

## ORIGINAL ARTICLE

## NEEDLE-STICK INJURY: A RISING BIO-HAZARD

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**Background:** Needle stick injury has been identified as the foremost health allied concern and the specialty of dentistry is not an exception. Its incidence can be reduced when a dental practitioner is completely proverbial to the standard cross-infection control measures. This study was intended to assess the knowledge, attitude and practices among the dental practitioners regarding Needle Stick Injuries and associated risk factors. **Methods:** This survey was carried out in the Oral Surgery Department, Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Karachi. Dental practitioners of different job categories were conveniently approached by the BDS students. They all were provided with a structured and validated, self-administered questionnaire. Descriptive statistics and Chi-square test was applied with 5% level of significance. **Results:** All 100 (55 females and 45 males) practitioners agreed to participate in the study. Prevalence of Needle Stick Injury observed was 30% with no significant relationship with the demographic characteristics. Seventy-four percent of the participants were aware of the universal guidelines. Majority (88%) of the dental personnel believed that recapping of needles should be performed soon after use and 53% knew about needle-less safety devices. These injuries were experienced by 30% of the respondents, of which just 28% were reported. **Conclusion:** Dental practitioners were at high risk of getting Needle Stick Injuries in dental offices. Most of them had knowledge about it but there was lack of practice of universal precautions.

**Keywords:** Needle Stick Injury, Blood Borne Diseases, Dental Practitioners, precaution, infection

## INTRODUCTION

Needle Stick Injury (NSI) has been identified as the foremost health allied concern around the globe.<sup>1</sup> Transmission of blood borne diseases associated with health care has always been an imperative public and medical concern.<sup>2</sup> NSI correspond to a thrust that produces a blood wound that incepts blood or other hazardous substances by a hollow bore needle or sharp instruments; it may include broken glass, lancets, scalpels and contaminated needles itself, into the body of a healthcare worker, usually undergraduate, and un-experienced postgraduate while working in dental offices.<sup>3</sup> Evidences have proved that the primary cause behind NSI is the lack of practice of global precautionary measures.<sup>4</sup>

The consequences of an injury with a contaminated sharp object are related to various blood-borne infection, e.g., Hepatitis-B virus (HBV), Hepatitis-C virus (HCV), and Human Immuno-Deficiency Virus (HIV). The healthcare professionals are at high risk if appropriate and recommended instrument handling is not carried out.<sup>5,6</sup> The specialty of dentistry is highly susceptible to sharp injuries as most of the instruments used are sharp and there is a limited working area with heavy patient burdened outpatient departments.<sup>7</sup> In Pakistan, the incidence of NSI is about 2.9% in consultants, 24.5% in trainees, 44.7% in house officers and 16.3% in nurses.<sup>8</sup> In United Kingdom, nearly 48% of the nurses have reported that they have been stuck by a needle or sharp instrument used on a patient at some point in their career.<sup>9</sup> In Australia, the reported incidence of needle injuries in nurses was 13.9%.<sup>10</sup> How sharp injuries are prevented, is a part of global undergraduate academic training, as the exposure

to blood-borne pathogens is more related to dental undergraduates than their medical fellows. Therefore, it is the prior responsibility of training and teaching institutions to make certain the safety of trainees.<sup>11</sup> The injury burden can be reduced when a dental practitioner working in a dental office is completely proverbial to the current and universally accepted standard precautionary measures against NSI. There is a need to identify the knowledge, attitude and practices of dental practitioners against the preventive parameters of NSI.

This study was intended to assess the knowledge, attitude and practices regarding NSIs and associated risk factors among dental practitioners of Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Karachi.

## MATERIAL AND METHODS

This survey was carried out in the Department of Oral Surgery, Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences (DIKIOHS) Karachi. Dental practitioners of different job categories were conveniently approached after taking informed consent. They all were provided with a structured, pre-tested, validated, self-administered questionnaire<sup>12</sup>, comprising of the demographic details and close-ended questions regarding the knowledge, attitude and practices related to NSI.

The participants were requested to self report at same time. The data obtained via questionnaire were entered and analysed using SPSS-16. Descriptive analysis involving frequencies and percentages was performed on the given data set. Chi-square test was applied for finding the associations and  $p < 0.05$  was considered significant.

**RESULTS**

All 100 approached participants agreed to participate in the study, giving a response rate of 100%. Among the respondents 55% were females and 45% were males. Age ranged from 20 to 58 (mean 24.58±7.317) year, while (85%) were 20–30 years of age. More than half (62%) of the study participants were undergraduates, followed by postgraduates (21%), graduates and staff (13% and 4% respectively). Majority (94%) of the respondents had working experience of 1–5 years. Table-1 shows the socio-demographic characteristics of practitioners by age, gender, job categories and working experience.

Majorities (74%) of the study population knew the universal precaution guidelines for cross-infection control, while 53% had knowledge of needle less safety device. Nearly all (97%) of the practitioners were in favour of and actually wear gloves during phlebotomy, when withdrawing needle from a patient (92%), when disposing contaminated sharps or needles (96%), and when manipulating the sharp bin (92%). Results have identified that 28% of the participants disassemble used needle or sharps with their hands, 88% recap needles/sharps after use, and 64% of the practitioners before disposal detach the needle from the syringe. Among the dental practitioners of DIKIOHS 30% had experienced NSIs, and 28% were reported (Table-2).

A total of 30 dental practitioners had experienced NSI. Out of those, 88% were recapping needles, 28% were disassembling needles, 94% were disposing gloves, while 64% were separating syringe when they had needle prick (Table-3).

There was no significant association between the prevalence of NSI and any of the demographic characteristic. Although greater NSI cases were reported in age group of 20–30 years, those who were undergraduates and in practitioners with a minimum of 1–5 years of service experience.

**Table-1: Socio-demographic characteristics of dental practitioners**

Variables	Descriptions	Frequencies	
		n	%
Age (Year)	20–30	85	85
	31–40	11	11
	41–50	2	2
	51–60	2	2
Gender	Male	45	45
	Female	55	55
Job category	Postgraduate	21	21
	Graduate	13	13
	Undergraduate	62	62
	Staff	4	4
Experience (Years)	1–5	94	94
	6–10	0	0
	11–20	2	2
	21–30	4	4

**Table-2: Knowledge, attitude and practices of dental practitioners for risk and prevention of NSIs**

Items	Yes/No	Frequency	
		n	%
Do you know about the universal precaution guidelines?	Yes	74	74
	No	26	26
Do you know about the needle-less safety device?	Yes	53	53
	No	47	47
Can hepatitis b be transmitted by needle stick and sharp injuries?	Yes	98	98
	No	2	2
Can hepatitis c be transmitted by needle stick and sharp injuries?	Yes	84	84
	No	16	16
Can HIV/AIDS be transmitted by needle stick and sharp injuries?	Yes	84	84
	No	16	16
Do you need to wear gloves during phlebotomy?	Yes	97	97
	No	3	3
Do you use gloves during phlebotomy?	Yes	93	93
	No	7	7
Do you wear gloves when withdrawing a needle from a patient?	Yes	92	92
	No	8	8
Should needles be recapped / bent after use?	Yes	88	88
	No	12	12
Do you recap needles after use?	Yes	88	88
	No	12	12
Do you disassemble used needle or sharp with your hands?	Yes	28	28
	No	72	72
Do you wear gloves when disposing of contaminated needles or sharps?	Yes	94	94
	No	6	6
Do you separate the needle from the syringe prior to disposal?	Yes	64	64
	No	36	36
Do you wear gloves when manipulating the sharp bin?	Yes	92	92
	No	8	8
Do needle stick and sharp injuries need to be reported?	Yes	94	94
	No	6	6
Have you ever had a needle stick or sharp injury?	Yes	30	30
	No	70	70
Was the incident of needle stick or sharp injury reported?	Yes	28	28
	No	72	72

**Table-3: Dental procedures and frequencies of NSIs**

Practice parameters	n	%
Recapping needle	88	88
Disassemble needle	28	28
Disposing gloves	94	94
Separate syringe	64	64
Throw needle	69	69
Bend needle	92	92

**Table-4: Association between socio-demographic characteristics and prevalence of NSIs**

Variables	Descriptions	NSIs				$\chi^2$	p
		Yes		No			
		N	%	n	%		
Age (Year)	20–30	27	27	58	58	16.14	0.553
	31–40	2	2	9	9		
	41–50	0	0	2	2		
	51–60	1	1	1	1		
Gender	Men	12	12	33	33	0.43	0.511
	Women	18	18	37	37		
Job Category	Postgraduates	8	8	13	13	3.71	0.447
	Graduates	6	6	7	7		
	Undergraduates	15	15	47	47		
	Staff	1	1	2	2		
Experience (Year)	1–5	18	18	45	45	9.27	0.958
	6–10	7	7	16	16		
	11–20	3	3	5	5		
	21–30	2	2	4	4		

**DISCUSSION**

Needle-stick injury is a matter of contemporary concern as evidences suggest it being a route of transmission of certain potentially detrimental diseases. Our findings indicate that dental practitioners are at high risk of NSIs,

most of them had knowledge about potential hazards of NSI, but overall practice of infection control procedures was insufficient. The prevalence of NSIs among dental practitioners and staff in this study is slightly more than reported earlier. A study from Nepal<sup>13</sup> reported 74%, while in a research conducted in Iran<sup>14</sup> it was 39.4%.

Published studies on occupational hazards describing the frequency of NSIs are extensive.<sup>15-17</sup> Many researchers<sup>18-20</sup> have analysed NSIs among the healthcare professionals and not exclusively on the dental practitioners. Our results illustrated that 74% of participants know about the universal precautions concerning NSIs but they were not in compliance with the previous knowledge.

The recapping of needles has been prohibited under the Occupation Safety and Health Administration (OSHA) blood-borne pathogen standard.<sup>21</sup> Present study evaluated that 88% of the dental personnel believed that recapping of needles should be performed soon after use, and only 53% were known to needle-less safety devices. Majority (94%) responded that NSI requires a prompt reporting; however, out of 30% who had experienced NSIs, only 28% were reported.

Evidences suggest that exposure for HIV infection following a per-cutaneous injury with HIV contaminated blood is about 0.3%.<sup>22,23</sup> Results of this study demonstrated that most of respondents (84-98%) knew about spread of blood borne diseases via NSIs but precautionary measures are lacking as only 28% respondents disassemble needles themselves and 64% separate used needles from syringes prior to disposal. Therefore, it is recommended to use safety devices in order to reduce the incidence of NSIs among dentists.

No significant relationship between the demographic characteristics and the prevalence of NSIs was observed in previous studies.<sup>12,23</sup> Similar results were obtained in this study as none of the demographic characteristics (age, gender, job category and service years) was found to be significantly associated. This suggests that the background knowledge and exceptional training against NSIs preventive protocol, provided by the dental institute actually matters rather than the personal skills and work experience. Therefore, it is the foremost responsibility of the training institution to provide its candidate the evidence based knowledge and outstanding supervised training, which can ultimately reduce the burden of bio hazards including NSIs from our society.

## CONCLUSION

Dental practitioners and staff of DIKIOHS were at high risk of getting NSI, and blood-borne diseases in dental offices. Most of them had knowledge about NSI but they lacked practice of universal precautions. There is need

for improvement in domains of attitude and practice.

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