

Inoculation Injuries: An Analysis at GCRI

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Summary

Inoculation injuries are common occurrence in the health care profession. Amongst them, needle stick injuries are highest in all health care workers. Needle stick injuries are often reality for staff who regularly use needles, like nurses and lab workers but many go unreported. This study was carried out by Infection prevention and control department of GCRI retrospectively. All inoculation injuries that occurred from January 2018 to December 2022 to all categories of hospital staff like Doctors, nurses, technicians and housekeeping staffs were included in study. From 2018 to 2022, total 86 inoculation injuries were reported in GCRI. Out of total 86 injuries, 81(94%) were needle stick injuries and only 5(6%) were splash of blood/body fluids. The number of reported Inoculation injuries that occurred per year ranged from 8-29. Inoculation injuries were highest in nursing staff (44%) followed by housekeeping staff (24%). Inoculation injuries were commonest while discarding sharps (25.5%), followed by invasive procedures (17.4%). Inoculation injuries are unavoidable incidents in all health care settings. Continuous training on sharp education, universal precaution, disposal of Sharps can reduce the number of incidents in health care settings. It is responsibility of Infection prevention and control department to set a multi-variate approach to protect the staff against inoculation injuries.

Keywords: Inoculation injuries, needle stick, health care workers

Aim: To know the prevalence of inoculation injuries and factors influencing it and also management of muco-cutaneous and percutaneous injuries in all health care workers of GCRI.

Introduction

Inoculation injuries are a very common occurrence in the health care settings. But unfortunately many of them go unreported.¹

All institutions must focus on decreasing the incidence of inoculation injuries and also reducing the rate of blood born transmitted diseases depending on the risk of transmission.

Amongst different inoculation injuries, needle stick injuries are highest in all health care workers.¹ In order to decrease the injuries, it is important that all individuals of hospital should be well trained about all exposure risk and educated regarding appropriate management.

There are three most common primary pathogens which are transmitted through inoculation injuries.²⁻⁵

Sr. No.	Name of Viruses	Risk of Infection	Factors which increased risk:
1	Human Immunodeficiency Virus (HIV)	•approximately 0.3 % without proper PEP (post exposure prophylaxis). ²	•Deep wound •Visible blood on the sharp •Patient with terminal HIV •Needle used in the vein or artery of the patient. ³
2	Hepatitis B Virus (HBV)	•If the patient is HbeAg-positive, which indicates active multiplication of virus then the risk of hepatitis is 3-31%. ^{3,4} •If the source is Hbe Ag-negative, the risk is less as compared to Hbe Ag positive, that is around 1-6%. ³	•Depends on the infectivity markers of the source. ³
3	Hepatitis C Virus (HCV)	•approximately 1.8%. ⁵	•No post exposure prophylaxis is available

- While there is active (potent vaccine) and specific passive (Hepatitis B immunoglobulin, HBIG) immunization available for HBV infection, such immunization is not available for HIV, HCV infections. Therefore 'High standard of handling' should be used while in contact with all invasive procedures.
- Although HBV immunization gives protection, we should always follow good Infection Prevention and Control practices, as vaccine gives protection in 80-90% of vaccinated individuals. There may be non-responders also.³
- Titer for Antibody against HBV should be checked after three months of completion of full course. All non-responder individuals and individuals with less than 10 mIU/ml titer value should be considered for a repeat course.³

What to do after any Inoculation injury?

1. Do not Panic.
2. Don't suck the wound.
3. Don't scrub or squeeze the wound.
4. Allow the blood to trickle/ flow under running tap water & wash with soap.
5. Dry and cover with water proof dressing.
6. Inform immediately to Head Nurse and Infection Control Nurse to fill up the NSI form and for further action.
7. If the needle is contaminated with patient positive for HIV/ HbsAg/ HCV or patient's status is unknown then it is required to take a prophylactic dose its available in Super Room and later to go to Anti-Retroviral Therapy centre, Civil Hospital along with the Needle stick injury form within 24 hrs of the injury.
8. Counselling by Infection Control Nurse.
9. All report forms to be sent to the Infection Prevention and Control Department
10. Blood is collected from victim for – HIV, HCV, HBV, Anti HBs titer
11. Blood is collected from the patient for – HIV, HCV, HBV
12. Further follow up of serological testing of the victim should be done till six months

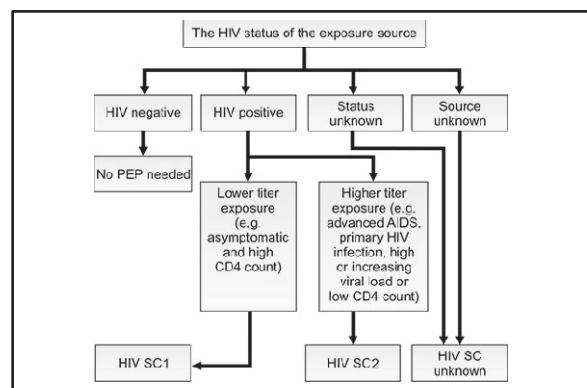
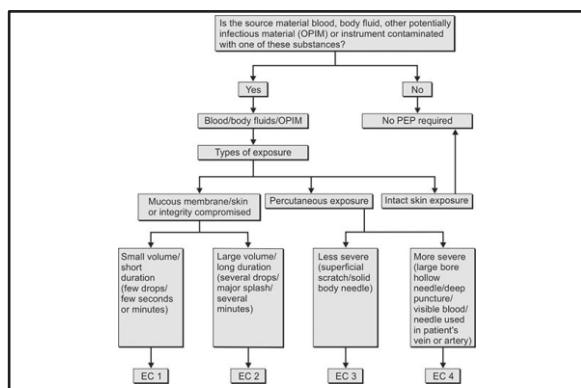
Post exposure prophylaxis (PEP) for HIV / HBsAg/ HCV2

- HIV: When the source is HIV positive, take a prophylactic dose within an hour and its available

in Super Room and later to go to Anti-Retroviral Therapy center for further PEP.

- The employee is counseled by Infection Control Nurse regarding the risk of infection and precautions to be observed.
- Clinical and serological evaluation of the employee is offered.
- The employee is advised to report any symptoms such as fever, lymphadenopathy, rash, profound fatigue, or persistent headache that occurs within 12 weeks after exposure.
- Initially seronegative employees should be tested at 3 and 6 months after exposure.
- Additional counselling should be arranged if necessary. The PEP should be taken on the available NACO guideline which is based on exposure to HIV and HIV status of the source from whom exposure/infection has occurred. [Figure 1]⁷

1. **HBV:** The PEP is mainly based on HBV status of the source and immunity status of victim.¹
 - If, victim is unvaccinated than vaccination should be initiated inspite of the status of source.
 - If the vaccination status of the victim is unknown, then tested for anti-HBs titre before giving PEP.
 - If a victim has a documented anti-Hbs titer more than 10 mIU/ml, than no PEP is required.
2. **HCV:** No PEP is available till date for victims exposed to HCV positive source but follow-up for HCV RNA is recommended by few studies



PEP - HIV TREATMENT NACO		
Exposure Code (EC)	Source Code (SC)	Treatment
EC 1	SC 1	PEP may be required
EC 1	SC 2	Consider basic regime
EC 2	SC 1	Recommend Basic regime (most exposures in this category)
EC 2	SC 2	Recommend Expanded regime
EC 3	SC 1 / 2	Recommend Expanded regime
2 / 3	Unknown	Consider basic regime

Revised ARV regimen for Post Exposure Prophylaxis for HIV infection		
Exposed person	Preferred regimen	Alternate regimen (if the preferred regimen is not available or contraindicated)
Adolescents and Adults (>10 years of age and age > 30 kg weight)	Tenofovir (300 mg) + Lamivudine (300 mg) + Dolutegravir (50 mg) (FDC - one tablet OD)	Tenofovir (300 mg) + Lamivudine (300 mg) (FDC - one tablet OD) Lopinavir (200mg) /ritonavir (50 mg)(two tablets BD) OR Tenofovir (300 mg) + lamivudine(300 mg) + Efavirenz (600 mg) (FDC - one tablet OD)
Children (> 6 years and > 20 kg weight)	Zidovudine + lamivudine (dosage as per weight band) + Dolutegravir (50 mg) (one tablet OD)	If Hb < 9 gm/dl Abacavir + Lamivudin (dosage as per weight band) + Dolutegravir (50 mg) (one tablet OD)
Children (<6 years old or < 20kg weight)	Zidovudine + lamivudine + lopinavir / ritonavir (dosage as per weight band)	If Hb < 9 gm/dl Abacavir + Lamivudin + Lopinavir / Ritonavir (dosage as per weight band)

Figure1: NACO guideline based on exposure to HIV and HIV status of the source

We studied the frequency of inoculation injuries, types of injuries and post exposure prophylaxis in all groups of health care workers of GCRI.

Materials and Method

This study was carried out by Infection prevention and control department of GCRI retrospectively. All inoculation injuries that occurred during a period 5 years between January 2018 to December 2022 were included in this study. All categories of hospital staff like doctors, nurses, technicians and housekeeping staffs were included in study.

As a part of Employment risk reduction Policy, Inoculation injury (NSI - needle stick injury) form was filled, if any inoculation injury happened in hospital immediately by Infection control nurse.

We obtained following details from the filled Inoculation injury form:

- Demographic details of staff and patient
- Information about injury like: date, time, type of sharp etc.
- Vaccination status of staff
- Patient status of HIV, HBV and HCV
- History of incident
- Action taken after injury
- Details of PEP, if given
- Results of follow –up sample

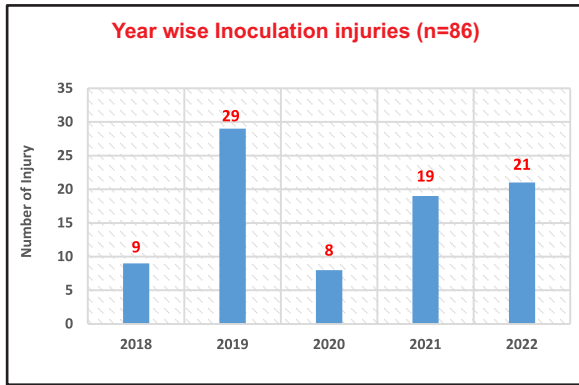


Figure 2: Year wise inoculation injuries

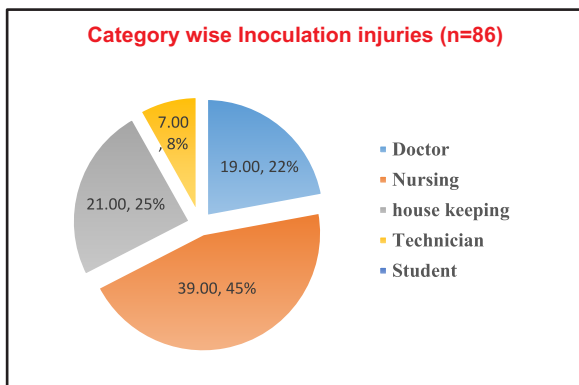


Figure 3: Inoculation injuries in different categories of staff

All data were entered and analyzed using SPSS 16. Exposure code of Injury is defined as per standard guideline.

Results

Over a period of five years (2018 to 2022), total of 86 inoculation injuries were reported in GCRI. Out of total 86 injuries, 81(94%) were needle stick injuries and only 5 (6%) were splash of blood/body fluids.

Figure 2 shows year wise inoculation injuries. Inoculation injuries in different categories of staff are mentioned in Figure 3.

Figure 4 shows the type of sharp which were involved in Inoculation injuries, like hypodermic needle, viggio stylet, scalpel, suture needle etc.

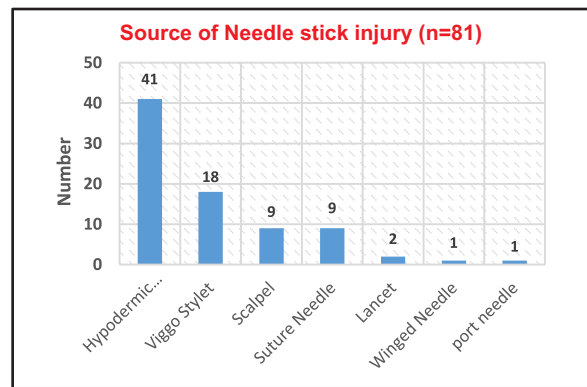


Figure 4: Source of needle stick injury

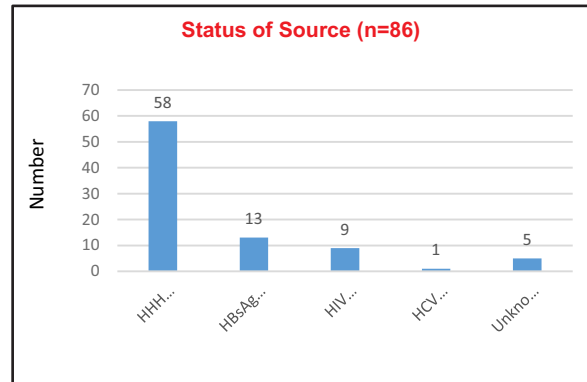


Figure 5: HIV, HBV and HCV (HHH) status of source

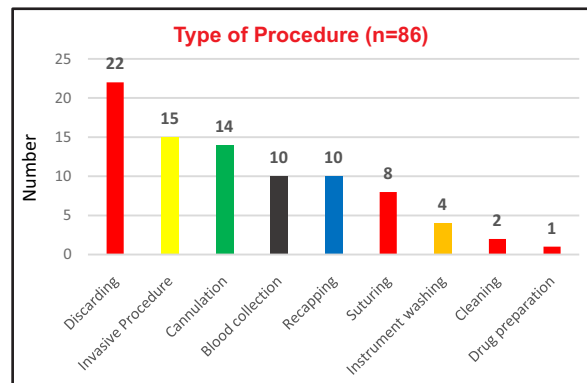


Figure 6: Inoculation injuries occurred during different procedures

HIV, HBV and HCV (HHH) status of source are shown in Figure 5.

Inoculation injuries occurred during different procedures like; discarding, invasive procedures, cannulation, blood collection etc. this is shown in Figure 6.

Discussion and Conclusion

The number of Reported Inoculation injuries that occurred per year during last five years (2018-2022) ranged from 8 – 29. Study by Sharma et al., from Delhi reported 0-20 injuries in their study.⁶

Amongst the different categories of staff, injuries were highest in nursing staff (38/86, 44%) followed by housekeeping staff (21/86, 24%). Study by Sharma et al. has also shown that Nursing staff are more prone to inoculation injuries in his study. (42/322, 13.4%).⁶

Out of total 86 injuries, 58 (67%) patients were negative, 13 (15%) were HBV positive, 09 (10%) were reactive to HIV, one patient was reactive to HCV and 05 (5.8%) injuries were from unknown sources.

- Following Injury by HBV positive source, out of 13 staff, 12 were well protected. only one staff was non-vaccinated. HBIG and first dose of HBV vaccine was given to that staff.
- After injury from HIV positive source (N=9), one-month ART as per NACO guideline were given to all nine staff.
- All 86 staffs were followed for six months. Follow up blood samples were taken at the interval of 0, 3, and 6 months for testing of HIV, HBV and HCV. None of them were found to be positive.

Inoculation injuries occurred highest while discarding sharps (22/86, 25.5%), followed by invasive procedures (15/86, 17.4%). It is also common during cannulation, re-capping of needle and suturing. Khursheed et al also observed that more injuries occurred during disposal of sharps (43%).⁸

Comment

Inoculation injuries are unavoidable incidents in all health care settings. In addition to that it may include psychological trauma to the staff. The introduction of safety devices may decrease the occurrence of this type of incidents.

Multi-variate approaches are required to prevent the staff against inoculation injuries. Like; training on

- Standard sharp education
- Universal precaution
- Disposal of Sharps
- Bio-medical waste management

It is responsibility of Infection prevention and control department to set up a proper surveillance mechanism and proper facility for immediate response and post exposure prophylaxis of all inoculation injury.

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