Section: Community Medicine

Original Research Article

A STUDY OF NEEDLE STICK INJURY AMONG INTERNS AT M R MEDICAL COLLEGE KALABURAGI-KARNATAKA

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ABSTRACT

Background: Needle stick Injury is an inevitable event for hospital staff involved in patient care at a health care facility. One of the most serious threats healthcare workers face during their clinical practice is the possibility of exposure to deadly viruses. The emotional impact of an NSI can be severe and long-lasting, even when a serious infection is not transmitted. Yet the problem of exposure to contaminated blood among health-care workers, especially interns and medical students, has received inadequate attention. In India, relatively few studies have addressed the issue of needle stick injury among medical students. Our study mainly focuses on calculating the magnitude, identifying risk factors and awareness about needle stick injury and post exposure prophylaxis (PEP) being offered in the hospital settings of M R Medical College, Kalaburagi.

Materials and Methods: A cross-sectional study was conducted among interns MR Medical College Kalaburagi for period of one month (July - August 2019). Data was collected in the form of self-administered questionnaire include characteristics like cause of the event, cause of injury, Awareness of needle stick injury. The confidentiality of event will be explained to student and assured that the information will be only used for research work. The collected data was entered in Microsoft excel and analysed using SPSS version 20.0. Data was presented as percentages and proportion.

Result: Approximately 41.6% of study participants had experienced at least one episode of needle stick injury. Among them, 38.4% reported that needle stick injuries were caused by improper injection practices (negligence). Additionally, 32.5% of study participants had poor awareness regarding needle stick injuries. While 87.2% of study participants were aware of post-exposure prophylaxis (PEP), only 6.4% had actually taken PEP. Furthermore, only 62.4% had received the hepatitis B vaccine, while 38.2% had no knowledge about the vaccine.

Conclusion: Approximately 41.6% of study participants reported experiencing at least one episode of needle stick injury. Among them, 38.4% attributed the injuries to improper injection practices, indicating negligence. Additionally, 32.5% of participants demonstrated poor awareness regarding needle stick injuries.

This study revealed a high prevalence of NSIs among interns, with many failing to take proper post-exposure actions. It is imperative that health education training programs be introduced for all HCWs, especially young doctors like interns, before they begin their professional careers in clinical practice. This will help ensure the safety and well-being of both healthcare workers and patients.

Keywords: Needle Stick Injury, Interns, Blood Borne Disease.

INTRODUCTION

Needlestick injuries (NSIs) are one of the most common occupational hazards in healthcare settings, particularly affecting interns and young healthcare workers who are at the beginning of their clinical careers. These injuries not only pose a risk of transmitting bloodborne pathogens, including hepatitis B, hepatitis C, and HIV, but also create

psychological stress among affected individuals.[1] The World Health Organization (WHO) estimates that needlestick injuries account for a significant proportion of occupational exposures to bloodborne pathogens, leading to an increased burden on healthcare systems.[2]

Interns, who are often new to clinical procedures and under pressure in high-demand settings, are especially vulnerable due to limited experience and insufficient training in safe handling practices.[3] Studies have shown that factors such as prolonged working hours, inadequate supervision, and improper disposal of sharps contribute to the prevalence of NSIs among healthcare interns.[4,5] Additionally, underreporting of such incidents remains a major concern, further exacerbating the issue.[6]

Needle stick injuries (NSIs) injuries can lead to the transmission of blood-borne pathogens such as hepatitis B, hepatitis C, and HIV, posing serious health risks. 7Despite the high prevalence of NSIs, there is often a lack of awareness and proper post-exposure practices among interns. This study aims to evaluate the prevalence of needle stick injuries among interns and assess their knowledge, attitudes, and practices regarding NSIs and post-exposure prophylaxis (PEP).[8]

Given the serious health implications and the potential for improved preventive measures, this study seeks to provide valuable insights into the current state of NSI awareness and management among medical interns. By identifying gaps in knowledge and practice, targeted interventions can be developed to enhance the safety and well-being of healthcare professionals.

The purpose of this study is to evaluate the prevalence of Needle Stick Injuries among interns and their level of awareness regarding post-exposure prophylaxis (PEP) for Needle Stick Injuries among medical interns, providing insights into potential preventive measures to mitigate these risks.

MATERIALS AND METHODS

A cross-sectional study will be conducted among interns at MR Medical College Kalaburagi over a period of 6 months (June - November 2019). All participants will be thoroughly briefed on the study's objectives, and written informed consent will be obtained. Data will be gathered through a predetermined self-administered questionnaire, which will include characteristics such as the cause of the event, the cause of injury, an explanation of how the event occurred, and awareness of needle stick injuries. Students will be assured of the confidentiality of their information, with a guarantee that it will only be used for research purposes.

Sampling: All interns at MR Medical College, Kalaburagi during the 2019-2020 academic year will be included in the study, with a total of 125 interns identified.

Inclusion Criteria: Interns who have been working for more than 6 months.

Exclusion Criteria: Individuals who are unwilling to participate in the study.

Method of statistical analysis: Data will be collected using a pre-designed and pre-tested questionnaire. The collected data will be entered into Microsoft Excel and analyzed using SPSS version 20.0. Results will be presented as percentages and proportions.

RESULTS

The table -1 summarizes the age and sex-wise distribution of 125 study participants. The majority of participants were in the 21–23 years age group (50.4%), with females (60.3%) outnumbering males (39.6%). In the 24–26 years age group (39.2%), males formed a higher proportion (63.2%) compared to females (36.7%). Similarly, among participants aged 27 years and above (10.4%), males constituted 69.2%, while females accounted for 30.7%. Overall, the study had a balanced gender representation, with males comprising 52.0% and females 48.0% of the total participants. These findings suggest age-specific variations in gender distribution among the study population.

The table -2 illustrates the distribution of 125 study participants based on the duration of their internship. A majority (71.2%) had completed 6–12 months of their internship, while a smaller proportion (28.8%) were in the early phase of 0–6 months. This indicates that most participants had considerable exposure to clinical settings at the time of the study.

Graph -1 presents the magnitude of needlestick injuries (NSIs) among the study participants over the past 12 months. Of the 125 participants, 52 (41.6%) reported experiencing an NSI, while 73 (58.4%) had not sustained any injury. These findings indicate that nearly two-fifths of the participants were affected by NSIs, highlighting the occupational risk faced by interns during their clinical training.

Graph-2 outlines the distribution of study participants based on the number of needlestick injury episodes they experienced. Among those who sustained injuries, the majority (63.4%) reported a single episode, while 34.6% experienced two episodes. Only one participant (0.01%) reported four episodes, and none reported three episodes. This distribution suggests that most needlestick injuries occurred as isolated incidents, with a smaller proportion experiencing repeated exposures.

Table 3 shows the distribution of needlestick injuries based on the site of injury. The majority of injuries occurred at the pulp of the finger, accounting for 31 cases (59.6%). The second most common site was the 2nd interphalangeal (IP) joint, with 11 injuries (21.1%), followed by the 1st IP joint with 9 cases (17.3%). A single injury (1.9%)

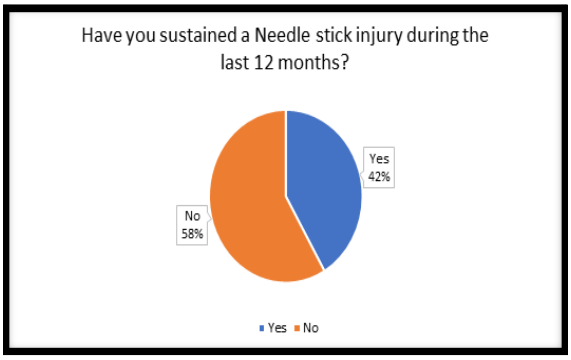
occurred at the 3rd IP joint. These findings indicate that injuries were most commonly localized to the finger, particularly at the pulp, highlighting a specific area of risk in needlestick incidents.

Table 4 describes the causes of needlestick injuries (NSIs) among the study participants. The most common cause was individual carelessness or accidental handling, reported by 20 participants (38.4%). This was followed by inability to recall the cause, accounting for 18 cases (34.6%). Poor disposal of needles was responsible for 10 injuries (19.2%), while other unspecified causes contributed to 4 cases (7.6%). These findings highlight that personal errors and lack of proper needle management are significant contributors to NSIs.

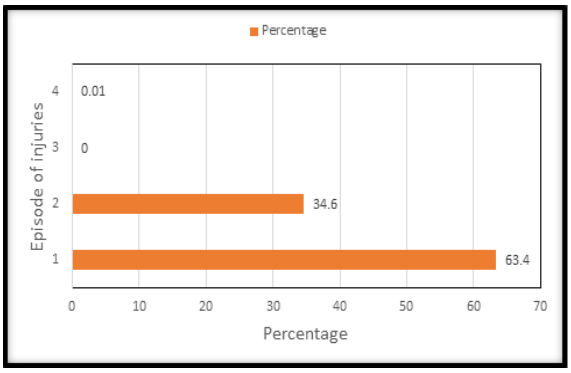
Table 5 illustrates the distribution of study participants based on their awareness scores regarding needlestick injuries (NSIs). Most participants (33.6%) scored between 6.1 and 8, indicating a moderate level of awareness. This was followed by 25.6% scoring between 4.1 and 6, and 19.2% achieving scores between 8.1 and 10, reflecting higher awareness levels. A smaller proportion scored less than 4 (9.6%) or above 10.1 (12.0%), representing the lowest and highest awareness levels, respectively. These results suggest that while a majority have moderate to good awareness, there is still room for improvement in knowledge regarding NSIs. Above 6 considered good awareness whereas below 6 shows poor awareness

Graph-3 highlights the awareness of post-exposure prophylaxis (PEP) among the study participants in relation to needlestick injuries. Of the 125 participants, a significant majority (87.2%) reported being aware of PEP, while 12.8% were not. This indicates that most participants had knowledge about PEP as a preventive measure following exposure, although a small proportion lacked this critical awareness.

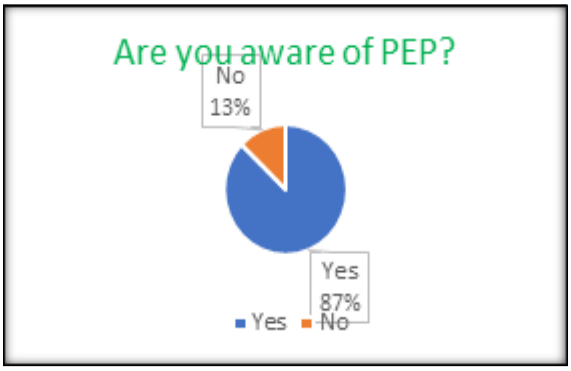
Graph-4 presents the practices regarding post-exposure prophylaxis (PEP) following needlestick injuries among the study participants. Only 8 participants (6.4%) reported having taken PEP after an injury, while a majority of 117 participants (93.6%) had never taken PEP. These findings suggest a significant gap between awareness of PEP and its actual use, highlighting a need for better implementation of preventive measures following needlestick exposures.



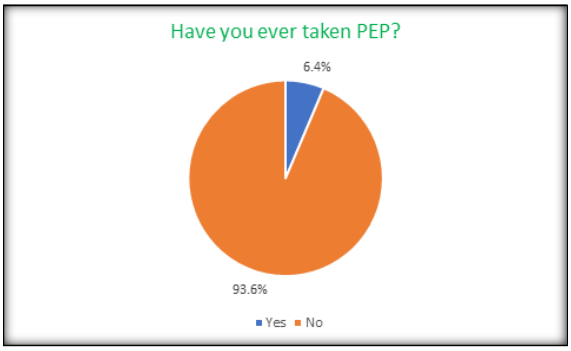
Graph 1: Magnitude of needle stick injuries



Graph 2: Distribution based on episode of injuries



Graph 3: Awareness regarding PEP of Needle stick injury



Graph 4: Practice regarding PEP of Needle stick injury

Table 1: Age and Sex wise distribution of study participants

Age (years)	Male		Female		Total	
	no	%	no	%	no	%
21-23	25	39.6	38	60.3	63	100.0
24-26	31	63.2	18	36.7	49	100.0

27 and above	9	69.2	4	30.7	13	100.0
	65	52.0	60	48.0	125	100.0

Table 2: Distribution of study participants based on duration of internship

Duration of internship (months)	Number
0-6	36
06-12	89

Table 3: Distribution based on site of injuries

Site of injuries	No	Percentage
Pulp of the finger	31	59.6
1st IP joint	9	17.3
2nd IP joint	11	21.1
3rd IP joint	1	1.9

Table 4: Cause of Needle stick injury

Cause of injuries	No	Percentage
Poor disposal of needle	10	19.2
Individual carelessness/accident	20	38.4
Cannot remember	18	34.6
Other	4	7.6

Table 5: Distribution based on awareness regarding Needle stick injury

Awareness score	No	Percentage
Less than 4	12	9.6
4.1- 6	32	25.6
6.1-8	42	33.6
8.1-10	24	19.2
10.1-12	15	12.0

Above 6 shows good awareness, below 6 shows poor awareness

DISCUSSIONS

The present study participants were distributed across three age groups, with a total of n=125 individuals comprising 65 males (52.0%) and 60 females (48.0%). In the 21–23 age group, which had the largest number of participants (63), females predominated, accounting for 60.3%, while males made up 39.6%. Conversely, in the 24–26 age group, males formed the majority at 63.2%, with females comprising 36.7% of the 49 participants. Among those aged 27 and above, the smallest group with 13 participants, males also outnumbered females, representing 69.2% compared to 30.7%. In study done by Ramesh Holla et.al9 (Mangalore) found out observed that majority of the health care personnel (n=127, 67.2%) were aged between 25 and 45 years followed by those aged less than 25 years (n=35, 18.5%). Male and female distribution is almost equal (n=94, 49.7% and n=95, 50.3% respectively).

The distribution of study participants based on the duration of their internship is summarized as follows: Among the participants, the majority 36 individuals had an internship duration of 0–6 months, while 89 individuals reported an internship duration of 6–12 months. This indicates that a significant proportion of the participants had relatively large internship experiences. In study done by Ramesh Holla et.al9 (Mangalore) found out While analyzing the experience of the health care personnel, it was observed that majority of them (n=137, 72.5%) had a work experience of more than 5 years followed by those who had a work experience of less than 5 years (n=52, 27.5%).

The magnitude of needle stick injuries among the study participants was assessed based on their experiences during the last 12 months. Of the participants, 52 individuals (41.6%) reported sustaining a needle stick injury, while 73 participants (58.4%) indicated they had not experienced such an injury. This highlights that a substantial proportion of participants were exposed to needle stick injuries within the study period. The number of needle stick injuries episodes was recorded among the participants who reported NSI. Most participants 63.4% experienced only one episode, while 34.6% reported two episodes. No participants reported three episodes, and a single individual (0.01%) experienced four injury episodes. In study done by Ramesh Holla et.al,[9] (Mangalore) found out the proportion of needle stick injuries among health care personnel of tertiary care hospital has shown a higher proportion of health care personnel were exposed to needle stick injuries in their work tenure (n=136, 71.9%).

A study done at Nepal among health care workers of medical college teaching hospital,[10] and a study from rural North India,[11] has shown similar results to the present study i.e. 70.8% and 73% respectively. Whereas the studies from New Delhi, India,[12,13] has shown relatively higher proportion of needle stick injuries among health care workers of tertiary care hospital i.e. 79.5% and 80.1% respectively when compared to the present study findings

In present study most common site of needle stick injuries was the pulp of the finger, with 31 cases (59.6%). This was followed by the first interphalangeal (IP) joint with 9 cases (17.3%), the second IP joint with 11 cases (21.1%), and the third IP joint with 1 case (1.9%). In study done by Tripti Agrawal et.al,[14] (New Delhi) found out injuries can be categorized into two types: superficial and deep. Superficial injuries, which do not involve blood oozing, account for the majority, with 43 cases (69.4%). In contrast, deep injuries, characterized by blood oozing, are less common, comprising 19 cases (31.6%).

In present study causes of needle stick injuries were categorized into various factors. Individual carelessness or accidental injuries were the most frequently reported cause, accounting for 20 cases (38.4%). Poor disposal of needles was cited in 10 cases (19.2%), while 18 participants (34.6%) could not recall the exact cause. Other miscellaneous causes were reported by 4 participants (7.6%). In study done by Tripti Agrawalet.al,[14] compare the Accidents were the most common cause, accounting for 23 cases (37%), carelessness, which was responsible for 15 cases (24.2%). Poor disposal practices contributed to 11 cases (17.7%), while 9 cases (14.6%) involved individuals who could not recall the cause. Lastly, 4 cases (6.5%) were attributed to other unspecified reasons. In study by Tripti Agrawal et.al,[14] (Punjab, jalandhar) The most frequent clinical activity leading to needle stick injuries (NSIs) was blood withdrawal, accounting for 55% of cases, followed by suturing at 20.3% and vaccination at 11.7%. Additionally, 13% of healthcare workers (HCWs) experienced NSIs due to patient aggressiveness. Recapping needles also emerged as a significant contributor to NSIs.

In present study Participants were also evaluated for their awareness levels regarding needle stick injuries. The awareness scores ranged from less than 4 to 12, with 42 participants (33.6%) scoring between 6.1 and 8, which was the most common range. About 32 participants (25.6%) scored between 4.1 and 6, 24 participants (19.2%) scored between 8.1 and 10, 15 participants (12%) scored between 10.1 and 12, and 12 participants (9.6%) scored less than 4.

Awareness about post-exposure prophylaxis (PEP) was high among the participants, with 109 individuals (87.2%) being aware of PEP, while 16 participants (12.8%) did not have knowledge. Despite this awareness, only 8 participants (6.4%) reported having ever taken PEP, while the majority (93.6%) had not utilized this PEP. In study done by Tripti Agrawalet. al,[14] compared among the 62 respondents, the majority (91%) reported that they had followed the PEP (Post-Exposure Prophylaxis) protocol completely, accounting for 56 individuals. In contrast, 6 respondents (9%) admitted that they did not fully adhere to the protocol. In study by Tripti Agrawal et.al,[14] 85% were aware that NSIs are preventable if appropriate PPE are utilized, 72% HCWs confirmed wearing gloves while handling needles, 91% followed the PEP protocol completely under guidance.

In a study done by Megnath, et al,[15] the prevalence of NSI among the interns was 47.22%. Males had a higher proportion of NSI, but it was not statistically significant.

Similar to a study by Al-Dabbas et al,[16] in this study nearly half of the interns (41.18%) did not report the injury with 57.14% interns citing lack of knowledge in reporting system as the reason, and another 42.85% felt the patient has low risk. Nagandla et al,[17] in their study found the main reason for underreporting to be due to perceived low risk of the patient's status for viral infection transmission.

The results of this study underscore the importance of implementing a robust surveillance system for reporting Needlestick Injuries (NSI) and providing comprehensive training for healthcare workers (HCWs) on universal precautions, NSI prevention practices, infection control, post-exposure protocols, and biomedical waste management. It is crucial to establish clear protocols for managing NSIs, including mandatory reporting and the establishment of a Post-Exposure Prophylaxis (PEP) center that offers appropriate treatment, psychological support, and counseling.

However, it is important to acknowledge the limitations of the current study, including a small sample size, variations in the duration of internships among participants, and the use of self-administered questionnaires.

CONCLUSION

Needlestick injuries (NSIs) are the most common occupational hazards, and interns are a high-risk group. Unfortunately, many NSIs go unreported, as many healthcare workers (Interns) do not adhere to universal precautions or take adequate post-exposure actions, such as post-exposure prophylaxis (PEP).

This study revealed a high prevalence of NSIs among interns, with many failing to take proper post-exposure actions. It is imperative that health education training programs be introduced for all HCWs, especially young doctors like interns, before they begin their professional careers in clinical practice. This will help ensure the safety and well-being of both healthcare workers and patients.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee [HKES/MRMC/IEC/191007]

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