



## AWARENESS AMONG CRRI AGAINST BLOOD BORNE PATHOGENS

Anitha M., Ramya K., Mathivathani P., Monisha DM., Silvia Antony Raj and Pratikshia K

Department of Microbiology, ShriSathyaSai Medical College & Research Institute, Thiruporur, Sri BalajiVidyapeeth University, Tamil Nadu, India

### ARTICLE INFO

#### Article History:

Received 10th November, 2016  
Received in revised form 12th  
December, 2016  
Accepted 4th January, 2017  
Published online 28th February, 2017

### ABSTRACT

**Objectives:** This study is aimed to provide awareness about the occupational exposure to blood borne pathogens (BBPs) and arousal of serious risk to physicians including House surgeons.

**Methodology:** A total of 125 interns were participated in this study. We have examined the occupational exposure to BBP on knowledge, behaviour, and incidence of medical sharp injuries among CRRI (Compulsory Rotatory Residential Intern) in SSSMC & RI through a self administered questionnaire form.

**Result:** Out of 125 house surgeon, the overall compliance to HBV vaccine of 68% were observed, from which male 40% and female 28%, among them 20 % of male and 14% of female completed their booster dose, while 10% of male and 13% of female were non vaccinated.

**Conclusion:** Hence in our study, we have recommended the healthcare workers particularly the CRRI to be immunized and which is the most effective way to prevent the transmission of HBV and should be aware of collecting body fluids from HIV, HB, HCV infected patients. Students are at high risk for NSIs and BBPs exposure, so they need a targeted education about protection strategies for blood-borne infection.

Copyright © 2017 Anitha M et al., This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## INTRODUCTION

Health care workers involved in direct patient care (physicians, nurses, and technicians) faces a well recognized risk in acquiring bloodborne pathogens, in particular hepatitis B and C viruses (HBV/HCV) and human immunodeficiency virus (HIV), at their place of work through occupational exposure to contaminated blood and body fluids while discharging their routine duty of patient care.<sup>(1)</sup>

In endemic areas, hepatitis B is a major cause of mortality because of chronic active hepatitis, hepatocellular carcinoma, and cirrhosis, which are preventable by vaccination against hepatitis B. Effective treatment for chronic hepatitis B has not been established so far. Vaccination against hepatitis B prevents not only the morbidity and mortality because of acute viral disease but also chronic hepatitis B and its eventually fatal complications.<sup>(2)</sup>

In addition, the prevalence of HCV is rising. Unlike HIV and HBV, there are no immunization or chemo prophylactic interventions currently available to reduce the risk of infection after exposure to HCV.<sup>(3)</sup> In addition, the prevalence of HCV is rising.

The increasing prevalence of HIV in health care workers is due to the risk of exposure to blood from patients infected with the virus, especially when blood and body fluid precautions are not followed for all patients. By assuming all the patients might have potential infection with HIV and other bloodborne pathogens, there is a need to follow infection-control precautions to minimize the risk of exposure to blood and fluids.<sup>(4)</sup>

Medical students who are exposed to needles in their clinical activities are at higher risk of acquiring needle stick injuries which may lead to serious or fatal infections with blood-borne pathogenic infections such as hepatitis B virus (HBV), hepatitis C virus (HCV), or human immunodeficiency virus (HIV).<sup>(5)</sup>

The activities associated with the majority of needle stick injuries are administering injections withdrawing blood, recapping needles, disposing of needles, handling trash and dirty linen while attempting to transfer blood or other body fluid from a syringe to a specimen container (such as a vacuum tube) and misses the target.<sup>(6)</sup>

Blood and other effluents from infected patients may bear such pathogens as HIV, hepatitis B and hepatitis C virus, increasing the risk of transmission from such accidents as needle pricks and contacts with deep body fluids. A safe injection is one that is given using appropriate equipments, does not harm the recipient, does not expose the provider to any avoidable risk and does not result in any waste that is dangerous to other people.<sup>(7)</sup>

\*✉ **Corresponding author: Anitha M**

Department of Microbiology, ShriSathyaSai Medical College & Research Institute, Thiruporur, Sri BalajiVidyapeeth University, Tamil Nadu, India

The World Health Organization (WHO) estimates that 16 billion injections are administered annually in developing countries of which 90-95% is for therapeutic purpose. Approximately 5% of HIV, 40% of Hepatitis C and 32% of Hepatitis B virus infections are caused by unsafe and unnecessary injections worldwide.<sup>(8)</sup>

## MATERIALS AND METHODS

The purpose of this study, is to examine the impact of the blood borne pathogens prevention programme on knowledge, behaviour and incidence of self-reported needle stick/sharp injuries among House surgeons in SSSMC & RI from a period of April 2016 to June 2016, 3 months after students began their practice.

CRRI's were chosen because they are the beginner in the clinical practice, and the educational intervention was connected to them at this point in their practices.

A self-administered questionnaire was used to collect data, that were distributed to each participant which include causes of the injury and whether they are vaccinated or non vaccinated or completed their booster dose. Oral consent was obtained from all participants and questionnaire data were collected anonymously. Data were collected from 125 CRRI, among which 70 are males and 55 are from females.

## RESULT

**Table1** Awareness of HBV vaccination among CRRI

Gender	Total no of Crri	Vaccinated	Non vaccinated	Booster dose
Male	70	40	10	20
Female	55	28	13	14

Our study deals with the vaccination and awareness of blood borne pathogens among CRRI, A total of 125 CRRI were participated, in which 70 are male and females 55. These 125 CRRI's are differentiated as Vaccinated, Non Vaccinated and Booster dose completed. Vaccinated group males are 40 and 28 are females, where else 10 males and 13 females come under Non Vaccinated group. Booster cycle possesses 20 and 14 as males and females respectively. As depicted in Table:1.

Hence CRRI are potentially exposed directly or indirectly, to blood-borne pathogens. As a result, CRRI are at increased risk of acquiring human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV), which can all be transmitted through percutaneous injury.

In this study, our concern was limited to CRRI who perform blood sampling (risk of needle-sticks) and deal with blood or body fluid samples or reagents on an almost daily basis. These CRRI's were chosen because they are the beginner in the clinical practice. The study was conducted in April to June 2016, 3 months after students began practice.

## DISCUSSION

The transmission of blood-borne pathogens from patients to health care workers via occupational exposure has been well known for many years. In our study, we have focused the

awareness of blood borne pathogens and vaccination among 125 CRRI's.

Sharp injury may cause a number of possible deadly infections with blood borne pathogens.

Stringer *et al*, indicated that the risk can be high depending on the quantity of virus present in the blood of the infected person at the time of the injury, the depth of the injury and the volume of body fluids reaching the cutaneous barrier by needle stick injury. And also further he mentioned that donning of gloves may reduce the amount of solution introduced into the wound because the needle may loses half its volume on the glove surface.<sup>(9)</sup>

In our study, most of the CRRI's are infected by percutaneous exposure, when a break in the skin by a needle stick contaminated with blood or body fluid and also infected through cutaneous exposure, when body fluids come into contact with open wounds, non-intact skin that found in eczema, or mucous membranes like eyes. Similarly, in other studies reported that > 60% of residents and students had sustained contact with blood, mucous membranes and broken skin or other potentially infectious sources.<sup>(10,11)</sup>

Smith AJ and Patterson JM stated that one of the serious problems of Medical and Paramedical students is the risk of occupational exposure, via sharp injuries, to blood-borne pathogens (BBPs) such as Hepatitis B (HBV), Hepatitis C (HCV) and human immunodeficiency virus (HIV).<sup>(12,13)</sup>

Thirty percent of needle stick injuries (NSIs) are not reported in the United States. The risk of pathogen transmission from infected persons to non immune persons through an injury with a sharp object has been estimated to be between 6 % and 30% for HBV, between 5% and 10% for HCV and 0.3% for HIV.<sup>(14,15)</sup>

Occupational exposure to the human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and other blood borne pathogens (BBP) poses substantial risks to health care workers (HCWs), particularly in regions with high prevalence of such pathogens. It is clear that the epidemic has spread rapidly in recent years.<sup>(16)</sup>

In the present study, from a total of 125 CRRI, the overall compliance to HBV vaccine of 68% were observed, from which male 40% and female 28%, among them 20 % of male and 14% of female completed their booster dose, while 10% of male and 13% of female were non vaccinated. Hence in our study we had recommended the healthcare workers to be immunized and which is the most effective way to prevent the transmission of HBV, where as 80.0% and 80.7% were vaccinated, reported from the United Kingdom and Brazil.<sup>(17,18)</sup>

Injuries from needle pricks are thought to be the commonest work-related hazard reported from a Nigerian teaching hospital.<sup>(19)</sup> The risk of acute hepatitis C infection in a health worker following a needle prick injury has been estimated to be from 1% to 5%.<sup>(20)</sup> Although the risk of human immunodeficiency virus (HIV) infection through occupational

exposures to blood has received considerable attention, relatively few studies have addressed blood exposure accidents among medical students.<sup>(21)</sup>

Blood and other effluents from infected patients may bear such pathogens as HIV, hepatitis B and hepatitis C virus, increasing the risk of transmission from such accidents like needle pricks and contacts with deep body fluids. The World Health Organization (WHO) estimates that 16 billion injections are administered annually in developing countries of which 90-95% is for therapeutic purpose. Approximately 5% of HIV, 40% of Hepatitis C and 32% of Hepatitis B virus infections are caused by unsafe and unnecessary injections worldwide.<sup>(22,23)</sup>

In the United States of America (USA), the Centers for Disease Control and Prevention (CDC) recommend the use of universal precautions (UP) to minimize exposure to BBP, and implementation of UP is overseen by the Occupational Safety and Health Administration (OSHA) (CDC 1988, Fraser & Powderly 1995).<sup>(24,25)</sup>

## CONCLUSION

The wholesome ambition of this study to bring out an consciousness regarding the blood borne infections and vaccination among CRRI while handling, collecting blood and body fluids of HIV, HBV, HCV infected patients.

The outcome of this study clearly proves that the non-vaccinated CRRI frighteningly low compliance with HBV vaccine are at significant higher risk.

These findings highlight the compelling need to progress more effective and innovative interventional measures to improve the awareness of HBV vaccine among physicians, CRRI in specific. Moreover, Healthcare workers should be aware of wearing appropriate gloves, mask, proper use of needles, well training and improved work practices will be needed to prevent the risk of needle stick injury as well as blood-borne infections.

## Acknowledgements

We thank the Management for the endurance provided for completion of this project. We also thank the CRRI for their cooperation provided.

## References

1. Cardo DM, Bell DM. Blood borne pathogen transmission in health care workers, *Infect Dis Clin North Am* 1997;11:331-43.
2. Bonanni P, Bonaccorsi G. Vaccination against hepatitis B in health care Workers, *Vaccine* 2001; 19:2389-94.
3. CDC Updated U.S. public health service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for post exposure prophylaxis, *Morbidity and Mortality Weekly Report* (2001) 50, 1-42.
4. Centers for Disease Control and Prevention. HIV/AIDS surveillance report. Atlanta, Georgia, US Department of Health and Human Services 1994, 6:21.
5. C Doig, Education of medical students and house staff to prevent hazardous occupational exposure. *CMAJ* 162, 344-345 (2000).
6. C Shen, J Jagger and RD Pearson. Risk of needle stick and sharp object among medical students, *Am J Infect Control* 27, 435-437 (1999)
7. Gerbending JL. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus and cytomegalovirus amongst health care personnel at risk of blood exposure: final report from a longitudinal study, *J infect Dis.* (1994); 170(6):1410-1417.
8. Ramos- Gomez F, Ellison J, Greenspan D, et al. Accidental exposure to blood and body fluids amongst health care workers in dental teaching clinics; a prospective study, *J Am Dental Assoc.* 1997; 1(28):1253-1261.
9. Stringer, B., Rivard, C. I., and Hanley J. Quantifying and reducing the risk of bloodborne pathogen exposure. *AORN Journal*, (2001);73(6), 1135-1146.
10. Radecki S, Abbott A, Elol L. Occupational human immunodeficiency virus exposure among residents and medical students: an analysis of 5-year follow-up data. *Archives of internal medicine*, (2000); 160(20):3107-11.
11. Henry K, Campbell S. Needle stick/sharps injuries and HIV exposure among health care workers. National estimates based on a survey of US hospitals. *Minnesotamedicine*, (1995);78(11):41-4.
12. Smith AJ, Cameron SO, Bagg J, Kennedy D. Management of needle stick injuries in general dental practice. *Br Dent J* (2001); 190:645-50.
13. Patterson JM, Novak CB, Mackinnon SE, Ellis RA. Needlestick injuries among medical students. *Am J Infect Control* 2003; 31:226-30.
14. Centers for Disease Control and Prevention. Selection, evaluation and using sharps disposal containers 1998. 2004. Jun [cited 2004 July 18].
15. AskarianM, Ghavanini AA. Survey on adoption of measures to prevent nosocomial infection by anaesthesia personnel. *East Mediterr Health J* (2002); 8; 416-21.
16. Anonymous Joint ILO/WHO guidelines on health services organization and HIV/AIDS. Geneva, Switzerland: International Labor Organization and World Health Organization (2005).
17. Gyawali P, Rice PS, Tilzey AJ. Exposure to blood borne viruses and hepatitis B vaccination status among health care workers in inner London. *Occup Environ Med* 1998;55:570-2.
18. Manso VFC, Castro KF, Matos SM, JunqueriaALN, Souza SB, Sousa MM, et al., Compliance with hepatitis B virus vaccination and risk of occupational exposure to blood and other body fluids in intensive care department personnel in Brazil. *Am J Infect Control* (2003); 31:431-4.
19. Orji EO, Fasuba OB, Onwudiegwu U, et al. Occupational health hazards among health care

- workers in an Obstetric and Gynecological unit of a Nigerian Teaching hospital. *J ObstetGynaecol.* (2002); 22(1):75-78.
20. Joint WHO/ILO Guidelines on health services and HIV/AIDS. June (2005); Accessed 5th October 2012.
  21. PM fereskerz, RD Pearson and JJagger: Occupational exposure to blood among medical students. *NEJM* 335, 1150-1tS3 (1996).
  22. Gerbending JL. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus and cytomegalovirus amongst health care personnel at risk of blood exposure: final report from a longitudinal study. *J infect Dis.* (1994); 170(6):1410-1417.
  23. Ramos- Gomez F, Ellison J, Greenspan D, et al. Accidental exposure to blood and body fluids amongst health care workers in dental teaching clinics; a prospective study. *J Am Dental Assoc.* (1997); 1(28):1253-1261.
  24. CDC. Perspectives in disease prevention and health promotion update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other blood borne pathogens in health-care settings. *Morbidity and Mortality Weekly Report* (1988); 37, 377-388.
  25. Fraser V.J. & Powderly W.G. Risks of HIV infection in the health care setting. *Annual Review of Medicine* (1995); 46, 203-211.

**How to cite this article:**

Anitha M et al.: Awareness Among Crri Against Blood Borne Pathogens. *International Journal of Research and Current Development* 2017; 2(2): 103-106.

