



Microbes and Infectious Diseases

Journal homepage: <https://mid.journals.ekb.eg/>

Original article

Prevalence of sharp injuries infection by HIV and HBV among nurses in Khartoum state

Amira Hasan Baleel^{*1}, Mohammed Aldai Hammad², Alkhair Abd Almahmoud Idris^{*3}

1- National University-Sudan.

2- Dar ALaloum College-Sudan.

3- Alhfad University for Women-Sudan..

ARTICLE INFO

Article history:

Received 11 June 2022

Received in revised form 27 July 2022

Accepted 30 July 2022

Keywords:

HBV
HIV
Nurse
Sudan

ABSTRACT

Background: Needle stick injuries (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, needles used to connect parts of iv delivery systems. It is the most efficient method of transmitting blood-borne infections between patients and healthcare staff, and hepatitis B, hepatitis C and human immunodeficiency virus (HIV). **Aim:** The study aimed to evaluate the prevalence of sharp injuries infection by HIV and HBV among Sudanese nurses in Khartoum state. **Methods:** This was a cross sectional study carried out in Ibrahim Malik Hospital-Khartoum State conducted to evaluate the prevalence of sharp needle injuries infection by HIV and HBV in nurses. Sixty nurses working in variant hospitals and centers were enrolled in this study after taking their verbal consent. **Results:** Out of 60 nurses, 6 (10.0%) have a history of blood transfusion and 54 (90.0%) don't have a history of blood transfusion, 52 (87.0%) were vaccinated against HBV, and 8 (13.0%) were not vaccinated against HBV, 6 (10.0%) have a history of surgical transplantation and 54 (90.0%) don't have a history of surgical transplantation. Out of 60 nurses, 0.0 (0.0%) with positive HIV and HBV, 60 (100%) with negative HIV, HCV and HBV. The results showed negative results of HIV, HCV and HBV among Sudanese nurses in Khartoum state. **Conclusion:** The study observed that nurses have negative results of HIV, HCV and HBV.

Introduction

Needle stick/sharp injuries (NSIs) are defined as wounds that are caused by sharp objects like hypodermic needles, fluid collection needles and IV cannula, which are attributed to improper handling or manipulation of needles in different activities such as obtaining or transferring sample specimens, recapping activities and failure to dispose needles in puncture proof containers [1].

Needle stick injuries caused by sharp objects are the most important issue in exposure of

healthcare workers especially nurses to blood borne pathogens. Nursing and midwifery students are highly exposed to the risks as well when they perform clinical trainings [2].

A NSI is a percutaneous piercing wound typically set by a needle point, but possibly also by other sharp instruments or objects [3], Needle stick injuries are the most efficient method of transmitting blood-borne infections between patients and healthcare staff, and hepatitis B,

hepatitis C and human immunodeficiency virus (HIV) are the most common results [4], However, the main cause of anxiety in most health care centers is HIV [5].

Active surveillance and periodic review of interventions are important aspects to reduce NSIs in targeted high-risk occupational groups, especially when the workforce has a high turnover, as in academic health centers like hospital [6] and also we can prevent this injury by applying various strategies such as immunization for hepatitis B virus (HBV), post exposure prophylaxis and procedures to prevent percutaneous injuries [7].

Mohamed D. Dafaalla, Asgadsuliman, Abdelmoneim E.M. Kheir (University of Khartoum) in 2016, were sowed in their studies a percutaneous injuries caused by sharp needle and stick for nurses and all health worker. They found two million injuries are believed to occur each year among nurses [8].

Percutaneous injuries, caused by needle sticks and other sharps, are a serious concern for all health care workers (HCWs) and pose a significant risk of occupational transmission of blood borne pathogen. Although sharp instruments injuries are preventable, a minor injury can carry the risk of transfer of over twenty pathogens of which the most serious are HBV, Hepatitis C virus (HCV) and HIV [9].

Contaminated NSIs are the most common sources of infection among HCWs. Approximately 3 out of 35 million HCWs worldwide experience NSIs annually, exposing them to blood-borne pathogens. Although as many as 20 different pathogens could be transmitted by NSIs, HBV, HCV, and HIV constitute the majority of blood-borne infections transmitted post-injury. Percutaneous occupational exposure accounts to approximately 37% of HBV, 39% of HCV, and 4.4% of HIV cases among HCWs [10].

Nurses are highly exposing to needle stick/sharp injuries, it is an important method to transmitting infections such as by HIV, HBV and HCV.

This study aimed to detect the prevalence of sharp injuries infection by HIV and HBV among nurses in Khartoum state.

Materials and Methods

Study design

It was descriptive hospital based study design (cross sectional) on nurses working in Ibrahim Malik Hospital- Khartoum State.

Study area

The study was conducted in Khartoum state.

Study population

Sixty respondents were involved in this study. They were selected from hospital as case group.

Case group

Nurses in hospitals and centers was selected for this study.

Sample size

The number of samples was 60 samples from nurses.

Method

Viral screening test.

Procedure

The samples must be collected in appropriate tubes to maintain the integrity of the sample and stored at appropriate temperature (4 C) to preserve the virus and prevent fungal or bacterial growth, the methods look for certain antigens (fragments of virus) and antibodies (produced by the immune system in response to viral infection).

Data analysis

The collected data was analyzed using statistical package of social sciences (SPSS) version 21.

Ethical consideration

Approval was taken from national university ethical review board and verbal consent will be taken from all participants before sample collection.

Results

Out of 60 nurses, 40 (67%) with experience ≤ 5 years and 20 (33%) with experience > 5 years, this is presented in **table (1)**.

Out of 60 nurses, 44 (73.3%) with age 22-31 years, 11 (18.3%) with age 32-41 years and 5 (8.3%) with age 42-51 years, this is presented in **table (2)**.

Out of 60 nurses, 6 (10.0%) have a history of blood transfusion and 54 (90.0%) don't have a history of blood transfusion, 52 (87.0%) were vaccinated against HBV and 8 (13.0%) were not vaccinated against HBV, 6 (10.0%) have a history of surgical transplantation and 54 (90.0%) don't

have a history of surgical transplantation, this is presented in **table (3)**.

Out of 60 nurses, 0.0 (0.0%) with positive HIV, HCV and HBV, 60 (100%) with negative HIV, HCV and HBV, this is presented in **table (4)**.

Table 1. Distribution of study group according to Experience (years).

Variables	Frequency	Percentage (%)
≤5 Years	40	67.0
>5 Years	20	33.0
Total	60	100.0

Table 2. Distribution of study group according to age.

Variables	Frequency	Percentage (%)
22-31 Years	44	73.3
32-41 Years	11	18.3
42-51 Years	5	8.3
Total	60	100.0

Table 3. Distribution of study group according to history of blood transfusion, surgical transplantation and vaccination status.

Variables	Frequency	Percentage (%)
History of Blood transfusion		
Yes	6	10.0
No	54	90.0
Vaccination		
Yes	52	87.0
No	8	13.0
History of surgical transplantation		
Yes	6	10.0
No	54	90.0
Total	60	100.0

Table 4. Frequency and percentage of HIV, HCV and HBV in study group.

Hepatitis	Frequency	Percentage (%)
HIV		
Positive	0.0	0.0
Negative	60	100.0
HBV		
Positive	0.0	0.0
Negative	60	100.0
HCV		
Positive	0.0	0.0
Negative	60	100.0
Total	60	100

Discussion

Needle stick and sharps injuries (NSSIs) remain a source of infection for HCWs worldwide. Three viruses alone HBV, HCV and HIV account for most cases of occupational infection. A great number of studies appeared in the literature review exposing the prevalence of injuries caused by sharp needle sticks.

In this study a total of 60 nurses were involved, with age ranged from 22-51 years' old, the duration of experience divided into groups; more than five years and less than five years.

All nurses who participated in this study didn't have infection with HIV or HBV, this result was incompatible with previous study which reported an increase in the reported cases of

infections by NSSIs from 10 injuries in 2001 to 50 during the year 2005, they found a Several factors might be responsible, including the sustained awareness efforts of the Infection Control Department and HCWs understanding the risk of this type of injuries, rather than a real increase in NSSIs [11].

In other study done by **Dafaalla et al.**, they revealed that the prevalence of NSI was 46% from case group, approximately 96% of the study population were aware that HBV is transmitted by blood, although only 65% were fully vaccinated, yet, 86% of them did not check their Anti HBs antibodies level. Out the 7 participants who had a NSI from a HBV positive patient, 5 were fully vaccinated and all of them didn't check their vaccination status. Moreover, none of the 5 participants received PEP [12].

Safari et al., reported that through adequate management and follow-up of NSI low transmission rates can be achieved after exposure to blood-borne viruses within the occupational environment [13].

Alfulayw et al. mentioned that a study of a large Saudi Arabia Medical Center describes characteristics and factors associated with NSIs. Our data indicated that sharp device injuries were frequent among the participants were nurses account for proportion of NSIs. These injuries occurred most frequently during the morning shift and most common in the wards as nurses perform with sharp objects. Expatriate HCWs with NSIs are less likely than Saudi employees to have had a complete hepatitis B vaccination series before injury. The findings of this study may guide the development of programs targeted to specific risk categories in order to more effectively prevent these injuries [14].

Conclusion

The study concluded that nurses have negative result of HIV, HCV and HBV.

Conflict of interest

We declare that we have no conflict of interest.

Funding: None.

References

- 1-**Desalegn Z, Gebreselassie S, Asemamaw Y.** Epidemiology of Needle Stick-Sharp Injuries (NSSIs) and Potential High Risk Exposures

among Health Professionals in Ethiopia: Neglected Public Health Concern .American Journal of Health Research 2015; 3(5): 298-304.

- 2-**Khoshnood Z, Nouhi E, Mahdi SA.** Prevalence of needle stick and sharp injuries among nursing and midwifery students. Asian J. Nur. Edu. and Research 2015;5(3): 311-315.
- 3-**Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M.** Needle stick injuries among health care workers in a tertiary care hospital of India. Indian J Med Res 2010; 131:405-10.
- 4-**Smith DR, Mihashi M, Adachi Y, Shouyama Y, Mouri F, Ishibashi N, et al.** Organizational climate and its relationship with needlestick and sharps injuries among Japanese nurses. Am J Infect Control 2009;37(7):545-50.
- 5-**Cardo DM, Culver DH, Ciesielski CA, Srivastava PU, Marcus R, Abiteboul D, et al.** A case-control study of HIV seroconversion in health care workers after percutaneous exposure. Centers for Disease Control and Prevention Needlestick Surveillance Group. N Engl J Med 1997;337(21):1485-90.
- 6-**Shobokshi OA, Serebour FE, Al-Drees AZ, Mitwalli AH, Qahtani A, Skakni LI.** Hepatitis C virus seroprevalence rate among Saudis. Saudi Med J 2003 ;24 Suppl 2:S81-6.
- 7-**Hauri AM, Armstrong GL, Hutin YJ.** The global burden of disease attributable to contaminated injections given in health care settings. Int J STD AIDS. 2004 Jan;15(1):7-16.
- 8-**Mohamed DD, Abdelmoneim EM, Mahil A, Ahmed H, Najla M, Mehera M, et al.** Knowledge, attitude and practice towards needle stick injury among health care workers in a tertiary Sudanese hospital. South

- American Journal of Clinical Research 2016; 3(1).
- 9-**Rapiti E, Prüss-Üstün A, Hutin Y.** Sharps injuries: assessing the burden of disease from sharps injuries to health-care workers at national and local levels. Geneva: World Health Organization; 2005. Available at: <https://apps.who.int/iris/handle/10665/43051>.
- 10-**Lee JJ, Kok SH, Cheng SJ, Lin LD, Lin CP.** Needlestick and sharps injuries among dental healthcare workers at a university hospital. J Formos Med Assoc 2014 ;113(4):227-33.
- 11-**Amini M, Behzadnia MJ, Saboori F, Bahadori M, Ravangard R.** Needle-Stick Injuries Among Healthcare Workers in a Teaching Hospital. Trauma Mon 2015;20(4):e18829.
- 12-**Saadeh R, Khairallah K, Abozeid H, Al Rashdan L, Alfaqih M, Alkhatatbeh O.** Needle Stick and Sharp Injuries Among Healthcare Workers: A retrospective six-year study. Sultan Qaboos Univ Med J 2020;20(1):e54-e62.
- 13-**Safari N, Rabenau HF, Stephan C, Wutzler S, Marzi I, Wicker S.** Hochrisikonadelstichverletzungen und Virustransmission : Eine prospektive Beobachtungsstudie [High-risk needlestick injuries and virus transmission : A prospective observational study]. Unfallchirurg 2020 ;123(1):36-42. German.
- 14-**Alfulayw KH, Al-Otaibi ST, Alqahtani HA.** Factors associated with needlestick injuries among healthcare workers: implications for prevention. BMC Health Serv Res 2021;21(1):1074.