

# Awareness of safety protocols for prevention of needle stick injuries in anaesthesiologists from Maharashtra: A survey study

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## ABSTRACT

**Background and Aim:** Needle stick injury (NSI) has a serious risk of transmission of various blood borne pathogens amongst healthcare personnel and more so in anaesthesiologists. This survey assessed the prevalence of NSI and awareness of safety protocols for its prevention amongst the anaesthesiologists from Maharashtra, India. **Methods:** This self-administered survey was completed by 403 anaesthesiologists across Maharashtra from August 2019 to October 2019. The pre-validated and pretested 18-item questionnaire was administered using Google forms and the link was circulated amongst anaesthesiologists electronically. The questionnaire items included information on the awareness of safety protocols and immediate measure after NSI, knowledge of immunisation and safety practices followed in routine practice. Data were collected, tabulated and coded in Microsoft Excel. Descriptives are presented for the different items and prevalence of NSI. Comparison of prevalence of NSI in subgroups based on gender, period of experience and type of practice were analysed using Chi-square test. **Results:** The prevalence of NSI was 73.7% ( $n = 403$ ) in anaesthesiologists with 71.1% ( $n = 235$ ) in males and 77.4% ( $n = 168$ ) in females. The anaesthesiologists from the medical schools had a prevalence of 75.0% ( $n = 148$ ), those in private practice had a prevalence of 72.7% ( $n = 216$ ), whereas those working in both medical school and private practice had a prevalence of 74.4% ( $n = 39$ ). A greater prevalence was observed in those working for longer periods. **Conclusion:** The prevalence of NSI's is alarmingly high amongst anaesthesiologists and there is an immediate need of creating awareness and practice safety protocols in routine practice. Training and education are required in the formative years of healthcare curriculum.

**Key words:** Anaesthesiologists, needle stick injuries, safety protocol

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## INTRODUCTION

Percutaneous injuries caused by needle sticks and other sharps are a serious concern for anaesthesiologists and pose a significant risk of occupational transmission of blood borne pathogens.<sup>[1]</sup> A needle stick injury (NSI) poses a serious risk of transmission of various blood borne pathogens.<sup>[2]</sup>

Because needle stick injuries are often underreported, healthcare institutions should not interpret low reporting rate as low injury rate. Injuries recorded through standard occupational reporting systems may underestimate the true injury rate, as much as 10-fold.<sup>[3]</sup>

The World Health Report 2002 estimates that 4.4% of HIV, 37.0% of HBV, and 39.0% of HCV cases among healthcare workers (HCW) worldwide are the result of occupational exposures.<sup>[4]</sup> These injuries not

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only potentiate health consequences but also cause emotional distress in HCWs which results in missed workdays and directly affects the health care services and resources.<sup>[5]</sup>

Preventing NSI is an essential part of any blood borne pathogen prevention programme in a healthcare setting. This survey attempts to identify the prevalence of NSI amongst anaesthesiologists and understand their awareness of safety protocols required to prevent NSIs.

**METHODS**

This cross-sectional survey study was conducted between August 2019 and October 2019 and responders included qualified anaesthesiologists across the state of Maharashtra, India.

The objective of the survey was to assess the prevalence of NSI and awareness of safety protocols for its

prevention amongst the responding anaesthesiologists. The study was approved by the institutional ethics committee.

All participants had to complete an 18-item self-administered questionnaire [Table 1] consisting of 11 knowledge-based items, five awareness-based items and last two questions for suggestions and recommendations. The questionnaire was designed and validated to include 16 items out of the original 20 items. Principal component analysis was done for construction of questionnaire which returned six components based on their factor loadings. The intraclass correlation coefficient (ICC) of the final 16-item questionnaire was 0.750 (95% CI 0.554–0.884, *P* < 0.0001) and the Cronbach’s alpha was 0.750. The final questionnaire items included information on the awareness of safety protocols and immediate measure after NSI, knowledge of immunisation and safety practices followed in routine practice. This pre-validated and pre-tested questionnaire was

**Table 1: Responses of anaesthesiologists with duration of practice**

	1-5 years (n=108)		6-10 years (n=70)		11-20 years (n=112)		>20 years (n=113)		Total (n=403)		Chi-square test	
	No.	%	No.	%	No.	%	No.	%	No.	%	χ <sup>2</sup>	P
1) Have you encountered needle stick injury (NSI)?	82	75.9%	43	61.4%	79	70.5%	93	82.3%	297	73.7%	10.605	0.014
2) No. of NSI encountered												
None	26	24.1%	30	42.9%	34	30.4%	21	18.6%	111	27.5%	11.787	0.007
1-2 times	80	74.1%	38	54.3%	77	68.8%	86	76.1%	281	69.7%		
≥3 times	2	1.9%	2	2.9%	1	0.9%	6	5.3%	11	2.7%		
3) How many different pathogens get transmitted by NSI?												
0-10	42	38.9%	40	57.1%	52	46.4%	66	58.4%	200	49.6%	11.427	0.076
10-20	36	33.3%	16	22.9%	29	25.9%	22	19.5%	103	25.6%		
>20	30	27.8%	14	20.0%	31	27.7%	25	22.1%	100	24.8%		
4) Do you know that hypodermic needle increases the risk of NSI?	87	80.6%	55	78.6%	92	82.1%	103	91.2%	337	83.6%	6.901	0.075
5) Do you know the standard method of discharging needle is without recapping?	93	86.1%	63	90.0%	100	89.3%	91	80.5%	347	86.1%	4.769	0.190
6) Do you know whom to report after NSI?	78	72.2%	50	71.4%	62	55.4%	63	55.8%	253	62.8%	11.391	0.010
7) In case of NSI, will you fill in an incident report?	83	76.9%	55	78.6%	79	70.5%	77	68.1%	294	73.0%	3.609	0.307
8) Are you aware not to use antiseptic after NSI?	54	50.0%	36	51.4%	48	42.9%	63	55.8%	201	49.9%	3.836	0.280
9) Do you know that after NSI, the affected area should be washed thoroughly with soap and water?	105	97.2%	67	95.7%	101	90.2%	106	93.8%	379	94.0%	5.296	0.151
10) Do you know the wound shouldn't be squeezed to bleed?	82	75.9%	53	75.7%	79	70.5%	86	76.1%	300	74.4%	1.247	0.742
11) Do you know that prick finger shouldn't be kept in mouth?	102	94.4%	63	90.0%	106	94.6%	97	85.8%	368	91.3%	7.320	0.060
12) Are you aware of post-exposure prophylaxis HIV test?	96	88.9%	65	92.9%	99	88.4%	94	83.2%	354	87.8%	4.085	0.252
13) Do you know that after repeat exposure, what is the interval between two prophylaxes?	33	30.6%	25	35.7%	34	30.4%	41	36.3%	133	33.0%	1.430	0.699
14) Have you seen your colleagues encountering NSI?	100	92.6%	63	90.0%	99	88.4%	90	79.6%	352	87.3%	9.308	0.025
15) Have you helped your colleagues at the time of NSI?	98	90.7%	62	88.6%	91	81.3%	98	86.7%	349	86.6%	4.594	0.204
16) Does your institution/hospital run any educational programme regarding NSI?	58	53.7%	48	68.6%	59	52.7%	56	49.6%	221	54.8%	6.870	0.076
17) Has this survey sensitise you enough to go through protocol?	103	95.4%	65	92.9%	104	92.9%	109	96.5%	381	94.5%	1.950	0.583
18) Will you educate medical/paramedical staff in future regarding NSI?	108	100.0%	67	95.7%	112	100.0%	111	98.2%	398	98.8%	8.319	0.040

administered using Google forms and the link was circulated amongst anaesthesiologists electronically (e-mail, WhatsApp, Telegram messenger). The survey was sent to about 1,350 potential responders registered with the Indian Society of Anaesthesiologists (ISA), Maharashtra branch over a period of 2 weeks. Reminder communications were sent after 1 week of initial communication. Data from Google forms were collected, tabulated and coded in Microsoft Excel and data analysis was done using windows-based 'MedCalc Statistical Software' version 19.0.3 (MedCalc Software bvba, Ostend, Belgium; <http://www.medcalc.org>; 2019). Descriptives are presented for the different items and prevalence of NSI. Comparison of prevalence of NSI in subgroups based on gender, period of experience and type of practice were analysed using Chi-square test.

## RESULTS

The response rate for the survey was 29.8% (403/1350), and there were more males and a greater number of private practitioners amongst the responders. The prevalence of NSI's in different subgroups is presented in Table 2, whereas the responses to all items are presented in Table 1. Overall prevalence of NSI was 73.7% with males accounting for a higher prevalence (77.4%) than females (71.1%). However, the differences were not significant ( $P = 0.1695$ ). Similarly, the NSI prevalence is similar in those having private practice, those in a medical college and those with both ( $P > 0.05$ ). The NSI prevalence is higher in those with a longer duration of practice ( $P = 0.014$ ), with a higher number of repeat injuries in those with longer practice duration ( $P = 0.007$ ). The awareness was similar in different groups based on the practice

duration ( $P > 0.05$ ). It is noteworthy that only 62.8% anaesthesiologists were aware of the reporting protocols. About 54.8% anaesthesiologists reported that their institution/hospital runs educational programme regarding NSI [Table 1].

## DISCUSSION

This survey study was conducted to understand the awareness and knowledge related to NSI amongst anaesthesiologists across Maharashtra state. In a prevalence study by Bashir *et al.* (2019) the NSI prevalence reported in Tamil Nadu is 28.0%.<sup>[6]</sup> In another study conducted by Rampal *et al.* (2010) from Malaysia, reported an NSI prevalence of 23.5% in healthcare workers.<sup>[7]</sup> In our study, we observed a very high prevalence of 73.7% for NSI amongst anaesthesiologists in Maharashtra which is alarmingly high. A study from Delhi reported doctors to have the highest exposure rate of 73.7% compared to only 19.1% in nurses.<sup>[8]</sup> In our study, NSI was higher in females but not significant statistically. This is contrast to the study conducted by Goel *et al.* (2017), who reported predominance amongst males (59.9%,  $n = 285$ ) in all healthcare workers.<sup>[8]</sup> We found greater NSI prevalence amongst anaesthesiologists having longer duration of practice. However, in the study conducted by Rampal *et al.* (2010), the NSI prevalence reported was 23.1% in >10 years of experience and 25.4% in <10 years of experience which is very less as compared to our findings.<sup>[7]</sup> Our findings are similar to the findings reported by Mondal *et al.* (2013) who reported 41% NSI prevalence in their life.<sup>[9]</sup> Although recapping of needles has been prohibited under the Occupation Safety and Health Administration (OSHA) blood-borne pathogen standards,<sup>[10]</sup> our results show that 13.9% responders are still unaware of this practice.

We observed good awareness (87.8%) about HIV testing after post-exposure prophylaxis. This is higher compared to Khan *et al.* in medical staff who reported it in only 49.0%.<sup>[11]</sup> We have observed 60% of the participants are aware about correct, immediate measures to be taken after NSI. Other studies report different awareness amongst healthcare professionals with a 10% awareness reported by Motavaf *et al.* (2014),<sup>[12]</sup> and 70% by Jahangiri (2016).<sup>[13]</sup> In our survey, 50.1% responders reported use of antiseptic and 25.6% squeezing of puncture as an immediate measure after NSI. Jahangiri *et al.* (2016)<sup>[13]</sup> reported that only 11% professionals report pressing the NSI site as immediate measure and only 6.2% washing

Table 2: Profile of responders

	NSI encountered			
	No.	%	No.	%
All responders	403	-	297	73.7%
Gender				
Male	235	58.3%	167	71.1%
Female	168	41.7%	130	77.4%
Practice type				
Medical college	148	36.7%	111	75.0%
Private practice	216	53.6%	157	72.7%
Both	39	9.7%	29	74.4%
Experience				
1-5 years	108	26.8%	82	75.9%
6-10 years	70	17.4%	43	61.4%
11-20 years	112	27.8%	79	70.5%
>20 years	113	28.0%	93	82.3%

injury site with disinfection. Thus, the awareness of anaesthesiologists is less compared to those reported by Jahangiri *et al.* (2016).<sup>[13]</sup> Most responders (94.0%) in our study reported that after NSI the wound should be washed thoroughly with soap and water. This contrasts with the findings of Motavaf *et al.* (2014) who report that only 10.2% of participants agreed that washing with soap and water is the first step after contact with infective materials.<sup>[12]</sup>

Motavaf *et al.* (2014)<sup>[12]</sup> reported that 32.2% people with NSI report NSI to the concerned authority, whereas 73.0% of our study responders reported that they will report the NSI. In the Kotwal *et al.* (2010) study 60% doctors and 38% nurses reported that the needles should not be recapped after use, whereas 86.1% anaesthesiologists in our survey reported the same.<sup>[14]</sup> This supports that fact that anaesthesiologists are relatively more rational in their practice.<sup>[15]</sup>

Zafar *et al.* (2009) reported the impact of infection control activities on the rate of needle stick injuries at a tertiary care hospital in Pakistan over a period of 6 years.<sup>[16]</sup> Thus, there is a need for inclusion of topics on NSI prevention and management in healthcare curriculum, and Chakravarthy (2010)<sup>[17]</sup> recommends that improvement in awareness should be brought about by discussing NSIs not only in anaesthesia conferences but also by inculcating the same in the syllabus of anaesthesia trainees. Also, anaesthesiologist's knowledge of risk of HIV and infections is a necessity.<sup>[18]</sup>

Limitations of our study include the responders which were only from Maharashtra state and a small responder sample. Also, there is a possible confounding due to the study design and the way responses were collected. In-person interview method would have possibly yielded correct responses.

## CONCLUSION

The prevalence of NSIs is alarmingly high amongst anaesthesiologists and there is an immediate need of creating awareness and practice safety protocols in routine practice. Training and education are required in the formative years of healthcare curriculum.

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## Conflicts of interest

There are no conflicts of interest.

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