



ISSN NO. 2320-5407

**Journal Homepage: -[www.journalijar.com](http://www.journalijar.com)**  
**INTERNATIONAL JOURNAL OF  
ADVANCED RESEARCH (IJAR)**

**Article DOI:** 10.21474/IJAR01/7649  
**DOI URL:** <http://dx.doi.org/10.21474/IJAR01/7649>



**RESEARCH ARTICLE**

**OCCUPATIONAL HAZARD: NEEDLE STICK INJURY AMONG HEALTH CARE WORKERS.**

**Abeer Abdullah Alrumayyan.  
BDS, AEGD, MPC.**

**Manuscript Info**

**Manuscript History**

Received: 03 July 2018

Final Accepted: 05 August 2018

Published: September 2018

**Abstract**

Many infectious diseases can be transmitted through injuries. Of most important are virus infections like human immunodeficiency (HIV), hepatitis C (HCV) and hepatitis B (HBV). Health workers are nurses the most affected. Needle stick injury is considered highly under reported. The world health organization and the International Council of Nurses introduced a pilot Project to decrease needle stick injury among health workers. Policies and methods of prevention of needle stick injury were distributed worldwide. Although WHO needle stick injury policies are recognized in Saudi Arabia, they are not implemented properly. This assignment will review the health issue of injuries and infectious diseases produced by needle stick injuries internationally and in Saudi Arabia (NGH).

*Copy Right, IJAR, 2018,. All rights reserved.*

**Introduction:-**

Needle stick injury is a very important issue to discuss as it is a major hazard to patients and health workers. Many infectious diseases can be transmitted through injuries. Of most important are virus infections like human immunodeficiency (HIV), hepatitis C (HCV) and hepatitis B (HBV)<sup>iii</sup>. Health workers are nurses the most affected <sup>2iiiv</sup>. Needle stick injury is considered highly under reported<sup>2</sup>. The world health organization and the International Council of Nurses introduced a pilot Project to decrease needle stick injury among health workers. Policies and methods of prevention of needle stick injury were distributed worldwide.<sup>1</sup> Although WHO needle stick injury policies are recognized in Saudi Arabia, they are not implemented properly.

Needle stick injury can cause serious infectious diseases by transmission of blood born pathogen from patients to the health workers and vice versa<sup>15</sup>. It represents eighty percent of contact causes between the blood borne pathogen and the health workers.<sup>2</sup> The most serious of the twenty blood borne pathogens that can affect the health workers during their daily contact with infected patients are hepatitis C (HCV) and human Immunodeficiency virus (HIV), and hepatitis B virus (HBV)<sup>2</sup> which is the only one that has immunization.<sup>1</sup> Generalized vaccination started in the beginning of the 1980s<sup>v</sup>. The percentage of contamination with hepatitis C is from 0 to 3% and increase to 10% when dealing with hepatitis C positive patient<sup>5</sup>. Recently the evaluation of the risk of hepatitis C easier by using serum marker detection technique<sup>5</sup>. There are other infectious diseases that can be transmitted during needle stick injury as syphilis, malaria, herpes, Rocky Mountain spotted fever and varicella zoster <sup>12</sup>.

**Aim:-**

This assignment will review the health issue of injuries and infectious diseases produced by needle stick injuries internationally and in Saudi Arabia (NGH).

**Corresponding Author:-Abeerabdullahalrumayyan.**

**Methods:-**

Literature review was performed by using data-based search on internet websites as PubMed, science direct and Wikipedia, different key words I used as: occupational hazards, infectious diseases, needle stick injury, and transmitted diseases among health workers.

Also I used the websites of international and Saudi infection control journals. Also I took some information and guidelines from the hospital that I work in, the infection control department.

**Results:-**

The numbers of health workers are thirty five million all over the world, which represent twelve percent of the working community.<sup>1</sup> Numerous studies have shown that health workers that are exposed to dangerous infectious diseases by needle stick injury are of considerable percentages, hence the WHO created policies about its prevention and management. Worldwide percentage of hepatitis B and C is 40% and 2.5% for HIV in health care workers due to needle stick injury which is about two million injuries per year<sup>1</sup>. This number is considered low as many cases of needle stick injuries not reported and surveyed (40%-75% are underreporting)<sup>1</sup>. The center of disease control and prevention (CDC) reports that the number of American health workers that get needle stick injury range between 600,000 and one million annually<sup>2</sup>. In a study done in United Kingdom a 38% of 279 samples had needle stick injuries in the last year and about 74% during their careers<sup>4</sup>. Another Eight studies in United Kingdom showed 4% of needle injuries in ten thousands health care workers. In United Kingdom the number of injuries is still inaccurate due to underreporting<sup>vii</sup>. Another study done in Baylor College of medicine between December 2002 and December 2005 showed 98 injuries mostly in the operating room by hollow bore needles<sup>viii</sup>. One study done in a teaching hospital in 1990, ninety nine injuries occurred in 1382 surgical procedures<sup>viii</sup>. In Goa (India) a study showed 34.8% needle stick injuries in one year<sup>ix</sup>. In a Malaysian university a study was done to measure the incidence of needle stick injury between a sample of 417 medical students and the result was 14.1%<sup>x</sup>. Of 114 sample in operation room 58.8% reported more than four needle stick injury per year , 36.8% reported one to three needle stick injury per year , and only 4.4% reported no needle stick injury in last five year , among this studied group about 31% got infected with hepatitis B and C<sup>xi</sup> . The centers for Disease Control and Prevention (CDC) in United States of America reported 5100 cases of hepatitis B infection due to needle stick injury during health workers daily works and 54 cases of HIV resulting from exposure to infected blood<sup>2</sup>.

Studies have showed the common reasons and prevention methods of needle stick injury: In 1984 was the first report HIV infection from occupational exposure to health care worker<sup>1</sup>. 83% of needle stick injuries can be prevented by the use of safety features like needles or needleless system<sup>2</sup>. 64%<sup>3</sup> of nurses recap the needles after injection which increase the probability of getting injured, hence the policy of preventing recapping practice by education and using disposal puncture resistant containers to place sharp needles<sup>34xii</sup>. The use of needles protective device rather than the usual needles is safe by covering the needle tip after activation.<sup>xiii</sup> In United Kingdom: doctors and nurses are the most affected by needle stick injuries mainly from hollow bore needles, so education and training programs will be beneficial in addition to substitution of conventional needle with needle protective device<sup>6</sup>. United States of America recommends training, evaluation and changes in equipment to prevent needle stick injuries<sup>78</sup> . 16% of outer gloves and 6% of inner gloves perforation occur due to needle injuries while no perforation with protective end needles<sup>xiv</sup>. The use of self-sheathing intravenous cannula with Safelon device (new protective device) will reduce the needle stick injury hazard<sup>xv</sup> . Another study recommends the use of safeguard cannula to reduce the risk of needle stick injury<sup>xvi</sup> . Centers for Disease Control recommend avoiding recapping the needles to prevent needle stick injury<sup>xvii</sup> . A university hospital showed 326 injuries over ten months period, one third of these injuries due to recapping the needle. They recommended a new device for capping contaminated needle<sup>xviii</sup> . New York recommends the use of sharp disposal system to prevent needle stick injury<sup>xix</sup> .The Immunization Practice Advisory Committee (USA) recommends injection of polyvalent gamma globulins to the health workers with needle injury from hepatitis C infected patient, and early treatment by interferon<sup>5</sup> . Pakistan recommends hepatitis B vaccination before working in the operation rooms<sup>11</sup> . In Malaysia: there is an adverse relation between the degree of practice and the risk of needle stick injuries among medical students<sup>10</sup> . Another study recommends that using of needle stick prevention devices are not enough in preventing 100% injuries. Education on how to use these devices is more important<sup>xx</sup> . In the united states of America education of medical students will be beneficial in reducing the risk of needle stick injury<sup>xxi</sup> .

### **Statistic of Needle Stick Injury in Kingdom of Saudi Arabia:**

During my search only one published article that has been reported in Saudi Arabia regarding needle stick injury. The study showed that the Saudi health workers that getting hepatitis B and C from needle stick injury are of considerable percentages which are 8-10% for HBV and 2-6% for HCV. Education programs were recommended<sup>xxii</sup>. All the hospitals have their own statistics which is considered undisclosed information and only authorized persons are allowed to access.

### **Discussion:-**

Based on the literatures I can summarize that common reasons of needle stick injury are: the wrong way of recapping the needles<sup>3</sup>, the way of disposing sharp needles<sup>34xxiii</sup>, perforated gloves<sup>xxiv</sup> and the degree of practice<sup>10</sup>. Also as literatures recommended the prevention control measures summarize as using needless system<sup>2</sup>, preventing recapping<sup>xxvxxvi</sup> practice by education<sup>6xxvixxvii</sup> and using disposal puncture resistant containers to place sharp needles<sup>34xxxxxx</sup>, The use of needles protective device<sup>6xxxii</sup>, use of safeguard cannula<sup>xxxixxxxiii</sup>, injection of polyvalent gamma globulins to the health workers with needle injury from hepatitis C infected patient, and early treatment by interferon<sup>5</sup>, hepatitis B vaccination before working in the operation rooms<sup>11</sup>.

From my view here in Saudi Arabia specifically in the hospital where I work (NGH) the most common reasons of needle stick injury are: The health's workers mainly nurse do not wear gloves when giving patients injection. Gloves that are available are of poor quality that tears easily, I noticed that from my daily clinical work (personnel experience). The policy here concentrate on recapping the needle technique (even if it is important in preventing injury) , forgetting the importance of implementation of new devices as retractor or blunt end needles which are already implemented in north America and Europe. Lack of knowledge of the health workers regarding the effect of needle injury on health and its hazard. And this result in not reporting of the injury or follow up the cases in employee or ER clinics, because job security. Lack of training programs. Over loading the health workers with heavy duty (especially nurses). Resulting in loss of concentration and increase the incidence of injuries.

Even though after the presence of all of these risk factors that can result in needle stick injury only one published article was found during my search. Because this is very important issue that effect the workers' health I suggested some guidelines and recommendations that listed below.

### **Conclusions and recommendations:-**

The implementation of WHO needle stick injury guidelines is a big challenge in my country (KSA). Lack of resources, training programs and organization are major obstacles. I recommended that guidelines need to be reevaluated and tailored to the country with strict implementation policies. From all of studies and facts presented above, policies and guidelines to prevent needle stick injury became a necessity. Implementation of the universal precautions started from the first reported case of HIV infection in health workers.

The guidelines consist of two parts:

Standard precautions (control measures)<sup>xxxiv</sup>."American nurses association"

1. Elimination of hazards: using another route of administration as tablet, inhaler and patches instead of injection.
2. Engineering controls: using of technologist devices as retractor needle or the one that becomes dull after use (available in North America and Europe).
3. Administrative controls: policies and training programs.
4. Work practice controls: avoid recapping the needles and emptying the containers of sharp needle regularly and practicing how to hold and dispose sharp objects.
5. Personal protective equipment (PPE): these are the barriers that protect the worker.
6. Post exposure measures

Any health worker that gets needle stick injury should follow the following steps:

1. Wash the area of injury with water and soap.
2. Visit the clinic within one hour of injury to take post exposure prophylaxis (PEP) recommended for HBV and HIV but not for HCV.
3. Follow up for evaluation and possible treatment.

In my view the internal NGH policy should be reevaluated to fill the gap of the current one. Committees of infection control, finance, education, administrative, and nurses should meet to set the agenda, define the problems, set the objectives, priorities the problems then provide policies especially in developing training programs which are

more important than purchasing new technology devices. My job as a health worker is to convince each committee with the problems of our policy and how to solve them, as follows:

Financial committee: make the cost analysis to provide the hospital with gloves with high quality, employing well qualified adequate number of nurses to avoid over loading and buying new technology needles.

Education committee: organize training programs to educate the health workers and improve their knowledge about the hazards of getting injury first by better practicing and second by reporting after injury.

Nursing committee: monitoring and evaluation of nurses at work when dealing with injections in regards to wearing gloves and other precautions.

Administrative committee: yearly evaluation of the health workers. If not following the needle stick policy regarding reporting and follow up to the employee clinic after injury implement, a strict policy as delayed promotion will be in effect.

Infection control committee: organize, monitor and evaluate the work of other committees in addition to statistics and surveillance.

I believe that having a strict policy regarding the employee that does not follow up after injury, will be effective in preventing the infection from developing into a chronic stage, and protecting the patients.

The last step is evaluation which be regular like every three years to assure that the guidelines are followed, is effective and to continuously update it.

Is a strict policy as delaying the promotions of health workers who do not follow the needle stick guidelines would be beneficial in reducing the hazards of injury here in NGHA This need further studies.

## References:-

- 
- Willburn ,Eijkemans .Preventing needle stick injuries among health care workers. Int J Occup Environ Health 2004;10:451-456 .
- (No authors listed) .Needle stick injuries: nurses at risk. Mich Nurse 2000;73:8-9.
- Rogowska-Szadkowska D, Stanislawowicz M, ChlabczS.Przegl Epidemiol. Risk of needle stick injuries in health care workers: bad habits (recapping needles) last long . 2010;64(2):293-5.
- Watterson L.Nurs Stand. Monitoring sharps injuries: EPINet surveillance results. 2004 sep 29-oct 5;19(3);3.
- Germanaud J, Causse X, Dhumeaux D. Transmission of hepatitis C by accidental needle stick injuries.Evaluation of the risk.Presse Med 1994;23:1078-82.
- Trim JC, Elliot TS .A review of sharps injuries and preventive strategies Hosp Infect. 2003 Apr;53(4):237-42.
- <sup>vii</sup>Bakaeen F , Awad S, AlboD ,Bellows CF , Huh J , Kistner C , Izard D ,Triebel J , Khan M , Berger DH.Epidemiology of exposure to blood borne pathogens on a surgical service. Am J Surg. 2006 Nov;192(5):e18-21.
- Tokars JI, Bell DM, Culver DH, Marcus R ,Mendelson MH, Sloan EP, Farber BF , Fligner D, Chamberland ME , McKibben PS , et al .Percutaneous injuries during surgical procedures.JAMA. 1992 Jun 3;267(21):2899-904.
- Salelkar S , Motghare DD, Kulkarni MS, VazFS.Study of needle stick injuries among health care workers at a tertiary care hospital. Indian J Public Health. 2010 Jan-Mar;54(1):18-20.
- Norsayani MY , Noor HassimI.Study on incidence of needle stick injury and factors associated with this problem among medical students. J Occup Health 2003; 45:172-8
- Mujeeb SA ,Khatri Y ,KhananiR.Frequency of parenteral exposure and seroprevalence of HBV , HCV , and HIV among operation room personnel. J Hosp Infect 1998; 38:133-7.
- Cooley C, Gabriel J. Reducing the risks of sharps injuries in health professionals. Nurs Times. 2004 sep 28-oct 4;100(39):35
- Trim JC. A review of needle-protective devices to prevent sharp injuries.Br J Nurs. 2004 Feb 12-25;13(3):144, 146-53.

- 
- Rice JJ, McCabe JP, McManus F. Needle stick injury.Reducing the risk.IntOrthop 1996; 20:132-3.
- Watters J, MacCallum R, Maurice S, Robertson C. Safelon-a new device to reduce needle stick injuries during intravenous cannulation.
- Asia T, Matsumoto H, Yamamoto K, Shingu K. Prevention of needle-stick injury.Efficacy of a safeguarded intravenous cannula.Anesthesia 1999; 54:258-61.
- Leisure MK, Moore DM, Schwartzman JD, Hayden GF, Donowitz LG. Changing the needle when inoculating blood cultures. A no- benefit and high-risk procedure .JAMA ;264:2111-2.
- Jagger J, Hunt EH, Brand-Elnaggar J, Pearson RD. Rates of needle-stick injury caused by various devices in a university hospital. N Engl J Med 1988; 319:284-8.
- Smith DA, Eisenstein HC, Esrig C, GodboldJ . Constant incidence rates of needle-stick injury paradoxically suggest modest preventive effect of sharps disposal system. J Occup Med 1992; 34:546-51.
- (No authors listed) .Hazard report. Still getting stuck—protective devices alone won't always prevent needle stick injuries. Health Devices. 2009 Sep;38(9):306-7.
- Froom P , Kristal-Boneh E, Melamed S, Shalom A, RibakJ.Prevention of needle-stick injury by the scooping-resheathing method. Am J Ind Med 1998; 34: 15-9.
- Ziad A Memish, MahaAlmuneef. Epidemiology of needlestick and sharps injuries in a tertiary care center in Saudi Arabia.American journal of infection control. 2002 Jun;30:234-41.
- Cooley C, Gabriel J. Reducing the risks of sharps injuries in health professionals. Nurs Times. 2004 sep 28-oct 4;100(39):35
- Rice JJ, McCabe JP, McManus F. Needle stick injury.Reducing the risk.IntOrthop 1996; 20:132-3.
- Leisure MK, Moore DM, Schwartzman JD, Hayden GF, Donowitz LG. Changing the needle when inoculating blood cultures. A no- benefit and high-risk procedure .JAMA ;264:2111-2.
- Jagger J, Hunt EH, Brand-Elnaggar J, Pearson RD. Rates of needle-stick injury caused by various devices in a university hospital. N Engl J Med 1988; 319:284-8.
- (No authors listed) .Hazard report. Still getting stuck—protective devices alone won't always prevent needle stick injuries. Health Devices. 2009 Sep;38(9):306-7.
- (No authors listed) .Hazard report. Still getting stuck—protective devices alone won't always prevent needle stick injuries. Health Devices. 2009 Sep;38(9):306-7.
- Cooley C, Gabriel J. Reducing the risks of sharps injuries in health professionals. Nurs Times. 2004 sep 28-oct 4;100(39):35
- xxx Smith DA, Eisenstein HC, Esrig C, GodboldJ . Constant incidence rates of needle-stick injury paradoxically suggest modest preventive effect of sharps disposal system. J Occup Med 1992; 34:546-51.
- Trim JC. A review of needle-protective devices to prevent sharp injuries.Br J Nurs. 2004 Feb 12-25;13(3):144, 146-53.
- Watters J, MacCallum R, Maurice S, Robertson C. Safelon-a new device to reduce needle stick injuries during intravenous cannulation.
- Asia T, Matsumoto H, Yamamoto K, Shingu K. Prevention of needle-stick injury.Efficacy of a safeguarded intravenous cannula.Anesthesia 1999; 54:258-61.
- American nurses association. Needle stick prevention guide, 2002 p 13.