

Needle Stick Injuries in Health Care Providers

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Needle stick injuries may be defined as the parenteral introduction of blood or other potentially infectious material by a hollow bore needle or sharp instrument, including but not limited to needles, lancets, scalpels and contaminated broken glass. Centre for Disease Control and Prevention, Department of Health and Human Services, USA estimated that 0.6-0.8 million needle stick injuries, and other percutaneous injuries occur annually among Health Care Workers (HCW) making them susceptible to blood borne pathogens causing hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV), which are life-threatening, although preventable.

The potential risk of transmission of blood-borne viruses (BBV) arises from exposure to blood and other body fluids from infected patients. Body fluids other than blood which also pose risk of infection include CSF, peritoneal fluid, pleural fluid, pericardial fluid, synovial fluid, amniotic fluid, semen, vaginal secretions, breast milk, saliva, unfixed tissues and organs.

According to Canadian Needle Stick surveillance

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data (2001), 43 percent of injuries occur during the use of the device, 33 percent after its use, and 12 percent are related to disposal whereas another 12 percent have an unknown etiology. Besides BBVs other infections that can be transmitted are MRSA, tuberculosis, blast mycosis, brucellosis, Cryptococcus, diphtheria, malaria, syphilis and toxoplasmosis. The greatest occupational risk for transmitting a BBV is through parental exposure, by subcutaneous, intramuscular or intravenous route. As compared to mucocutaneous exposures, percutaneous exposures carry a higher risk of possible infection.

BBVs have not been shown to be transmitted by blood contamination of intact skin, by inhalation or by faeco-oral route. On the other hand, HIV is transmitted by exposure to blood, blood products, semen, vaginal secretions, donor organs and tissues and breast milk (UK Health Department's guidance, 1998. This guidance does not outline any currently available vaccine, but post exposure prophylaxis (PEP) has been developed as a means of treatment in the form of antiretroviral therapy. HBV is also transmitted by similar routes.

Although immunisation is available it cannot be considered a substitute for good infection control practice. PEP in the form of immunoglobu-

lin is available for HBV but it is not in much use. Acute form of HCV is, on the other hand, treated by administration of pegylated interferon. Exposure to HBV e-antigen positive blood without prior vaccination has a 22-31 percent risk of being infected (Beltrami et al, 2001) but is reduced to 1-6 percent if the source is s-antigen positive. Risk for HIV exposure lies between 0.3-0.4 percent (Marcus et al, 1988; Henderson et al, 1990; CDC 2001) and seroconversion is dependent on interval between needle use and exposure, depth of penetration, quantity of blood injected, bore of the needle, clinical status of source patient, titer of circulating virus, use of anti viral drugs or vaccination, immune response of the HCW and use of barriers.

Materials and Method

The study was conducted in 140 HCWs in 10 hospitals in June 2006, who after being briefed about the aims of the study, were asked to fill in a questionnaire regarding data pertaining to needle stick injuries for a period of 1 year, 6 months retrospectively, and 6 months prospectively. A general assessment of sharps management policy of all the hospitals/clinics was followed by a 15 min audio visual presentation regarding prevention of needlestick injuries and a group discussion. The questionnaire was collected

after a stipulated time period of 10 min and the data obtained was used for observations and statistical analysis

The sample included 30 (21%) specialists, 35 (25%) residents, 25 (18%) nurses, 10 (7%) paramedics, 10 (7%) lab technicians and 30 (21%) waste handlers between 20-50 years of age. They were required to answer 5 open-ended questions designed to elicit information on a number of injuries sustained, types of devices involved, procedure which led to the injury and if injury occurred, whether it was reported and the status of post exposure prophylaxis. Another 8 open-ended questions focused on role of health care set up and its sharp handling policy with respect to prevention of needle stick injuries.

Results

Out of 66 (48%) males and 74 (52%) females studied, immunisation against hepatitis B had been performed by 84 (60%) of the subjects. A total of 24 (17%) individuals admitted to have needlestick injuries (Table 1 and Fig. 1); 20 (83%) reported 1 needlestick injury each, whereas 4 (16.4%) had 2 injuries each. Waste handlers (42%), followed by nurses (33%) were the main victims of needle stick injuries among all HCWs.

Only 4 (16.6%) respondents out of 24 reported the injury to the person concerned, these included 1 (4.16%) resident, 1 (4.16%) specialist and 2 (8.33%) nurses. All the injuries reported were deep.

All 4 reported cases received post exposure prophylaxis.

Other 20 respondents did not receive any PEP as they never reported the injury. One specialist reported of a colleague who had died of hepatitis B after getting exposed to needlestick injury; 18 (12.8%) of the 140 respondents who had received sharp management training were residents, specialists or nurses. None of the institutions maintained the sharps injury record. Only 40 (28.5%) respondents acknowledged that their set up provided safe working environment in terms of sharps safety and could take care of PEP in case of such injuries.

Discussion

EPINet system suggests that on an average, hospital workers incur approximately 30 needle stick injuries per 100 beds per 10 years. Other studies have shown that needle stick injuries are unreported. Underreporting undermines determination of the extent and magnitude of these injuries. It is estimated that 90 percent of occupational exposures occur in developing world but only a handful get reported. In our study only 16.6 percent of these injuries were actually reported. Due to the higher incidence of injuries during recapping of needles, recapping has been prohibited under the Occupational Safety and Health Administration (OSHA), blood-borne pathogen standard. In our study, 7 (29%) respondents were injured while recapping procedures. CDC and OSHA (1985) introduced the *Universal Precaution Guidelines* which have been used worldwide in hospital

and community care setting. Needles or protected needle intravenous systems have decreased the incidence of needle stick injuries by 62-88 percent. In our survey 122 (87%) out of 140, did not receive any training related to infection control and prevention of needle stick injuries either due to inadequate information or they themselves did not realise the importance of training. The safe Injection Global Network (SIGN) was formed to control the menace of BBV through needle stick injuries. The controls used in hierarchy, as under, start from the most effective to the least effective.

a) Elimination of hazard. Prescribing a tablet rather than an avoidable injection or if the hazard cannot be eliminated, it can be modified by engineering methods to reduce the risk.

b) Engineering controls. Include needleless intravenous systems, i.e. needles that retract or become blunt after use. These devices result in lesser number of injuries (Yassi, 1995).

c) Administrative controls. These include policies limiting exposure to a hazard such as universal precautions, allocation of resources demonstrating management commitment to health care worker safety, development of exposure control plan, education and training of HCWs on proper use of safer devices and best practices.

d) Personal protective equipment. These are barriers and filters placed between HCWs and the hazard such as gloves, masks, gowns and goggles,

used as a part of infection control and prevention strategy.
e) Safe disposal of biowaste:
 It is the most important criterion for safety of both HCWs and the community at large.

Conclusion

Training the staff and developing good sharps management plans can ensure safety from sharps. A standing order procedure should be formulated regarding sharps injuries in all health institutions. Since needlestick injuries were highest in waste han-

dlers and nurses, it underscores the need to provide compulsory education to these HCWs with respect to needle stick injuries. Since only 28.5% of the respondents agreed that their institutions were actively involved in prevention of needlestick stick injuries and proper waste management, it becomes imperative that people at higher levels in medical institutions be held accountable for these practices. Government regulations may have to be put into practice to ensure the

same. Health care workers should be made aware of hazards and preventive measures against needle stick injuries which include avoidance of wearing open footwear in situations where blood may be spilt or sharps are handled, resheathing needles, disposing of used sharps in puncture proof containers, wearing personal protective equipment, immunising against BBs, however, it should not be considered a substitute for good infection control practices. Post-exposure prophylaxis, in case of inadvertent injury should commence within one hour. These injuries should be reported, so as to facilitate treatment. Finally good infection control techniques should be applied at all times and in all clinical situations to avoid injury.

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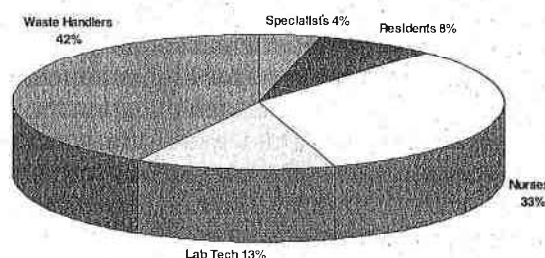
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NEEDLESTICK INJURY SURVEY QUESTIONNAIRE		
Name:	Place of work:	Nature of work:
1. How many sharp injuries have you sustained in last 12 months?		
2. Did you report the injury to the clinic incharge or the institution? Yes/ No		
If yes, immediately / after 1-2 hours / after 24 hours		
- Was injury deep / superficial		
- If no - reasons for not reporting		
3. What was the nature of being carried out during which the injury was sustained (tick)		
• IM /IV injection / recapping, Waste disposal & handling, Others		
• Suturing /blade handling		
• Blood drawing		
4. Was the device which caused injury infected /non infected /status not known?		
5. Whether you received adequate medical care (post-exposure prophylaxis) and did you get yourself tested for HIV, Hep. B or any other antibodies after the injury? (Yes/No)		
6. Are you immunised against Hep. B? (Yes/No). Any incident of HIV, Hep. B, Hep. C in any colleague which was due to needle stick injury (Yes/No)		
7. Does your setup have a sharps management policy?(Yes/No)		
8. Have you received any training in sharps handling?		
9. Does your set up maintain a sharps injury record?		
10. If yes, does your set up share sharps injury data, for education and injury prevention?		
11. Is your set up committed for providing a safe environment in terms of sharps safety?		
12. Can it take care of post-exposure prophylaxis requirement? (Yes/No)		
13. Are you aware that the needle stick injuries could be potentially dangerous to you?		
Suggestions to prevent needle stick injuries.		

Table 1 : Nature of work that led to needle stick injuries

No. of injuries	Designation	Work that led to injuries
1	Specialists	Wire prick during IMF
2	Residents	Suturing
7, 2	Nurses	Needle recapping , blood drawing
0	Paramedics	
2	Lab technicians	Sharpening of knife, blood testing
7, 3	Waste handlers	Waste collection, waste segregation

Figure 1 : Injury Distribution in Health Care Workers



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Fondly remembering Mr Boopathy

Mr. K. Boopathy, Nursing Tutor (Suptdt) (Retd.), Government General Hospital, Chennai passed away on 5 December 2001. I was adored by the principles of Florence Nightingale and so was my would be partner. I served as Staff Nurse in many government hospitals in Chennai for more than 32 years and retired as Nursing Supervisor from Government General Hospital, Chennai in 1988. I selected my life partner, Mr. Boopathy who was also in the same (nursing) profession. He completed B.Sc. (Nursing) at the age of 50 years and retired as Nursing Tutor at Government General Hospital, Chennai.

My husband had passion for teaching. He encouraged students through cash awards through his personal funding. Besides, his lifetime dream was to contribute financial assistance to the growth of school of nursing. Ofcourse, he could not fulfill his dream due to his total commitment to expanded family. It is my desire to fulfill his dream and my emotional attachment to the nursing community derive me to contribute a small financial drop of Rs. 5000/- for the sustained growth of TNAI. With warm regards.

Mrs. B. Jayammal

OBITUARY

Dr. (Mrs.) Aleyamma Kurian George left for her heavenly home on 15 June 2008. Born on 29 May 1931, she had done B.Sc. (N) in the year 1967, M.Sc.(N) in 1970, M.Ed. in 1971 and Doctor of Education in 1972 at Columbia University.



She had started her career as a Staff Nurse at ETCM Hospital, Kolar. She served different positions like Lecturer in Department of Public Health Nursing, Vellore; Professor, Vice Principal and Principal, MV Shetty Institute of Nursing, Mangalore and a Guide for Ph.D. scholars under Mangalore University. She was Dean / Director for about 14 years in the Vivekanandha College of Nursing, Elayampalayam, Tiruchengode, Namakkal (Dt), Tamil Nadu.

An active member of TNAI, she was a soft spoken and enthusiastic personality, encouraging many nurses to go for higher education. She was author of books on Education for Under graduate and Post graduate students studying nursing. Her everlasting smile will stand with the nursing fraternity to inspire the Nursing Society.

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*** Subject to conditions.