

**STRATEGIES FOR MITIGATION NEEDLE STICK INJURIES IN A HEALTHCARE CENTRE: COMPREHENSIVE RECOMMENDATIONS FOR PREVENTION AND SAFETY ENHANCEMENTS.****Dr. Preeti Verma***Hospital Administrator, Government Institute of Medical Sciences, Greater Noida, U.P.
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ABSTRACT

Medical treatment is intended to save life and improve health, and all health workers have a responsibility to prevent transmission of health-care associated infections. Occupational exposure to bloodborne pathogens from needle sticks and other sharps injuries is a serious problem, but it is preventable and requires management for it. The exposure can occur through needle-stick and sharp injuries, and from splashes contaminated with blood or body fluids. Management includes first aid, risk assessment, notification and reporting for HBV, HCV and HIV, and provision of PEP. The prophylaxis should be administered as soon after exposure as possible; it entails medical evaluation, follow-up care and prevention, and is specific to the etiologic agent involved. The articulation of robust management strategies, notably through prompt PEP administration and pathogen-specific protocols, serves as an imperative for safeguarding the well-being of healthcare professionals. Regularized training initiatives, adherence to established safety protocols, and meticulous reporting mechanisms collectively constitute the fulcrum of an effective framework for the prevention and management of occupational exposures in the healthcare system.

KEYWORDS : NSI, sharp injuries, infection safety, HBV, HCV and HIV.**INTRODUCTION**

The healthcare scenario is rapidly changing around the world. People's need for healthcare and how it is delivered are influenced by economic, political, social, environmental, and cultural issues. The emphasis is on offering high-quality services at the lowest possible cost, resulting in a variety of non-hospital care options. Quality of care has long been recognized as a key factor in deciding whether or not a person seeks medical advice, follows through with treatment, and maintains a long-term connection with a practitioner. (Journal of AHA Vol. 12, No. 1)

The risks of transmission of infection from an infected patient to the health worker following a needle-stick injury are estimated to be:

- Hepatitis B: 3–10% (up to 30%);
- Hepatitis C: 0.8–3%;
- HIV: 0.3% (mucous membrane exposure risk is 0.1%)

Factors that can increase the risk of transmission of HIV includes:-

- a deep wound, visible blood on the device
- a hollow-bore blood-filled needle
- use of the device to access an artery or vein
- high-viral-load status of the patient

Together, these factors can increase the risk of transmission of HIV from a contaminated sharp to 5%.

What is Needle Stick Injury?

The transmission of blood borne pathogens may occur through percutaneous and mucocutaneous routes, and sometimes, through exposure to other body fluids. A study was conducted by Dr. Annette Pruss-Ustun, Geneva, Switzerland in 2005 for estimation of global burden of hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) infection due to percutaneous injuries among health care workers (HCWs) in which they modelled the incidence of infections attributable to percutaneous injuries in 14 geographical regions and found Overall, 16,000 HCV, 66,000 HBV and 1,000 HIV infections may have occurred in the year 2000 worldwide among HCWs due to their occupational exposure to percutaneous injuries.²

Many injections around the world are unnecessary and often unsafe. Unsafe injections put lives at risk and every year cause 1.67 million hepatitis B infections, up to 315 120 hepatitis C infections and up to 33 877 human immunodeficiency virus (HIV) infections.³

The present high occurrence of needle stick injury in HCWs a study was conducted by Samathi Muralidhar, Safdarjang Hospital, New Delhi, India. In which the study group consisted 428 HCWs of various categories and with the use of structured questionnaire it was found that commonest cause of NSI was blood withdrawal (55%), followed

by suturing (20.3%), vaccination (11.7%) and bending the needles before discarding (11.4%) which shows ignorance and apathy towards NSI in HCWs.⁴

METHODOLOGY

Literature review was performed using the databases of ScienceDirect, ProQuest, MEDLINE, PsycINFO, Scopus, CINAHL, SpringerLink, JSTOR, and PubMed. The search terms of “nursing students”, “NSI incidents”, “prevention”, and “clinical settings” were entered, generating 103 articles published between 1991 and 2015.

DISCUSSION

Unsafe injections can result in transmission of a wide variety of pathogens, including viruses, bacteria, fungi and parasites. They can also cause non-infectious adverse events such as abscesses and toxic reactions. Reuse of syringes or needles is common in many settings. It exposes patients to pathogens either directly (via contaminated equipment) or indirectly (via contaminated medication vials). The risks of unsafe injection practices have been well documented for the three primary bloodborne pathogens – human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV). The estimated global burden of disease for the year 2000 from unsafe injection practices for these pathogens included:

- 21 million HBV infections (32% of new HBV infections);
- 2 million HCV infections (40% of new HCV infections);
- 260 000 HIV infections (5% of new HIV infections).

These bloodborne pathogens also contribute to illness among health workers – an estimated 4.4% of HIV infections and 39% of HBV and HCV infections are attributed to occupational injury. Among susceptible health workers who do not receive post-exposure prophylaxis (PEP), the risk of infection after needle-stick injury is 23–62% for HBV and 0–7% for HCV. Infections may also be transmitted (to other health workers and to patients) from cross-contamination of health workers' hands, medications, medical equipment and devices or environmental surfaces. Thus, proper injection techniques and procedures contribute to the safety of both patients and health workers.⁵

(Hari Prasad Kaphle, Neena Gupta, 2014) studied and found seven-out of ten (69.5%) had not received training on injection safety. The finding of this study is consistent with studies conducted in Ethiopia (66.9%) and in Bangladesh (73%). Many studies highlighted that the less attention provided in training in developing countries were associated with needle stick injuries.³

CONCLUSION

The delivery of patient care spans a spectrum from well-equipped clinics and advanced teaching hospitals to basic primary health centers. Despite progress in healthcare, the persistent issue of

infections in hospitalized patients, affecting patients and staff, demands meticulous examination.

Contributing factors include compromised patient immunity, the proliferation of medical procedures and invasive techniques, and the environmental transmission of drug-resistant bacteria, particularly in crowded hospital settings where inadequate infection control practices may facilitate transmission. Addressing these challenges mandates a focused and systematic approach to fortify infection control measures across varied healthcare environments.⁶

The safety of health care is now a major global concern. Services that are unsafe and of low quality lead to diminished health outcomes and even to harm. The experience of countries that are heavily engaged in national efforts clearly demonstrates that, although health systems differ from country to country, many threats to patient safety have similar causes and often similar solutions.

Treating and caring for people in a safe environment and protecting them from health care-related avoidable harm should be a national and international priority, calling for concerted international efforts.

The most important challenge in the field of patient safety must be how to prevent harm, particularly 'avoidable harm', to patients during treatment and care. All preventable errors can, and should be, avoided.⁷

RECOMMENDATIONS

Injection Safety checklist-

The following Injection Safety checklist items are a subset of items that can be found in the CDC Infection Prevention Checklist for Outpatient Settings: Minimum Expectations for Safe Care.

The checklist, which is appropriate for both inpatient and outpatient settings, should be used to systematically assess adherence of healthcare providers to safe injection practices. Assessment of adherence should be conducted by direct observation of healthcare personnel during the performance of their duties.

Injection Safety	Practice Performed	If answer is No, document plan for remediation
Proper hand hygiene, using alcohol-based hand rub or soap and water, is performed prior to preparing and administering medications.	Yes/No	
Injections are prepared using aseptic technique in a clean area free from contamination or contact with blood, body fluids, or contaminated equipment.	Yes/No	
Needles and syringes are used for only one patient (this includes manufactured prefilled syringes and cartridge devices such as insulin pens)	Yes/No	
The rubber septum on a medication vial is disinfected with alcohol prior to piercing.	Yes/No	
Medication vials are entered with a new needle and a new syringe, even when obtaining additional doses for the same patient.	Yes/No	
Single-dose or single-use medication vials, ampules, and bags or bottles of intravenous solution are used for only one patient.	Yes/No	
Medication administration tubing and connectors are used for only one patient.	Yes/No	
Multi-dose vials are dated by healthcare when they are first opened and discarded within 28 days unless the manufacturer specifies a different (shorter or longer) date for that opened vial. Note: This is different from the expiration date printed on the vial.	Yes/No	

Multi-dose vials are dedicated to individual patients whenever possible.	Yes/No	
Multi-dose vials to be used for more than one patient are kept in a centralized medication area and do not enter the immediate patient treatment area (e.g., operating room, patient room/cubicle).	Yes/No	
Note: If multi-dose vials enter the immediate patient treatment area, they should be dedicated for single-patient use and discarded immediately after use.		

Injection Safety-Assessment Checklist

SYSTEM DESIGN			
1	Is there availability of appropriate sharp containers?		
2	Placement criteria of the sharp container:	Accessible	
		Maintained upright	
		Not allowed to over fill	
		Lid/ cap to close the container before transport present	

SAFE INJECTION PRACTICE			
1	Injections are prepared using aseptic technique in a clean area free from contamination or contact with blood, body fluids or contaminated equipment		
2	There is no re-use of syringes and needles		
3	All staff are immunized against Hepatitis B		

Housekeeping staff are wearing appropriate PPE while transporting sharp waste

TRAINING/POLICY & DOCUMENTS

1	Is the facility has a competency-based training program for preparation and administration of parenteral medications outside of the pharmacy		
2	Is the facility routinely audits adherence to Injection Safety		
3	Is the facility has Injection safety committee?		

Document Title: Needle Stick Injury Policy

DOCUMENT TITLE: NEEDLE STICK INJURY POLICY

Aim
The aim of this policy is to provide the management of occupational exposure by Needle stick injury to blood and other potentially infectious material. The guidelines have been adapted from the existing WHO and CDC recommendations.

Policy applies on:
This policy applies to all employees whose activities involve contact with patients or with blood or other body fluids from patients work for or on behalf

What is an exposure?
Exposure is defined as a

(i) percutaneous injury, e.g., a needle stick or cut with a sharp object or

(ii) contact of mucous membrane or contact of non-intact skin, e.g., exposed skin that is chapped, abraded, or afflicted with dermatitis with potentially infectious source

The potentially infectious sources:
Exposure to:

- blood,
- tissue,
- or other body fluids that are potentially infectious: breast milk, bile, cerebrospinal fluid, feces, nasopharyngeal washings, saliva, semen, sweat, pleural fluid, peritoneal, pericardial, amniotic and synovial fluids

Notification
The health-care worker must **REPORT** immediately to the Hepatitis Prevention Control Cell/HFCC, and seek advice on the need for PEP for HIV, HBV, and HCV.

First Aid
The first aid given is based on the type of exposure (e.g. splash, needle-stick or other injury) and the means of exposure (e.g. intact skin, non intact skin). Application of first aid in different situation should vide infra:-

Allow it to bleed- Don't suck the wound, don't scrub the wound

Splash of blood and/or body fluids on non intact skin

- Immediately wash the affected area with soap and water.
- DO NOT use disinfectant on skin
- DO NOT scrub or rub the area



Splash of blood or body fluids on intact skin

- Immediately wash the affected area with soap and water
- DO NOT rub the area



Splash of blood or body fluids to eyes

- Flush the area gently but thoroughly with running water or saline for at least 15 minutes while the eyes are open
- Keep eyelid gently inverted



Splash of blood or body fluids to mouth or nose

- Immediately spit out the blood or fluids and rinse the mouth with water several times
- Blow the nose and clean the affected area with water or saline
- DO NOT use disinfectant

Evaluation and management of exposure to HBV

Risk of transmission of HBV

The risk of transmission of HBV is higher than that for HCV or HIV. Among susceptible health workers, the risk of HBV infection after a needle-stick injury involving an HBV-positive source is 23-62%.

Management of HBV exposure:

PEP for HBV can be highly effective in preventing transmission of the virus after exposure. PEP for HBV is based on the hepatitis B vaccine, either alone or combined with hepatitis B immune globulin (HBIG).

- For PEP to be effective, the initial dose of vaccine must be administered soon after exposure; the longer the gap between exposure and administration of the vaccine, the less effective the PEP
- Few studies have researched the maximum time after exposure during which PEP is effective, but it is likely to be less than seven days for needle-stick exposures.

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