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Occupational exposure and incidence of sharp injuries among healthcare workers in Ophthalmology: An online survey

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Abstract

Background: Needle stick and sharp injuries (NSSIs) pose a significant occupational hazard among healthcare workers (HCWs), increasing the risk of transmission of bloodborne pathogens such as HIV, HCV, and HBV. Ophthalmology, being a microsurgical specialty, involves frequent use of sharp instruments under magnification and dim lighting, making HCWs particularly vulnerable.

Objective: This study aims to assess the prevalence, risk factors, and post-exposure practices associated with NSSIs among healthcare workers in ophthalmology departments across medical colleges and teaching hospitals in India.

Methods: A cross-sectional online survey was conducted among ophthalmology HCWs, including consultants, residents, nurses, and housekeeping staff. Data on the incidence, mode of injury, post-exposure actions, and knowledge of safety protocols were collected and analyzed.

Results: A total of 512 HCWs participated in the study, with 108 (21%) reporting NSSIs in the past year. Nurses had the highest incidence (47.3%), followed by housekeeping staff (28.7%), residents (21.2%), and consultants (2.7%). The most common cause of injury was the passing of sharp instruments (38.8%), followed by improper biomedical waste disposal (37.7%). While all consultants, residents, and nurses were aware of post-exposure protocols, only 22.5% of injured housekeeping staff had adequate knowledge. Most HCWs received post-exposure evaluation, but underreporting due to privacy concerns was noted.

Conclusion: NSSIs are a significant risk in ophthalmology practice, especially among nurses and housekeeping staff. Implementing safer intraoperative practices, such as neutral zone instrument transfer, improving biomedical waste disposal, and conducting regular training programs, can help reduce incidence and enhance post-exposure management.

Keywords: Infection control, occupational exposure, healthcare workers, ophthalmology, sharp injuries, needle stick injuries

Introduction

Needle stick and sharp injuries (NSSIs) occur when there is a puncture and break in the skin continuity due to sharp objects like blades, needles, broken glass vials etc. These are a major occupational hazard among healthcare workers. These increase the risk of spread of highly contagious blood borne pathogens causing lifelong illnesses like HIV, HCV, HBV [1].

The average prevalence of NSSIs ranges from 36.3% in low income countries to 41.8% in middle income countries and 24.8% in High income countries. On an average, about one in three HCWs globally is at risk of injury [2].

Ophthalmology has advanced as a fast growing microsurgical branch which involves use of a various types of blades (like Keratome, Crescent, MVR etc), sutures and needles under the microscope. This requires development of great hand eye coordination and depth perception by years of practice and experience [3]. This poses a risk of NSSIs to the surgeons, especially the residents as well as the assisting personnel. The dim light in the ophthalmology operation theatre also makes visualisation difficult specially during transfer of instruments [4]. The needles and blades require proper disposal in the sharps container so as to prevent injury to the housekeeping staff while handling the biomedical waste.

This study aims to estimate the prevalence, identify risk factors, and evaluate post-exposure practices related to needle stick and sharp injuries among healthcare workers in the Department of Ophthalmology at medical colleges and teaching hospitals across India.

Materials and Methods

An online cross-sectional survey was conducted among the healthcare workers who work in the Department of Ophthalmology in medical colleges and teaching hospitals across the country. Snowball sampling method was used for collection of data. The survey collected data on the incidence of injuries, contributing factors, and post-exposure actions taken by the respondents. A questionnaire was shared with Consultants, Residents and Nursing staff of various medical colleges. The residents were encouraged to share the questionnaire with housekeeping staff in their respective vernacular language. Healthcare workers from departments other than Ophthalmology were excluded from the study. This study was conducted according to the tenets of Helsinki Declaration. Prior Institutional Review Board approval was obtained.

Results

A total of 512 responses were recorded. 312 residents, 86 nurses, 69 sanitation workers, and 45 consultants answered the questionnaire.

Table 1 shows the total number of injuries and its distribution among participants. 108 participants (21%) suffered needle stick and sharp injuries during the past 1 year while working in ophthalmology department. Most of the injuries were reported by the Nurses (51), followed by Housekeeping staff (31), Residents (23) and Consultants (3). Table 2 shows that majority of the Residents (34.7%) suffered needle pricks while transferring instruments and while administering local anaesthesia (26.03%). Nurses reported majority of injuries happened during transfer of instruments while assisting (62.7%). Improper disposal of needles, blades and sharps caused majority injuries to Housekeeping staff (90.4%).

Table 3 shows that of the 108 injured personnel, all the consultants, residents and nurses answered affirmatively when asked if they knew the exact protocol to be followed after NSSI while only 23% of the housekeeping staff knew about the protocol to be followed.

All the consultants, residents, nurses had received training in NSSI prevention and biomedical waste management while only 41% housekeeping staff recalled having received the training at one point in their tenure.

2 out of 3 consultants, 47 out of 51 nurses, 17 out of 23 residents and 11 out of 31 housekeeping staff reported injury to Hospital infection control centre (HICC).

The most common reason given to not report an injury was unwillingness to disclose the injury. These personnel preferred getting tested outside the hospital to maintain privacy.

All exposed personnel got evaluated for HIV, HBsAg, HCV post exposure either inside or outside the hospital.

Various qualitative questions were asked to ascertain the cause of injuries. Most Nurses and residents blamed hasty work and dimly lit operation theatre while majority of the housekeeping staff blamed improper disposal of biomedical waste by junior doctors.

Discussion

NSSIs are a major and serious event in a healthcare workers' life. The implications of NSSIs range from transmission of various blood borne pathogens to deep psychological distress to healthcare workers which affects both their personal and professional lives [5]. Although the

injury might happen at any location in the hospital like outpatient department or wards, the surgical departments are at a higher risk of NSSIs while working in the operation theatre. Ophthalmology practice has fast evolved from simple cataract surgeries to vast array of microsurgical procedures. These involve handling and use of various types of blades and needles while performing surgeries under a high magnification microscope requiring great hand eye coordination, stereopsis and experiences and all this is generally performed in a dimly lit operation theatre. The proper disposal and segregation of biomedical waste forms the backbone of prevention of biomedical waste related spread of infections.

A study conducted by Sharma *et al* in 2018 showed prevalence of needle prick injuries in HCWs at around 76.7%, while a study by Talwar *et al* in 2017 showed it to be around 55.46 % [6, 7]. Our study showed prevalence of NSSIs in personnel working exclusively in ophthalmology department to be around 21%.

A study done by Rishi *et al* reported a total of 140 NSSIs in over 5 years. They reported highest incidence amongst Ophthalmic fellows followed by nursing staff and Consultants. A study done in Switzerland by Trotman *et al* estimated that 42.7% of ophthalmology surgeons had NSSIs [8]. In our study nurses were found to have the highest incidence (47.3%) followed by housekeeping staff (28.7%). Passing and transfer of instruments was the most common cause of injury in their study (23.97%) as well as in our study (38.8%) [5].

A study conducted by Ghauri *et al* in the United Kingdom on sharp injuries in ophthalmic practice also showed nurses (54.4%) had the highest incidence of injuries followed by doctors. (38.7%) [9]. This study also showed that a significant injuries happened to people handling disposed needles as in our study at around (37.7%). This was single most common cause of injuries in housekeeping staff. This is more serious as most of the time it is impossible to ascertain the source and serology status of the patient [9].

A study done by Pandey *et al* to assess knowledge of housekeeping staff about protocol to be followed post NSSI showed around 11.1% of them had poor while 37% had good knowledge of the protocols [10]. In our study only 17.3% of the housekeeping staff had the adequate knowledge about the post NSSIs protocols. This can be linked to lack of formal or higher education in most of the housekeeping staff. Therefore, repeated periodic training and education of housekeeping staff is important in preventing NSSIs and taking appropriate actions post exposure [10, 11].

Under training Ophthalmology residents are at high risk for NSSIs which can be attributes to high learning curve of operating under high magnification microscopes and hand to hand transfer of sharp instruments while performing surgery. Around 12 residents reported injuries related to this. A method strictly following the use of neutral zone transfer of instruments rather than hand to hand transfer can reduce this incidence [8].

A lot of sharp injuries go unreported due to various reasons like ignorance of the injury or unwillingness to disclose the injury. This leads to gross under estimation of the burden of NSSIs. Regular training and educational programs for all staffs especially for housekeeping staff can lead to better reporting and better post exposure care of the HCWs.

Table 1: Total number of injuries and its distribution among participants

	Answered the questionnaire	Injured in the last 3 years (n%)
Consultants	45	03(2.7%)
Residents	312	23 (21.2%)
Nurses	86	51 (47.3%)
Housekeeping staff	69	31 (28.7%)
Total	512	108 (21%)

Table 2: Mode of injury by health care worker category

Mode of Injury	Consultants	Residents	Nurses	Housekeeping staff
Passing of Instruments by hand	2 (66.67%)	08 (34.7%)	32 (62.7%)	0
Intraoperative	1 (33.3%)	04 (17.3%)	0	0
While administering Local anaesthesia	0	06 (26.03%)	0	0
Recapping of Needle	0	03 (13%)	10 (19.6%)	03 (9.6%)
Improperly disposed biomedical waste	0	02 (8.6%)	09 (17.6%)	28 (90.4%)
Total	03	23	51	31

Table 3: Awareness of the protocol to be followed post-NSSI

	Knowledge of post NSSI protocol	Knowledge of post NSSI protocol in Injured
Consultants	45 (100%)	03 (100%)
Residents	302 (96.7%)	23 (100%)
Nurses	86 (100%)	51 (100%)
Housekeeping staff	12 (17.3%)	07 (22.5%)

Conclusion

We conclude that in ophthalmology department sharp injuries to happen frequently to surgeons as well as the team including nurses and housekeeping staff. Implementing good intraoperative practices like neutral zone transfer of sharps and proper biomedical waste disposal can help reduce the incidence of NSSIs and proper training, education and awareness can reduce the incidence, improve reporting and help in better care of HCWs post injury.

Conflict of Interest

Not available

Financial Support

Not available

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