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NEEDLE STICK INJURIES AMONG STAFF NURSES IN A TERTIARY CARE HOSPITAL OF CENTRAL INDIA

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ABSTRACT

Background: Percutaneous injuries caused by needlesticks, pose a significant risk of occupational transmission of bloodborne pathogens. Their incidence is considerably higher than current estimates, and hence a low injury rate should not be interpreted as a non existent problem.
Aims and Objectives: To Study prevalence of needle Stick injuries among staff nurses during patient care and some factors influencing the prevalence of needle stick injury.
Methods: Study design- Cross sectional Study, Study setting – Tertiary care hospital in Nagpur. Study duration Aug 2009 to Feb-2011, Sample size – 450 Staff nurses working in hospital involved in patient care directly. Using interview technique information regarding needle stick injury (NSI) was recorded in predesigned and pretested proforma. Data was analysed using STATA software.
Results: Mean age of Staff nurse was 44.63 ± 7.90 years. Maximum nurses were posted in Medicine 18.22%, Surgery (15.56%), OBGY (12.22%). OT 11.78%) and Pediatrics (10%). Mean duration of service is 19.48 ± 7.77 years The case incidence of NSIs was 31.78% (143/450). The total number of episodes of NSIs among respondents was 341 (range: 1-5 episodes) with incidence rate of episodes i.e. 2.39 per person/Year among them. The causal devices in 215 cases (63.64%) were hypodermic needles and the main causes of percutaneous injuries with hypodermic needles were during injecting drugs (38.4%) and handling sharp wastes (32.9%).
Conclusion: Nurses working in Govt Medical College and Hospital Nagpur are frequently exposed to blood-borne infection. NSIs were highly prevalent in these nurses therefore more intensive education programs should be directed at nurses to increase their awareness of and compliance with universal precautions (UP). We recommend a surveillance system and a center for managing injured persons.

Keywords: Staff nurse, Hypodermic needle, Needle stick injury.

Introduction

Health care workers (HCWs) who are exposed to needle in their clinical activities are at increased risk of acquiring needlestick which may lead to serious or fatal infection with blood-borne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV) or human immunodeficiency virus (HIV) (1). Nursing personnel report nearly 30 needle sticks per 100 full-time equivalent employees per year [2].

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The activities associated with the majority of needlestick injuries (NSIs) are injections, blood sampling, recapping and disposing needles and also handling trash [3]. The National Institute for Occupational Safety and Health (NIOSH), USA defines needle stick injuries as injuries caused by objects such as hypodermic needles, blood collection needles, intravenous (IV) stylets and needles used to connect parts of IV delivery systems [1].
Potential exposure are not limited to needle sticks alone because manipulation of other sharp instruments or mucous membrane exposure to infected body fluids also can results in transmission of infectious diseases [2]. The risk of pathogen transmission from infected persons to nonimmune persons through an injury with a sharp instrument has been estimated to be between 6% and

30% for HBV, between 5% and 10% for HCV, and 0.3% for HIV [4]. While there is considerable evidence to suggest that hepatitis B is rapidly transmissible by needlestick or other muco-cutaneous relatively few studies have reported the blood exposure accidents among nurses and other paramedical personnel.[5]In India, the problem of exposure to contaminated blood among nursing personnel's is not well documented. The aim of this study was to determine the incidence of needle stick injuries in population of nurses Tertiary care hospital in Nagpur in terms of number of cases and frequency of the injuries.

Materials and Methods

This was a cross-sectional, questionnaire based study that was performed among 450 nursing workers in Tertiary care hospital in Nagpur a 1400-bed public teaching hospital in Central India during Aug 2009 and Feb 2011. The survey instrument comprised a tick-box format, with sections for demographic items, the type of devices that caused the NSI, whether the device has been used on a patient prior to the NSI (contaminated devices), and how the injury occurred. The nurses who work in the hospital were asked about their experience of needlestick and sharp injuries from last 12-month recall period. In this study, needlestick injury was defined as percutaneous injury caused by hollow-borne needles, suturing needles, scalpel blades and lancets. Subjects were interviewed using structured questionnaire. Cases of needle stick injuries were the number of personnel who have had at least one experience of needle stick injury. The episodes of needle stick injuries were the number of injuries that were experienced by respondents. Data regarding the Site of injury, Procedure during NSI occurs and time of injury was recorded. The incidence of cases was the number of cases to the number of nurses who answered the questionnaire and the incidence of episodes was the number of episodes to the number of respondents. The respondents were also asked about needlestick injuries in their overall work experience.

Statistical analysis

The data obtained was analyzed with STATA software, version 11.0 Data are given as mean±SD for quantitative variables and counts as well as percentages for categorical variables.

Results

A total of 450 were interviewed. All the study subjects were female and 67.56% were above 40 years of age. Mean age of Staff nurses was 44.63 $\pm$ 7.90 years (Table 1). Maximum nurses were posted in Medicine 18.22%, Surgery (15.56%), and OBGY (12.22%). OT (11.78%) and Pediatrics (10%)(Table 2). Mean duration of service is 19.48 $\pm$ 7.77 years with 51.78% having duration of service between 11 to 20 years (table 3). The case incidence of NSIs was 31.78% (143/450). Out of 143 staff nurse 53(37.06%) had experienced needle stick injury twice (table 4).The total number of episodes of NSIs among respondents was 341 (range: 1-5 episodes) with incidence rate of episodes i.e. 2.39 per person/Year among them. The highest proportion if NSI was in Minor OT(42.86%) followed by OBGY (41.82). The causal device in 215 cases (63.64%) was hypodermic needles and the main procedure responsible for percutaneous injuries with hypodermic needles were during injecting drugs (38.4%) and handling sharp wastes (32.9%).commonest site of NSI was fingers 98.53%.50.44% of NSI were occurs in evening shift of 2pm to 8 pm.

Table 1: Age Wise Distribution of Study Subjects

Age Group in Years	Study Subjects	
	Number	Percentage
≤ 25	01	00.22
26-30	20	04.44
31-35	36	07.96
36-40	89	19.88
41-45	108	23.96
46-50	77	16.94
51-55	82	18.46
≥ 56	37	8.14
Total	450	100.00

Table 2: Section wise Distribution of Study Subjects

Section	Study Subjects	
	Number	Percentage
Medicine	82	18.22
Surgery	70	15.56
OBGY	55	12.22
Major OT	53	11.78
Paediatrics	45	10.00
Orthopaedics	22	04.89
TB and Chest	18	04.00
ENT	14	03.11
Ophthalmology	12	02.67
Radiotherapy	12	02.67
Casualty	11	02.44
Radiology	11	02.44
OPD	08	01.78
Paying ward	07	01.56
Plastic Surgery	07	01.56
Minor OT	07	01.56
Psychatry	06	01.33
Skin and VD	06	01.33
IPC and Injection room	04	00.88
Total	450	100.00

Table 3: Distribution of study subjects according to duration of service

Duration of Service in Years	Study Subjects	
	Number	Percentage
≤ 5	14	03.10
06-10	34	07.56
11-15	133	29.56
16-20	100	22.22
21-25	45	10.00
26-30	81	18.00
31-35	42	09.34
≥ 36	01	00.22
Total	450	100.00

Table 4: Frequency distribution of needle stick injuries during last one year

Number of needle stick Injuries	Study Subjects	
	Number	Percentage
1	51	35.67
2	53	37.06
3	15	10.49
4	07	04.89
5	11	07.69
>5	06	04.20
Total	143	100.00

Table 5: Section wise Distribution of Study Subjects with needle stick injury

Section	Study Subjects	
	Number	Percentage
Minor OT(n=7)	03	42.86
OBGY(n=55)	23	41.82
Radiotherapy (n=12)	05	41.67
Major OT (n=53)	22	41.51
Medicine (n=82)	30	36.58
Psychatry (n=6)	02	33.33
Skin and VD (n=6)	02	33.33
Ophthalmology (n=12)	04	33.33
Surgery (n=70)	22	31.43
Plastic Surgery (n=7)	02	28.58
Paying ward (n=7)	02	28.58
ENT (n=14)	04	28.57
TB and Chest (n=18)	05	27.78
Orthopaedics(n=22)	06	27.27
Casualty(n=11)	03	27.27
OPD(n=8)	02	25.00
Paediatrics(n=45)	05	11.11
Radiology(n=11)	01	09.09
IPC and Injection room(n=4)	00	00.00

Table 6: Various needles causing needle stick injuries

Type of Needle	Number of Injuries (n=341)	Mean	SD	Range
Suture Needle (n=23)	54	2.35	1.67	1-8
HypodermicNeedle (n=115)	215	1.87	1.02	1-5
Intracath (n=30)	51	1.72	0.88	1-5
Scalp Vein (n=2)	03	1.50	0.71	1-2
Lancet (n=12)	18	1.50	0.52	1-2

Table 7: Various procedures resulting needle stick injuries

Procedure	Number of Injuries (n=341)	Mean	SD	Range
Assisting in Surgery (n=29)	76	2.62	2.21	1-10
Handling Sharp waste (n=69)	112	1.62	0.80	1-5
Injecting drugs (n=84)	132	1.54	0.84	1-5
Drawing blood sample (n=2)	03	1.50	0.71	1-2
Re-capping the needle	17	1.06	0.26	1-2
Other(n=1)	01	1	--	--

Table 8: Site of needle stick injury

Site	Number of Injuries (n=341)	Mean	SD	Range
Finger (n=142)	336	2.37	1.88	1-10
Palm (n=3)	04	1.33	0.58	1-2
Sole (n=1)	01	1	--	--

Table 9: Distribution of needle stick injuries according to time of occurrence

Time of occurrence of injury	Injuries	
	Number	Percentage
2 pm-8pm (n=103)	172	50.44
8am-2pm (n=48)	94	27.56
8pm-8am (n=47)	69	20.24
Don't remember (n=6)	06	01.76
Total	341	100.00

Discussion

This study showed that nurses were exposed to the risk of exposure to blood-borne diseases such as HBV, HCV and HIV through NSIs. Needlestick injuries are one of the hidden problems in the health care workers(12, 16). The mean age and duration of service was similar with the studies of Khader Y *et al*(6), Chunquing lin *et al*(7), Karbakash M *et al*(8), Malak M et al(9) and Hamlyn et al(10).The prevalence of NSIs in this study (31.78%) was similar with Kulkarni MS et al(11), Mehta A et al(12), Karbaksh M et al(8) while Jayant S et(13) al,Tetali S et al(14) and Khader Y et al(6).found higher prevalence of NSI in their studies.In present study the higher percentage of NSI was in Minot OT (42.26%) the findings of various studies shows more percentage as Jayanth S *et al*(13) – Medicine Ward (42.24%), Chunqing Lin *et al* (7)– OT (87%), Malak M (9)et al out of 1315 health worker 20.3% having NSI in surgical room, In Gupta A et al (14)study 26.9% were having NSI in medicine ward. Present study shows Hypodermic needle was responsible for NSI and during drug injecting this finding is in concordance with study of Kulkarni MS *et al*(11), Mehta A *et al(*12), Khader Y *et al,* Karbakash M *et al*, Malak M *et al*, Jayanth S *et al* and Hamlyn et al.(6,8,9,10,13)Present study reveals that the maximum number of NSI occurs in evening shifts (50.44%) similar findings were reported by Karbaksh M(8) et al and Nsubuga F *et a*l(14). Overall, this study showed that NSIs were counted as an important hazard for nurses. Thus, the importance of intervention strategies to reduce NSIs exposure must remain an essential facet of nursing education. In other studies the risk factors for injury have been described. As needlestick injuries often occur during unnecessary handling of a used needle, therefore needles should, never be recapped or otherwise unnecessarily handle after usage. Care should be taken to place used needles in puncture-resistance containers as soon as possible following infection or blood sampling. The benefit of prophylaxis following percutaneous exposure to HBV infection is well documented. We recommend the establishment of a surveillance system and also a center for managing injured persons as well as following up injured health care workers as a part of a local research or ongoing an audit project.

Conclusion: Nurses working in Govt Medical College and Hospital Nagpur are frequently exposed to blood-borne infection.NSIs were highly prevalent in these nurses therefore more intensive education programs should be directed at nurses to increase their awareness of and compliance with universal precautions (UP). We recommend a surveillance system and a center for managing injured persons.

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