

Full Length Research Paper

Prevalence and predictors of needle stick injury among nurses in public hospitals of Jimma Zone, South West Ethiopia

Kebede Bidira¹, Mirkuzie Woldie² and Gugsan Nemera^{1*}

¹Department of Nursing, Jimma University, Ethiopia.

²Department of health service management, Jimma University, Ethiopia.

Received 15 July, 2014; Accepted 3 August, 2014

Healthcare professionals may encounter infectious microorganisms while providing health care for patients predominantly following percutaneous needle stick injuries. Approximately 3 million percutaneous exposures to blood borne pathogens occur annually among healthcare workers worldwide. However, to what extent does this problem occur among nurses in public hospitals of Jimma Zone is not known. A cross-sectional study was conducted on 211 nurses working in public hospitals of Jimma Zone from 20 to 30 March, 2012. Data was collected through self-administered questionnaires. Of the total 211 nurses, 83 (39.3%) had sustained needle-stick injuries in the last one year. The odds of needle-stick injury were 88% less likely among nurses who had received training on needle-stick injury (adjusted odds ratio (AOR) = 0.2, 95% CI = 0.1, 0.4). The risk of a needle-stick injury was 3 times higher in nurses who had a low level of knowledge when compared with nurses having a high level of knowledge (AOR = 3.2, 95% CI = 1.6,6.5). The study revealed that a significant amount of needle-stick injuries occurs among nurses in hospitals of Jimma zone.

Key words: Prevalence, predictors, needle-stick injury, nurses, Jimma Zone.

INTRODUCTION

Needle-stick injuries (NSIs) refers to a penetrating wound with various types of needles (hypodermic blood collection, intravenous (IV) stylets and IV delivery systems connectors) (My and Hi, 2003) which are potentially contaminated with another person's body fluid

(Galougahi, 2010). The Centers for Disease Control and Prevention (CDC) estimates that about 236,000 to 384,000 hospital workers sustain needle-sticks injuries, and nurses share 40% of it (Clarke et al 2002). These injuries occur in a variety of procedures like during needle

*Corresponding author. E-mail: gugsanemera@gmail.com.

(Author(s) agree that this article remain permanently open access under the terms of the [Creative Commons Attribution License 4.0 International License](http://creativecommons.org/licenses/by/4.0/)

recapping, operative procedures, blood collection, intravenous line administration, suturing, checking blood sugar and poor sharp disposal system (Rodrigues, 2010; Mehta and Rodrigues, 2010). Needle-stick injury exposure in African countries is higher than other countries where the occupational safety of health care workers are often neglected in spite of the high risk of infection due to higher disease prevalence, low level awareness of the risks associated with occupational exposure to blood, inadequate supply of personal protective equipment (PPE), and limited organizational support for safe practices. Moreover, health care workers practicing in poor countries such as Ethiopia are more exposed to human immunodeficiency virus (HIV) and hepatitis B virus (HBV) following occupational exposure, and are less likely to use post-exposure prophylaxis (PEP) than those working in developed countries (Moges, 2010; Emeka, 2009; Alemayehu, 2008).

Almost 90% of all the needle-stick injuries which occurred in nurses of third world countries is due to lack of knowledge, resources and training (Zafar et al., 2009). Needle-stick injury among nurses varies according to work place, country, professional level and procedures. For instance 39% of registered nurses in USA (Doebbeling et al., 2003), 39.4% of nurses in Iran (Ghofranipour, 2009), 62% nurses in Nigeria (Mokuolu and Olawumi, 2011) and 32% of them in Ethiopia had sustained needle-stick injury in 12 months period (Gebriel, 2004). In Ethiopia, where primary health care services are covered by nurses, it is important to develop their knowledge and practice on universal precautions since the risks of contracting infections following needle-stick injuries are high in their day to day activities. Yet, there is no documented data identified in the area of prevalence and predictors of needle stick injury of nurses working at public hospitals in Jimma zone. Thus, the finding of this study will have significant input in designing needle-stick injuries preventive mechanisms by Federal Ministry of Health (FMOH), nursing schools, Hospital and Health centers and all others. Finally, nurses will be the ultimate beneficiary of rewarded recommendation based on the study findings.

METHODOLOGY

A cross-sectional study design was conducted from 20th to 30th March, 2012 on 211 degree and diploma nurses working in different units of public hospitals in Jimma Zone. Data was collected using structured questionnaire developed after the review of relevant literature and adapted to local situations. The questionnaire has four sections: (a) Socio demographical history and work related factors; (b) knowledge of standard precautions (14 items) (high knowledge level group had more than 80% correct answers, moderate knowledge level group had 60 to 79% correct answers and less than 60% are considered for low level knowledge group); (c) personal risk to NSI and; (d) compliance with standard

precaution (10 items). Respondents who scored 85, 76 to 84.9 and 75.9% or less on compliance questions is labeled as full compliant, partially compliant and less compliant to standard precaution, respectively.

Data analysis

After data collection, each questionnaire was checked for completeness, edited and cleaned manually, then coded and entered into statistical package for social sciences (SPSS) version 16.0. Recoding, transforming and re-categorization of variables were performed. Socio-demographic data was summarized using frequency tables, percentages, tables, graphs and texts. Binary and multiple logistic regression analysis were computed to examine association between dependent and independent variables. Significant factors was declared at P-value less than < 0.05 .

Ethical approval

Ethical clearance was obtained from Jimma University Ethical Review Board. Letter of permission was obtained from each health hospital administrative bodies. Verbal consent was obtained from each study subject for their willingness to participate in the study.

RESULTS

Two hundred and eleven returned the questionnaires (90.9% response rate). The mean \pm SD of age was 31.7 ± 7.99 years and majority (51.7%) was in age range of 25 to 34 years. Majority, 124 (58.8%) were females, 111 (52.6%) married, and 170 (80.6%) diploma nurses. Twenty four respondents (11.4%) were from medical wards. One hundred and three (48.8%) respondents had served less than 5 year and the mean \pm SD year of service was 7.27 ± 6.56 . Only 61 (28.9%) of the nurses reported that they attained training on standard precaution in the two years preceding the survey (Table 1).

Knowledge and compliance with standard precautions

One hundred and nine (51.7%), 65 (30.8%) and 37 (17.5%) of nurses had low, moderate and high level of knowledge on standard precautions, respectively. Whereas, 69.7, 8.5 and 21.8% reported low, partial and full compliance with standard precautions.

Occurrence and characteristics of needle-stick injuries

A total of 2 to 5 (39.3%) of nurses reported sustained needle stick injuries in the last one year. 70 (37.8%) were from JUSH, 47 (43.1%) were age range of 25 to 34 years, 51 (41.1%) females, 46 (52.3%) single, 66 (41.2%)

Table 1. Description nurses in Jimma Zone public hospitals, Oromia Region, South West Ethiopia, March, 2012.

Characteristics		Frequency (n=211)	Percentage (%)
Place of work	JUSH	185	87.7
	Limu Genet Hospital	26	12.3
Age group	≤24	36	17
	25-34	109	51.7
	35-44	38	18
	≥45	28	13.3
Sex	Male	87	41.2
	Female	124	58.8
Marital status	Married	111	52.6
	Single	88	41.7
	Divorced	11	5.2
	Widowed	1	0.5
Department/unit	Outpatient department (OPD)	20	9.5
	Under five clinic	10	4.7
	MCH and delivery	22	10.4
	EPI	5	2.4
	Tb clinic	6	2.8
	Art clinic	9	4.3
	Emergency and injection room	11	5.2
	Pediatric ward	15	7.1
	Operating theatre	22	10.4
	Surgical ward	22	10.4
	Medical ward	24	11.4
	Intensive care unit	9	4.3
	Ophthalmology clinic	12	5.7
	Gynecology ward	4	1.9
	Chronic illness clinic	5	2.4
	Psychiatric clinic	5	2.4
Others*	10	4.7	
Profession/Job title	Diploma nurse	170	80.6
	Degree nurse	39	18.5
	Others**	2	0.9
Year of the service	<5	103	48.8
	5-10	63	29.9
	>10	45	21.3
Training on NSI	Yes	61	28.9
	No	150	71.1

*Triage room, physiotherapy room and Dental clinic. **Physiotherapist nurse and dental nurse.

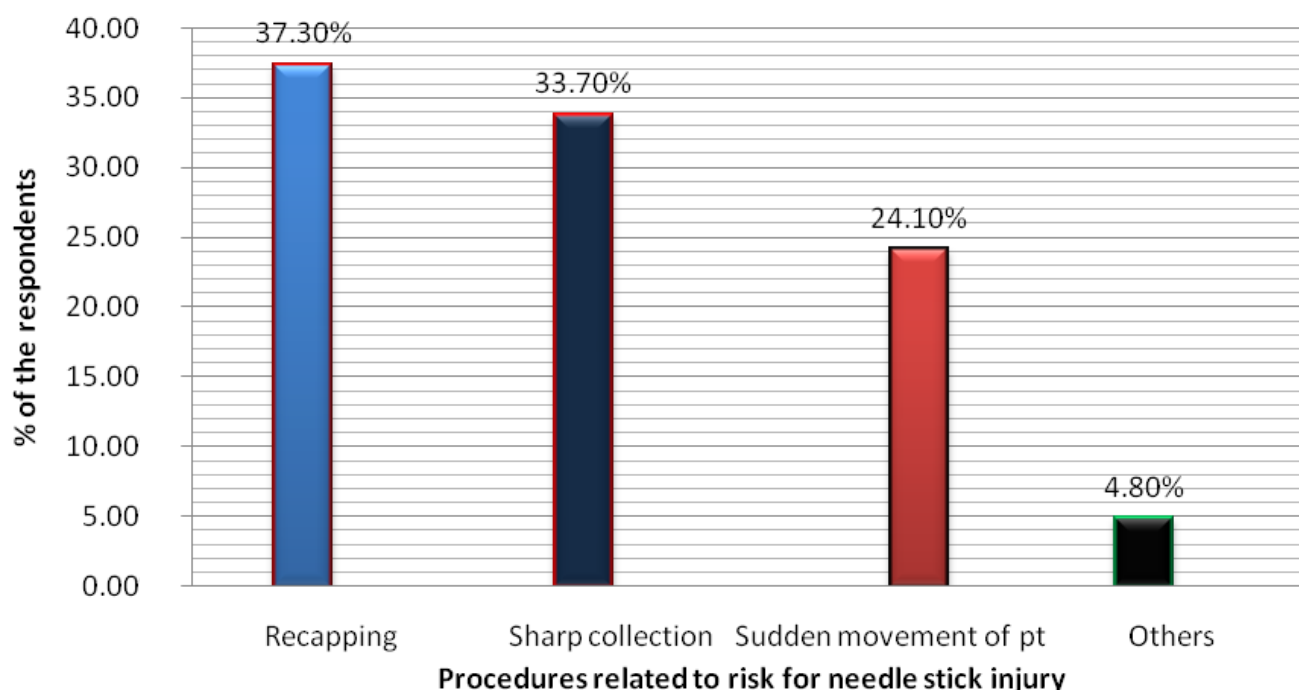


Figure 1. Procedures related to needle-stick injury among nurses, in public hospitals of Jimma Zone, Oromia Region, South West Ethiopia, March, 2012.

diploma nurse, 40 (48.1%) served less than five years. 64 (43.5%) nurses with low compliance and 38 (34.9%) nurse' who had low level knowledge reported sustained needle stick injury in the past one year (Table 2).

Procedures related to needle-stick injuries

31 (37.3%) reported that it was due to needles recapping and 28 (33.7%) were during sharp collection (Figure 1).

Factors associated with needle stick injury among nurses

The odds of needle stick injury was 88% less likely in those nurses who had received training on needle stick injury than those nurses who had not (AOR = 0.2, 95% CI = 0.1, 0.4). The risk of needle stick injury were 3 times higher in nurses who had low level of knowledge when compared with nurses having high level of knowledge (AOR = 3.2, 95% CI = 1.6, 6.5). Regarding avoiding needle recapping, the risk of needle stick injury were 2.6 times higher in those nurses who sometimes avoid needle recapping when compared to nurses who always avoid recapping needle (AOR = 2.6, 95% CI = 1.3, 5.2) (Table 3).

DISCUSSION

Exposure to blood borne pathogens is a serious occupational safety issue worldwide. Mandatory compliance with standard and transmission-based precautions is designed to prevent the transmission of infectious disease, regardless of the patient's known or suspected diagnosis. Nurses have the highest rate of documented needle stick injuries, yet do not always comply with mandated guidelines. Therefore, the nurses knew that complying with standard precaution on needle stick injury minimizes occupational risks of acquiring blood born infections due to needle stick injury. In this study, an effort has been made to identify the prevalence and predictors of needle stick injury. This study identified unacceptably low level knowledge 51.7%, self reported compliance 69.7% and high prevalence of needle stick injury 39.3%. The prevalence of needle stick injuries in current study is comparable with the study done in USA 39% (Doebbeling et al., 2003) and Uganda 40% (Reda et al., 2010). However, it is lower when compared to report from Iran (69%) in year 2010 (Ghofranipour, 2009) and India (100%) among health care workers (Nsubuga and Jaakkola, 2005; Manzoor et al., 2010). But, it was higher when compared with the study done in Awassa City in which 32% needle-stick injuries were reported in one year, respectively among health care workers (Gebriel,

Table 2. Distribution of needle sticks injuries among respondent, in public hospitals of Jimma Zone, Oromia Region, South West Ethiopia, March, 2012.

Variable		Frequency (N = 211)	
		Yes (%)	No (%)
Working place	JUSH	70 (37.8)	115 (62.2)
	Limu Genet Hospital	13 (50.0)	13 (50.0)
Age group	≤24	15 (41.7)	21 (58.30)
	25-34	47 (43.1)	62 (56.9)
	35-44	13 (34.2)	25 (65.8)
	≥45	8 (28.6)	20 (71.4)
Sex	Male	32 (36.8)	55 (63.2)
	Female	51 (41.1)	73 (58.9)
Marital status	Married	34 (30.6)	77 (67.4)
	Single	46 (52.3)	42 (47.7)
	Divorced	3	8 (72.7)
	Widowed	0	1
Job title	Diploma nurse	68 (40.0)	102 (60.0)
	Degree nurse	15 (38.5)	24 (61.5)
	Others**	0	2
Year of service	<5	40 (48.2)	63 (49.2)
	5-10	26 (31.3)	37 (28.9)
	>10	17 (20.5)	28 (21.9)
Training	Yes	10 (16.4)	51 (83.6)
	No	73 (48.7)	77 (51.3)
Departments/Units	OPD	10 (50.0)	10 (50.0)
	Under five clinic	4	6
	MCH and Delivery room	11 (50.0)	11 (50.0)
	EPI room	3	2
	TB clinic	1	5
	ART clinic	2	7
	Emergency and injection room	8	3
	Pediatric ward	7	8
	Operator theater	10 (45.5)	12 (54.5)
	Surgical wards	9	13 (59.1)
	Medical wards	8	16 (66.7)
	ICU	2	7
	Ophthalmology clinic	3	9
	Maternity ward	1	3
	Chronic illness clinic	1	4
Psychiatric clinic	2	3	
Others*	1	9	
Knowledge level (n = 83)	Low level	38 (45.8)	71 (55.1)

Table 2. Contd.

	Moderate level	37 (44.6)	28 (21.9)
	High level	8 (9.6)	29 (22.7)
Compliance level (n = 83)	Low	64 (43.5)	83 (56.5)
	Partial	6 (33.3)	12 (66.7)
	Full	13 (28.3)	33 (71.7)

*Triage room, physiotherapy room and Dental clinic. **Physiotherapist nurse and dental nurse.

Table 3. Factors associated with needle stick injury among nurses, in public hospitals of Jimma Zone, Oromia Region, South West Ethiopia, March, 2012.

Factors		AOR (95% CI)/P
Awareness on presence of rule/regulation/policy in hospital	Yes	5.4 (2.1, 13.8)*/0.00
	No	2.9 (1.3, 6.7)*/0.01
	I don't know	1
Training on standard precaution	Yes	0.2 (0.1, 0.4)*/0.00
	No	1
Knowledge about standard precaution	Low Level	3.2 (1.6, 6.5)*/0.00
	Moderate level	0.8 (0.3, 2.4)
	High level	1
Compliance with standard precaution	Low	2.3 (1.1, 5.0)*
	Partial	1.6 (0.5, 4.8)
	Full	1
Avoiding recapping of needle after use	Never	2.6 (0.7, 9.5)
	Sometime	2.6 (1.3, 5.2)*/0.00
	Always	1

*p-value ≤ 0.05 .

study population in the other places included all health care workers (HCWs) whereas our study included only nurses.

In our finding, the occurrence of needle-stick injuries among diploma nurses (41.2%) was the highest. It was consistent with study done in Awassa City in which the occurrence of needle-stick injuries among diploma nurses 30.3% was the highest. The most common reason for sustaining NSIs in our study was due to recapping of needle; 37.3% of the respondents sustained the injury during recapping and 24.1% of them experienced it due to sudden movement of patients. It was consistent with study done in India and Iran in which recapping needles was a common cause of NSI, 39 and 32.4%, respectively (Manzoor et al., 2010; Gebriel, 2010).

According to our study, 51.7% of the respondents had low level of knowledge while the remaining of the

respondents 30.8% of them had medium level of knowledge group and 17.5% had high level of knowledge group. In another study done in Maldives in year 2007 on knowledge, attitude and practice of standard and transmission-based precaution, 60.2% of the respondents had low level of knowledge, 36.4% had moderate level of knowledge and 3.4% of them had high level of knowledge, in which low and moderate knowledge were lower, but high level knowledge was higher when compared with previous study. The difference could be due to the gap of the study period, and also our study included only nurses but the previous study included both doctors and nurses; this could be the cause of the difference. In a study conducted in Awassa City, in Southern Ethiopia, among factors contributing to the occurrence of needle-stick injuries, sex, job category and years of experience were not significantly associated with the risk of

sustaining needle-stick injuries. It was consistent with our finding in which sex, job title and service year were not significantly associated with the risk of sustaining needle-stick injuries. Training on needle-stick injuries and recapping of needle were factors predicting the occurrence of needle-stick injuries among healthcare workers. It is also consistent with our finding in which training was (AOR = 0.167, 95%CI=0.069-0.402) and recapping needle sometimes was (AOR=2.62, 95% CI = 1.329, 5.166) (Manzoor et al., 2010).

CONCLUSION

The prevalence of NSI among nurses in Jimma zone public hospitals is 39.3%. High risk of needle-stick injury was observed among nurses working in emergency and injection room, expanded program of immunization (EPI), outpatient department (OPD), maternal and child health care (MCH) and delivery room, operation theater, surgical and medical wards. Moreover, nurses who had low level of knowledge about standard precaution and low compliance with standard precaution had higher risk of needle stick injury. Training on standard precaution is preventive to NSI. Furthermore, lack of knowledge is reported on the availability of National guideline of NSI/Infection prevention. Recapping of needle after use, compliance with SPs, knowledge about SPs, training on standard precaution and awareness on presence of rule/regulation/policy on infection in hospital are independent predictors of NSI among nurses in Jimma Zone Public Hospitals.

ACKNOWLEDGEMENTS

We would like to acknowledge Jimma University for providing us this opportunity in conducting this research. We would also give our respect and acknowledgement to Mr. Tezera Bekele who have helped us a lot by giving us important material in undertaking this research. We want to also acknowledge the data collectors, supervisors and participants for their genuine dedication and participation during the study.

Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES

- Afia Z, Faiza H, Roshan H, Muslima E, Khurshid K, Rozina K, Seema I (2009). Impact of infection control activities on the rate of needle stick injuries at a tertiary care hospital of Pakistan over a period of six years: an observational study. *BMC Infect. Dis.* 9(1):78.
- Alemayehu T (2008) Assessment of Health Care Workers Occupational Exposure to HIV and Post-Exposure Prophylaxis (PEP) in Health Centers and Hospitals of Addis Ababa.
- Clarke SP, Sloane DM, Aiken LH (2002). Needlestick Injuries to Nurses, Center for Health Outcomes and Policy Research School of Nursing University of Pennsylvania Leonard Davis Institute of Health Economics. 8(1):1-4.
- Doebbeling BN, Vaughn TE, McCoy KD, Beekmann SE, Woolson RF, Ferguson KJ, Torner JC (2003). Kristi J. Percutaneous Injury, Blood Exposure, and Adherence to Standard Precautions. *Infect. Dis. Soc. Am.* 37(8):1006–13.
- Emeka FO (2009). The knowledge and practice of standard precautions among health cares in public secondary health facilities in Abuja, Nigeria.
- Galougahi K (2010). Evaluation of needle stick injuries among nurses of Khanevadeh Hospital in Tehran. 15(4):172–7.
- Gebriel WY (2004). Assessment of the safety injection and related medical practices in health institution at Sidama zone, SNNPRS. *Ethiop. Pub. Health Assoc. (EPHA).* 53–6.
- Gebriel YW (2004) Assessment of the safety injection and related medical practices in health institution at Sidama zone, SNNPRS. *Ethiop. Publ. Health Assoc. (EPHA).* 53–6.
- Ghofranipour F (2009). Needle Sticks / Sharps Injuries and Determinants in Nursing Care Workers in Iran. *Eur. J. Soc. Sci.* 2(2):191-197.
- Iram M, Seema D, Norren RH, Hira S, Mirza SB, Abdul R, Madiha M (2010). Needle stick injuries in nurses at a tertiary health Care facility. *J. Ayub. Med. Coll. Abbottabad.* 22(3):174-178.
- Mehta A, Rodrigues C, Singhal T, Lopes N, D'Souza N, Sathe K, Dastur FD (2010). Interventions to reduce needle stick injuries at a tertiary care centre. *Int. J. Infect. Dis.* 28(1):17–20.
- Moges T, Tadesse T (2010). Epidemiology of needlestick injuries among health-careworkers in Awassa City, Southern Ethiopia. 40(2):111-3.
- Mokuolu OA, Olawumi HO (2011). Needle stick injuries among nurses in a Nigerian tertiary hospital. *International journal of current research.* 3(7):012–4.
- Norsayani MY, Noor HI (2003). Incidence of needle stick injury and factors associated with this problem among medical students. *J. Occup. Health.* 45(3):172–8.
- Nsubuga FM, Jaakkola MS (2005). Needle stick injuries among nurses in sub-Saharan Africa. *Trop. Med. Int. Health.* 10(8):773–781.
- Reda AA, Fisseha S, Mengistie B, Vandeweerd JM (2010). Standard Precautions: Occupational Exposure and Behavior of Health Care Workers in Ethiopia. *PLoS ONE.* 5(12):14420.
- Rodrigues C. (2010). Needle stick injuries & the health care worker. *Indian J. Med. Res.* 131:384–6.