hefty 34% (n=53) believed that there existed no protocols in the institution regarding needle stick injuries, while another 50% (n=78) stated that they were not aware of the hospital protocols regarding needle stick injuries if there existed any. In case an incident happens 35% (n=54) believed to let the blood ooze out. Only 43 % (n=66) believed to report it to the authorities. A worrying 8% (n= 11) believed to self medicate and apply bandage. Thirty two percent (n=49) of the participants were unaware of the hospital sharps and needle disposal protocols. The left behind 45% (n=69) were dissatisfied with the disposal process and protocols. A shocking 34% (n=53) admitted to not using needle cutters before disposing off the syringes. The reason stated by the 37% (n=58) was given that no needle cutters were available. A very small 3% (n=4) didn't know how to use needle cutters whereas 10% (n=15) stated that it was not the policy of hospital. A disturbing 34% (n=53) assume that they should recap the needles after using them. A little more than half of the participants i.e. 56% (n=87) believe that they could throw away an opened sharp even if they had not used it after opening. The important associations and factors contributing to needle stick injuries during the last year are given in the Table-I.

Major Associations		Needle stick injury during the last year		P value (p)
		Yesn (%)	Non (%)	
Sharps Use Frequency on High Risk Patients(n=155)	Daily	22(14%)	23(15%)	.012*
	Alternate days	17(11%)	26(17%)	
	Weekly	6(4%)	15(10%)	
	Occasionally	8(5%)	38(25%)	
Main cause of needle stick injuries (n=147)‡	Accidental	42(29%)	55(37%)	.005*
	Others	10(7%)	40(27%)	
Time taken to report needle stick injuries (n=149)‡	Immediately	37(24%)	65(4%)	.604
	Within 24 hours	15 (10%)	32(21%)	
Presence of Hospital Occupational Health and Safety Department(n=149)‡	Yes	21(14%)	60(40%)	.007*
	No	32(22%)	36(24%)	
Established hospital's protocols regarding needle stick or sharps injury (n=150)‡	Yes	23(15%)	74(49%)	<.001*
	No	29(19%)	24(16%)	
Awareness of hospital's sharps and needles disposal protocols (n=151)‡	Yes	42(28%)	60(40%)	.012*
	No	10(7%)	39(26%)	
Needle sticks injuries attributable to sharps disposal process? (n=149)‡	5-10%	42(28%)	68(46%)	.143
	More than 10%	11(7%)	28(19%)	
Use of needle cutters before disposing off syringes (n=145)‡	Always	32(22%)	33(23%)	.003*
	Occasionally	9(6%)	18(12%)	
	Never	10(7%)	43(30%)	
Availability of containers to dispose off used SHARPS (n=150)‡	Yes	37(25%)	74(49%)	.387
	No	16(11%)	23(15%)	
Awareness of standard precautions to be taken while using SHARPS (n=151)‡	Yes	45(30%)	50(33%)	<.001*
	No	8(5%)	48(32%)	

Table-I. Factors contributing to needle stick injuries among heath care workers during the last year (n=155)
‡n<155 due to non responders

DISCUSSION

The high prevalence of hepatitis B and C among Pakistani health care workers can compromise patient safety and affect the health system performance at large.[9] Omar A. et al evaluated that majority of needle stick injury sufferers from all over Kuwait were nurses (67%), followed by doctors (14%), technicians (10%) and housekeeping personnel (9%).[7] Ohnishi K argued that nurses and doctors accounted for 72% and almost 20% of sharp injuries suffered by health-care workers in a university hospital in Japan.[10] Almost 54% injuries occurred in the hospital wards, 25% in operating rooms, and 12% in outdoors.[10] Hashmi A et al estimated that 35% of doctors (n=10) and 47% (n=15) of nurses in MCH Hospital Najran, KSA suffered from sharps injury during first half of 2012.[3] Aslam M et al estimated the frequency of

needle stick injuries (among health care workers (nurses, student nurses and paramedical staff) in public hospitals of Karachi in 2008 and reported an estimated 66% (n=281) of participants with history of at least one needle stick injury.[1] Also, around 13% (n=54) had one or more needle stick injury in the previous one month at work and half of them were affected by non-sterile needles.[1] Among the sufferers of sharps injury 45% (n=126) were nursing students and 55% (n=155) were professionals. In comparison this study concluded that among all (n=155), 45% (n= 69) of health care workers had ever suffered from a needle stick injury ever in their career, whereas 34% (n=53) of them (n=122) suffered from needle stick injuries during the last year. Among those who suffered from needle stick injuries during the last year (n=53), 51% (n= 27) were medical doctors and 40% (n=21) were nurses. This higher prevalence can be attributed to the fact that the 65% (n=100) of health work force of institution had not been trained in an occupational health and safety workshop. Saleem et al argue that although the knowledge concerning needle stick injuries advances with progressing years of medical schooling the prevalence of needle stick injuries also amplifies.[6] Saleem et al argued that only a minority of students observed basic safety measures such as wearing gloves, not recapping used needles and proper disposal of sharp objects.[6]

Akeem et al reported that only 20% of health workers in Ilorin, Nigeria reported their needle stick injury.[11] In comparison only 12% of the participants of this study reported their injuries to the concerned authorities. Amira C. and Awobusuyi J conducted a multicenter study in Nigeria and argued that as a post exposure prophylaxis, 12% respondents had their blood tested for HIV and HBV, 7% received antiretroviral drugs, and 2% received hepatitis.[12] This study reports that in comparison to Nigeria, 25% (n= 38) health care professionals got tested after the latest needle stick injury. Moreover, this study anticipated that 34% (n=53) of health workers assumed that they should recap the needles after using them. Aslam M et al attributed recapping of needles in 19% (n=10) of health care workers (nurses and paramedical staff) as a cause for needle stick injuries in tree tertiary care hospitals of Karachi, Pakistan.[1] Although this number is lower than 79% that was observed by Akeem et al among primary health care workers of Ilorin, North Central Nigeria, but it is still alarming and has room for improvement[11] if compared with only 3% of needle stick injuries attributable to recapping in Najran KSA as estimated by Hashmi et al.[3]

The needle stick injuries can be prevented by the eradication of hazard causing equipment's, prevention through engineering measures, administrative controls and last but not the least personal protective measures.[13] Examples of hazard elimination include removal of redundant sharps and using needleless intravenous systems.[13] The engineering control measures include employment of retractable needles, needles with sheaths and self blunting needles.[13] The managerial and administrative preventive measures include using policies to restrict the hazards by allocation of resources towards health worker's occupational safety, forming a needle stick prevention committee, pre exposure prevention planning, forbidding unsafe devices, and consistent training on the use of safe devices.[13] The most important personal protective measures includes avoidance of recapping needles and ascertaining the safe handling equipment before sharps use.[13] Surgeons and surgical staff can reduce their risk of contracting a serious viral infection by wearing two pairs of gloves instead of one pair of gloves.[2]

The limitations of this study included recall bias and using convenient sampling technique which was managed statistically by increasing the design effect to 1.5. Caution should be observed when generalizing the results of this study because it only involved a single tertiary care hospital. Further multicentre studies are required to find out the burden of needle stick and sharps injuries among health care workforce.

CONCLUSION

Health workers including physicians and nurses in particular are at a considerable threat of needle stick injuries resulting in contraction of

infections agents like human immunodeficiency virus, hepatitis B and C viruses, the three of which can cause early fatality and morbidity. The chances of infection after a single needle stick or sharps injury sharply rises for certain diseases like HIV, Hepatitis B and C. Of all the surveyed participants, 45% had ever suffered from needle stick/ sharps injury during their medical job and career, whereas, 34% had suffered from a needle stick injury during the last year. The cause of injury was accidental, lack of awareness, improper equipment and lack of training. The reasons behind sharps or needle stick injuries include numerous factors like practice of recapping the needle, improper disposal of needles and the type or design of needle. No protocols in the institutions regarding needle stick injuries are present. There is a strong statistical association between establishment of hospital protocols regarding needle stick or sharps injury and an event of needle stick injury suffered by the health care workers during last year. The needle stick injuries can be prevented by the eradication of hazard causing equipment's, prevention through engineering measures, administrative controls and last but not the least personal protective measures.

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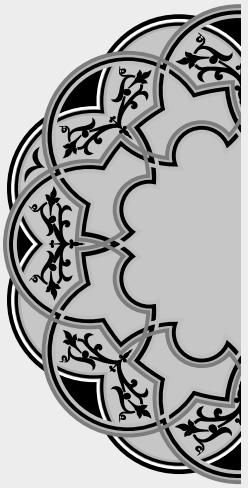

"People too weak to follow their own dreams will always find a way to discourage yours."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Syed Tehseen Haider Kazmi	Review of manuscript, Data analysis and supervision.	
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