



Original Article

The Prevalence of Needle Stick and Sharp Injuries Among Health Care Professionals in A Tertiary Care Centre of North Karnataka- A Cross-Sectional Study

Dr Shivasharan H N¹, Dr Harshitha V², Dr Nandana Sharma³

¹Senior Resident, Department of Community Medicine, Ballari Medical College and Research Centre, Ballari, Karnataka, India- 583103

²Post Graduate, Department of Community Medicine, Ballari Medical College and Research Centre, Ballari, Karnataka, India- 583103

³Post Graduate, Department of Community Medicine, Ballari Medical College and Research Centre, Ballari, Karnataka, India 583103

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Corresponding Author:

Dr Shivasharan H N

Senior Resident, Department of
Community Medicine,
Ballari Medical College and
Research Centre
Ballari, Karnataka India- 583103
Email:

shivasharan.hn@gmail.com

Received: 10-05-2026

Accepted: 05-06-2026

Available online: 20-07-2026

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Medical and Pharmaceutical Research

ABSTRACT

Introduction/Background Needle stick and sharp injuries epitomize one of the most common occupational perils encountered by healthcare workers. They occur when needles, scalpels or other sharp medical instruments penetrate the skin and expose individuals to blood or other potentially infectious body fluids. They can transmit several blood-borne pathogens such as hepatitis B virus, hepatitis C virus and human immunodeficiency virus. This study aims to find the prevalence of needle stick and sharp injuries among health care professionals working in a tertiary care centre of North Karnataka.

Materials and methods A cross-sectional study was conducted for a period of three months from March to May 2026 among the health care faculty in the tertiary care hospital of Ballari Medical College and Research Centre, Ballari, Karnataka. Those not willing to participate were excluded. Convenient sampling technique was used. A total of 542 participants took part in the study.

Results 231 (43%) participants sustained injury. The injuries were commonly sustained on hand and were mainly caused by syringe needles. The injuries frequently happened while collecting blood samples and suturing. The common places of injury were emergency department and inpatient wards. The association of injury with occupational cadre was significant.

Conclusion These injuries not only transmit life threatening infections but also induce lot of psychological and emotional disturbance and hence reduce the working efficiency of health care professionals. Imparting proper training and education in this regard is need of the hour.

Keywords: Needle stick injuries, Health care professionals, Tertiary care hospital, Occupational injuries.

INTRODUCTION

Needle stick and sharp injuries (NSSIs) epitomize one of the most common occupational perils encountered by healthcare workers. These injuries occur when needles, scalpels or other sharp medical instruments penetrate the skin and expose individuals to blood or other potentially infectious body fluids [1]. Around 3.35 million health care workers experience NSSIs in a year all across the globe. According to an average prediction, each health care worker may sustain needle stick and sharp injury four times annually [2]. These injuries are becoming more prevalent due to the growing workload and recurrent usage of invasive procedures in healthcare settings, especially in tertiary care facilities with huge patient load and emergency services [3].

Healthcare professionals including doctors, nurses, laboratory technicians, phlebotomists and workers involved in biomedical waste management are especially susceptible to needle stick and sharp injuries due to their consistent contact with sharp instruments [4]. The etiologies include injuries caused by use of hypodermic needles, blood collection needles, needles in intravenous delivery systems, needles in diagnostic aspiration procedures and needles in interventional or surgical procedures. Inappropriate seclusion and discarding of biomedical waste further surge the risk among healthcare personnel and waste handlers [5].

Needle stick and sharp injuries are important because they can transmit several blood-borne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Among these infections, HBV carries the greatest risk of transmission, followed by HCV and HIV [6]. In addition to physical health consequences, exposure incidents may also lead to psychological problems including stress, anxiety, fear, depression and post-traumatic stress disorder among affected healthcare workers [7].

Factors contributing to needle stick and sharp injuries include high workload, lack of proper training, inadequate use of protective equipment and non-adherence with safety protocols. Furthermore understaffing, long working hours and emergency situations can exacerbate the likelihood of such injuries [8].

A large proportion of these injuries can be disallowed by following standard safety precautions, curtailing unnecessary needle use, hiring safety-engineered devices, ensuring proper discarding of sharps and conducting regular training and awareness programs for healthcare personnel. Immediate reporting, documentation and timely administration of post-exposure prophylaxis are also crucial for reducing complications following occupational exposure [9].

In India, the burden of needle stick and sharp injuries remain a major concern. Although there is no well-established national surveillance system for reporting such injuries, studies have shown that unsafe injection practices are common.

Considering the serious health jeopardies and preventable nature of needle stick and sharp injuries understanding their prevalence and associated factors is essential for developing effective preventive strategies and enhancing the occupational safety among healthcare workers.

The present study aims to find the prevalence of needle stick and sharp injuries among health care professionals working in Ballari Medical College and Research Centre and to determine the procedural and work-related factors which led to its occurrence.

MATERIALS & METHODS

A cross-sectional study was conducted for a period of three months from March to May 2026 among the health care faculty which included doctors, nurses and lab technicians in the tertiary care hospital of Ballari Medical College and Research Centre, Ballari, Karnataka. All the healthcare workers with minimum experience of six months were included in the study. Those not willing to participate were excluded. A convenient sampling technique was used. A total of 542 participants across various occupational cadres took part in the study.

The healthcare personnel were approached in person and the purpose of the research was explained to them. A semi-structured questionnaire was designed in accordance with the study objectives. After obtaining the informed consent, the information was collected through face to face interview. Prior training was imparted to the data collectors and the interview was short and specific to reduce the chances of information and recall bias. The questionnaire comprised of two sections. The first part consisted of socio-demographic profile including age, sex, working cadre, experience and whether they had any occupation-related needle stick and sharp injuries in the past. The second part contained the information with respect to the type of device that caused injury, time of injury, site of injury, nature of injury and the procedure during which injury was encountered. If multiple injuries were sustained in the past, then most recent injury was considered. Information about the reporting of injury and action taken after the injury was also collected. All issues related to privacy and confidentiality were adhered to.

The data collected was entered in MS Excel. Since it was face to face interview no data was missed. Data was analyzed for descriptives like frequencies and percentages and appropriate statistical tests were applied to find the significance of association using JAMovi v.2.6.26. P value < 0.05 was considered to be statistically significant. Permission was obtained from the Institutional Ethical Committee of Ballari Medical College and Research Centre for the conduct of the research.

Operational definitions.

Needle stick or sharp injury was defined as a penetrating or a cut wound from a needle, scalpel, blade or other sharp objects that may result in exposure to blood or other body fluids. Postexposure prophylaxis was the comprehensive medical management to curtail the risk of infection in health care professionals after probable exposure to blood-borne pathogens.

RESULTS

A total of 542 health care professions participated in the research. The mean age of the study participants was 29 years. 56.8% of the study participants were females. 64.2% of the participants were medical faculty (Comprising of consultants, postgraduates and interns) and the rest were nursing staff and lab technicians (table 01). Out of them, **231 (43%) had experienced needle stick or sharp injuries** during the course of their occupation in the past (Figure 01). 43% of health care professionals above the age of 30 years had injuries. The association was not significant. 43.6% of the male participants had sustained injuries without any statistical significance. The occurrence of the injury was 43.4% in those who had an occupational experience of more than three years. The association had no significance. 46% of the medical faculty had needle stick and sharp injuries. The association was statistically significant (table 02). The most common anatomical site of injury was hand (93.5%) (table 03). The major form of injury was prick (92.6%) (table 04) and injuries occurred more frequently during the morning timings (38.09%) (table 05). The injuries were more frequently caused by syringe needles (60.6%) (table 06). With respect to the procedures that led to injuries the main causes were suturing (26.4%) followed by drawing of blood or other samples (23%) (table 07). The injuries commonly occurred in emergency and casualty (27.8%) followed by wards (26.1%) (table 08). 61.3% of the participants had worn gloves when then sustained injury. The common immediate response to the injury was wash with running water (47.2%) (table 09). 40.7% of the needle or sharps that caused injury were contaminated (table 10). 85.3% of health care professionals who were injured during the course of their profession did not report the same for concerned authorities and the prime reason for nonreporting was the source of injury was safe and did not have the risk of transmitting any infection (69%) (table 11). 44.1% of the injured participants had their immune status and serology checked after the exposure. 9.5% of the injured participants took post exposure prophylaxis after the injury (table 12). 85.2% of the injured participants were vaccinated for hepatitis B.

Table 01 - Distribution of study subjects according to their demographic and occupational cadre

Variable	Frequency(N=542)	Percentage
Age category (In years)		
Up to 25	195	35.97%
26 to 30	219	40.40%
31 to 35	41	7.50%
36 and above	87	16.05%
Sex		
Female	308	56.8 %
Male	234	43.2 %
Occupational cadre		
Consultant	50	9.2 %
Postgraduate	176	32.5 %
Intern	122	22.5 %
Staff nurse	168	31.0 %
Lab technician	26	4.8 %

**FIGURE 01-OCCURRENCE OF
NEEDLE STICK AND SHARP
INJURIES AMONG HEALTH CARE
PROFESSIONALS (N=542)**

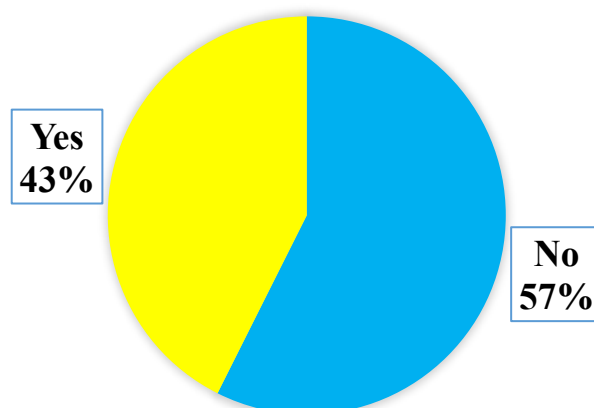


Table 02- Association between needle stick and sharp injuries and various demographic and occupation related factors

Variable	Occurrence of needle stick injury		Total	χ^2 value	P value
	No	Yes			
Age (in years)					
Above 30	73(57%)	55(43%)	128	0.008	0.92
Up to 30	238(57.5%)	176(42.5%)	414		
Sex					
Female	179(58.1%)	129(41.9%)	308	0.158	0.69
Male	132(56.4%)	102(43.6%)	234		
Work experience (in years)					
Up to 3	200(57.8%)	146(42.2%)	346	0.07	0.79
More than 3	111(56.6%)	85(43.4%)	196		
Occupation					
Medical	188(54%)	160(46%)	348	4.48	0.034
Non medical	123(63.4%)	71(36.6%)	194		

Table-03 Distribution of the incidents of needle stick and sharp injuries according to anatomical site of injury

Site of injury	Frequency (N=231)	Percentage
Arm	2	0.86 %
Face	8	3.5 %
Forearm	2	0.86 %
Hand	216	93.5 %
Leg	3	1.29 %

Table-04. Distribution of the incidents of needle stick and sharp injuries according to nature of injury

Nature of injury	Frequency(N=231)	Percentage
Cut	15	6.5 %
Prick	214	92.6 %
Splash	2	0.9 %

Table-05 Distribution of the incidents of needle stick and sharp injuries according to time of occurrence of injury

Time of injury	Frequency(N=231)	Percentage
Afternoon & evening (2 pm to 8pm)	80	34.6 %
Morning (8am to 2pm)	88	38.09 %
Night (8 pm to 8 am)	63	27.3 %

Table-06 Distribution of the incidents of needle stick and sharp injuries according to devices that caused injury

Device that caused injury	Frequency(N=231)	percentage
Ampoule	6	2.6 %
Blade/ Scalpel	17	7.4 %
IV Cannula	17	7.4 %
Lancet	3	1.3 %
Suture needle	48	20.8 %
Syringe needle	140	60.6 %

Table-07 Distribution of the incidents of needle stick and sharp injuries according to procedures that led to injury

Procedures causing the needle stick injury	Frequency(N=231)	Percentage
Accidental prick from the colleague	6	2.6%
biomedical waste handling	10	4.3%
Drawing blood or other samples	54	23.3%
insertion of IV cannula	11	4.8%
Recapping of the needle	46	20%
Injection (IM/ID/SC)	30	12.9%
Suturing	61	26.4%
Removing the dressing	4	1.7%
Opening NS bottles/ Ampoules/Vials	3	1.2%
Cleaning of the instruments	4	1.7%
Cutting the plaster	2	1.1%

Table-08. Different work places of needle stick or sharp injury occurrence

Work place of injury	Frequency(N=231)	Percentage
Emergency (Casualty / Minor OT / Triage)	64	27.8 %
ICU	34	14.8 %
Laboratory	12	5.2%
Labor room	12	5.2 %
Operation theatre	38	16.5 %
Outpatient department	11	4.7 %
Wards (in patients)	60	26.1 %

Table 09 - Different actions taken after the needle stick or sharp injury

Action taken after the injury	Frequency(N=231)	Percentage
Applied antiseptic agent	91	39.4 %
Squeezed the site and let out the blood	16	6.9 %
Washed the injured site with water	109	47.2 %
Did nothing	15	6.50%

Table 10– Status of the needle or sharp that caused injury

Status of the needle or sharp	Frequency(N=231)	Percentage
Status not known	35	15.2 %
Not contaminated	102	44.2 %
Contaminated	94	40.7 %

Table 11- Reasons for non-reporting of injury

Reasons for non-reporting	Frequency(N=197)	Percentage
It is not important to report	26	13.2 %
No knowledge of reporting system	35	17.8 %
The patient/source had no risk of HIV/Hep B/Hep C	136	69 %

Table 12 – Post exposure prophylaxis after needle stick and sharp injury

Post Exposure Prophylaxis	Frequency(N=231)	Percentage
Not taken	185	80.1 %
Taken	22	9.5 %
Not needed.	24	10.4%

DISCUSSION

The present study investigated the occurrence of needle stick and sharp injuries among health care professionals in a tertiary care hospital.

In the present study, the occurrence of needle stick injury was 43%. In the study conducted by Agrawal T et.al [10] in Jalandhar it was 34.8%. It was 23.8% in the observation of Umar AY et.al [1] in Manipur and 26.33% in that of Mehrotra S et.al [11] in Jodhpur, Rajasthan. The high occurrence of needle stick injuries in our hospital might be due to high patient turn over and heavy work load.

In our study not much difference was observed with respect to gender in the occurrence of needle stick injuries. The results were identical with the investigations of Alsabaani A et.al [12] in Saudi Arabia and Behran Z et.al [13] in Ethiopia. As both male and female personnel will be working in identical conditions with equal work pressure, their vulnerability remain similar.

In the present study the prevalence was almost identical in those who were aged below and above 30 years of age. Similar finding was reported by Umar AY et.al [1]. The incidences are more common in the younger age group in general as they lack experience. Imparting of adequate training and awareness about the hazards of needle stick and sharp injuries in our hospital might have reduced the chances of getting injury in the younger age group.

The prevalence was higher among the medical faculty (46%) in comparison with that of non-medical health care professionals (36.6%) in our research. Concurrent results were observed by Pandey P et.al [8] in Lucknow Uttar Pradesh. Contrasting results were observed by Jadhav SB et.al [9] in Maharashtra, Naidu RT et.al [4] in Mumbai, and Mehrotra S et.al [11] where the injuries were more in the non-medical staff. Since our study had higher participants from the medical background the incidence in them might be reported more.

The major anatomical site of injury in the current study was hand (92.6%). Consistent observations were made by Mehrotra S et.al (88.6%) [11] and Sriram S [14] in Nellore Andhra Pradesh (98%). Since all procedures are done with hand, fingers are most vulnerable to sustain injuries. The most common nature of injury in the present study was prick which was similar to the findings of Sriram S [14].

In our research the most common device causing the injury was syringe needle (60.6%). Sriram S [14] and Jayaprada R et. al [15] in Tirupathi, Andhra Pradesh also came out with identical report.

The injuries were sustained frequently in the emergency and casualty (27.8%) followed by inpatient wards (26.1%) in the present study. Concurrent places were reported by Bharti PP et.al [7] in Uttar Pradesh, Agrawal T et.al [10] and Avnisha et.al [3]. The patients in emergency will be in critical condition and the situation demands immediate attention from the health care professionals making them more prone in the haste situation of response.

The injuries generally occurred during the process of suturing and collecting blood or other samples in our study. Diverse studies have found diverse causes in this regard. Jayaprada R et al [15] found it as recapping of the needles. As per Jadhav S B et.al [9], collection of blood sample was the frequent cause. In that of Agrawal T et.al [10], it is the disposal of biomedical waste. The consequences of the injury are same irrespective of the procedure. Hence proper education and practical training in the hospital related works is mandate to reduce the incidences of injuries.

38.45% of the injuries were sustained in the morning hours followed by 34% in evening session. Parallel findings were seen in that of Bharti PP et.al [7] and Jayapradha R et al [15]. Since the patient load will be more in the day timings the likelihood of getting injured is high in the day shift.

In the present study the common immediate action taken by the injured persons to the site of injury was wash with the running water (47.2%) and 39.4% applied the antiseptic. The response to the wound was same in that of Avnisha et.al [3]. Washing with running water and applying local antiseptic lessen the quantity of microorganisms gaining access to the body.

61.3% of the injured were gloved when they had the incidence. It was 97.9% in that of Alshehri Net.al [16] in Kerala. Criticality of the patient's condition and non-availability of the gloves immediately at the moment might be the cause.

85.3% of the injured did not report to the concerned authorities in our hospital. It was 61.2% in that of Umar A Y et.al [1]. The reporting was low as may knew that the source of injury had no risk for transmission of infection in our study.

44.1% had their immune status checked and 9.5% took the post exposure prophylaxis following the injury in our hospital. The intake of post exposure prophylaxis was 23.1% in the research of Mehrotra S et.al [11], 17.6% in that of Umar A Y et.al [1] and 10.9% in Negash F B et.al [17] in Eritrea. The proportion of contaminated injuries sustained in these studies were different and hence the intake of post exposure prophylaxis.

85.2% of the injured health care professionals were completely vaccinated for Hepatitis B in our hospital. It was 55.3% in that of Jayaprada R et.al [15] and 93.8% in that of Alshehri Net.al [16]. Since free vaccine is provided for the health faculty in our hospital, the proportion of immunization was high.

CONCLUSION

The prevalence of needle stick and sharp injuries in the present study was 43%. These injuries not only transmit life-threatening infections but also induce lot of psychological and emotional disturbance and hence reduce the working efficiency of health care professionals. Imparting proper training and education regarding various procedures involving needles and sharps is the need of the hour. The availability of post-exposure prophylaxis all around the clock in tertiary care hospitals can prevent the spread of hazardous infections upon contact with a contaminated source. A proper surveillance system for needle stick and sharp injuries has to be developed to reduce underreporting. Using disposable sterile syringes, adequate training for biomedical waste disposal and handling and employing an adequate number of health care professionals in accordance with the patient load may prevent injuries and associated complications.

LIMITATIONS

The data was obtained only based on the information given by the study participant. No past medical records or documentations were checked. Hence there may be chance of recall bias or information bias.

ACKNOWLEDGEMENT

We express our gratitude to all the faculty of Ballari Medical College and Research Centre for their valuable help and support during the conduct of our research.

CONFLICT OF INTEREST

NIL

SOURCE OF FUNDING

NIL

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