

Frequency of Parenteral Exposure and Seroprevalence of HBV, HCV and HIV among Operating Room Personnel

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Abstract

Background: There are many experiences in the operation theatre professionals to get Hepatitis B virus, Hepatitis C virus and Human immunodeficiency virus during their profession in operating room due to accidental needle pricks or through cut by any sharp. The objective of this study is to find out the Frequency of parenteral exposure and seroprevalence of HBV, HCV and HIV among operating room personnel.

Methodology: Frequency of parenteral exposure and seroprevalence of HBV, HCV and HIV among operating room personnel was found using ICT method.

Results: All 108 (100 %) operating room personnel were HBV, HCV and HIV negative, none of them showed positive results. Among these 108 operating room personnel to complete my research, among these 58 (53.7%) were male and 50 (46.3%) were female.

Conclusion: It is concluded by the study that there are no positive cases of HBV, HCV and HIV among operating room personnel in Gulab devi hospital and Masood hospital.

Keywords: Hepatitis B virus, Hepatitis C virus, Human immunodeficiency virus

Introduction:

The invasion of an organism's body tissues by disease causing agents, their multiplication and reactions of host tissues to these organisms and the toxins they produce, is called infection. The infectious diseases are also called transmissible diseases. Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (1) causes viral diseases among human beings. About 1 in 12 persons i.e., 480-520 million people were chronically infected, worldwide (2). It was estimated in 2006 that 78% of primary liver cancer cases and 57% of liver cirrhosis cases are caused by chronic HBV and HCV infection (3). Major cause of death in patients with HIV is due to chronic liver disease

caused by coinfection with HBV or HCV (4). HBV is 50-100 times more infectious than HIV (5). In 2009 it was estimated by WHO that up to 2 billion people worldwide had been infected with HBV and about 350 million people live with chronic HBV infection and the rate of death per year due to HBV related liver disease or HCC was 600,000(5). In 2006 according to an estimate 130-170 million people were living with chronic HCV infection worldwide and death rate due to HCV related liver disease was 350,000 per year(3). In 2009 there were about 2.3-4.7 million new HCV infections per year only due to nosocomial transmission(6). In 2008, in most populations in Africa, North America, South America, Europe, and Southeast Asia, the prevalence in the general

population is less than 3% (2). HBV causes infectious disease Hepatitis B in liver which may be acute and chronic infection. Some of personnel infected with HBV shows sickness with vomiting, yellowish skin, tiredness, dark urine and abdominal pain (7). These symptoms often lasts for few weeks and rarely results in death (7, 8). Around 90% of patients who get HBV infection around the birth, develops chronic hepatitis B, on the other hand it becomes less than 10% chronic patients if they get infection after their age of 5 years (9). In case of HCV the hepatitis C infection primarily affects the liver (10). In start people might show mild or no symptoms occasionally fever, dark urine, abdominal pain, and yellow tinged skin occurs. Early on chronic infection typically has no symptoms. Over many years however, it often leads to liver disease and occasionally cirrhosis (11). Development of some complications such as liver failure, liver cancer, or oesophageal and gastric varices may occur in cases with cirrhosis (10). A subgroup of retrovirus, HIV is the known virus that causes acquired immunodeficiency syndrome (12, 13). The condition in humans which causes progressive failure of the immune system that result in life threatening opportunistic infection and cancer is known as AIDS. Without treatment, an infected personnel may survive about the average 9-11 years, depending upon the subtype of HIV (1).

The question that may rise in someone's mind is that how these diseases spread among people and from patients to health care workers or operating room personnel. The risk factors for HBV are intravenous drug use, sexual intercourses, dialysis and living with infected person(7, 9). The HBV spreads

person to person through exposure to infectious blood and body fluids. In the areas where the hepatitis B infection is common, the frequent methods are infection during birth or contact to people's blood in childhood. In areas where the infection is rare the most common causes of its spread is intravenous drug users and sexual intercourse (7). Other risk factors include working in healthcare, blood transfusions, dialysis, living with an infected person, travel in countries where the infection rate is high, and living in an institution (7, 9). Tattooing and acupuncture led to a significant number of cases in the 1980s; however, this has become less common with improved sterility (9). On the other hand HCV primarily spread by blood to blood contact associated in intravenous drug users, poorly sterilized medical equipment, needle stick injuries in healthcare, operating rooms, sexual intercourse, tattooing, body modification and transfusions (11, 14, 15). If a pregnant woman is infected with HCV, the virus may spread to her baby during birth (11) It is not spread by superficial contact (16). The HIV infection spread among people through transfer of blood, semen, vaginal fluid, pre-ejaculate or breast milk. The vital cells in the human immune system i.e., helper T cells, macrophages and dendritic cells are infected by HIV (17).

A research conducted in Thailand showed that there were 5-10% rate of HBsAg carriers (18). Since the beginning of HBV vaccine in the year 1992, among the new born babies was established, so the carrier rate decreased to be 4.30-4.61% in years 1995-1999 (18). In Italy, there was 3.5% higher incidence of HBV infection among health care workers

than general population (19). In another research, the incidence and prevalence of HIV, HBV and HCV and CMV in health care provider the baseline seroprevalence was 21.7% of HBV, 1.4% of HCV and 0% of HIV (20).

The rationale for this research is that there are many risk factors faced by operating room personnel to get infected to HBV, HCV and HIV, because they directly or indirectly in contact with blood and body fluid (20). To evaluate the frequency of infected operating room personnel and the viral prevalence and how to minimize these risk factors and infections. The objective of this is to evaluate the frequency of HBV, HCV & HIV among operating room personnel.

Material and Methods:

Study Design: This was a descriptive Study.

Setting: Surgical department of Gulab Devi Chest Hospital Lahore and Masood Hospital Lahore.

Duration: The duration of study was 6 months.

Sample Size: 108 cases were taken. Sample was calculated using $p=0.05\%$ (21) $d=3\%$ using the following formula:

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2}$$

Sampling Technique: Purposive sampling technique was used to collect the data.

Inclusion Criteria: Both Male and Female working staff (aged 20-60 years) without previous documented as the victims of HBV, HCV and HIV in department of surgery of Gulab Devi Hospital and Masood Hospital Lahore were included.

Methodology: Data was collected from personnel who fulfill the inclusion criteria, from surgical department of Gulab Devi Chest Hospital Lahore and Masood Hospital Lahore. The sample of blood was collected in syringes after taking their consent and by properly guiding them about the procedure. After collection of blood sample, the samples were processed immediately. A Performa designed to record the clinical findings and the laboratory results of the operating room personnel. Results were obtained using immunochromatography technique of blood samples through screening devices (HBsAg, anti-HCV and HIV Ag/Ab).

Statistical Analysis: The data was entered and analyzed by using SPSS version 20. The quantitative data like age were presented in the form of mean \pm SD. While the qualitative data like HBV, HCV, HIV prevalence and gender were presented in the form of charts and tables along its percentage.

Operational Definitions:

Operating Room Personnel: The personnel who do work in operation room during an invasive or surgical procedure.

HBV: Hepatitis B virus (HBV) causes viral disease among human beings

HCV: Hepatitis C virus (HCV) causes viral disease among human beings.

HIV: Human immunodeficiency virus (1) causes viral disease AIDS among human beings.

Results:

Age distribution: In this research 108 operating room personnel age range was 20 to 54 years and minimum age was 20 years, maximum age was 54 years, the age distribution was 29.58 ± 8.5 .

Gender distribution: Out of 108 operating room personnel involved in this study 58 (53.7%) were male and 50 (46.3%) were females.

Profession of personnel in operating room included in this study is described in Figure 1. **Parenteral exposure in operating room personnel per year** is described Figure 2. Studied operating room personnel who were already vaccinated are described in **Error! Reference source not found.** Current study revealed all 108 operating room personnel HBV, HCV and HIV negative.

Discussion:

According to a study Frequency of parenteral exposure and seroprevalence of HBV, HCV, and HIV among operation room personnel Self-assessment questionnaires were completed and blood tested for HBsAg, Anti-HBc (total), Anti-HCV and anti-HIV. Of 114 operation room personnel studied, the majority (58.8%) reported more than four needle-stick injuries per year, 36.8% one to three needle-stick injuries per year, while 4.4% reported no needle-stick injury in the last five years (21). In comparison to above in this study, of 108 operation room personnel studied, majority (93.5 %) reported less than 5 needle prick injuries per year and only 6.5 % were reported with more than 5 needle prick injuries per year but no one was reported with zero needle prick per year. Thirty-six percent of personnel had received a complete course of hepatitis B vaccination (21) while in this study there were only 3.7 % hepatitis B vaccination received, 1.9 % with both hepatitis B and hepatitis C vaccination received persons but other didn't received any vaccination. There was serological

evidence of hepatitis B virus and/or HCV infections in 31% of the studied population. Four percent were reactive for HCV infection, 7.5% for HBsAg infection and 25.43% for anti-HBc (total); none was HIV positive. Eighty percent of the HCV positive and 55% of the anti-HBc (total) positive personnel had more than four needle-stick injuries per year in the last five years, while 75% HBsAg-reactive personnel had received one to three needle stick injuries per year (21). In present study there were none with positive results. This study indicates a need for continued efforts to minimize the risk of blood-borne infection by enhancing the compliance of operation room personnel with HBV vaccination and adherence to infection control measures (21). Both of the studies showing significant difference it may be due to a wide range of HBV and HCV possessing patients in the region where S. A. Mujeeb et al. conducted the research as compared to the region where we are conducting. Another factor is passage of time, acknowledgement, attitude and practices and improvement in living methodology along with advanced facilities the prevalence of HBV, HCV and HIV is minimized now a days as compared to the study conducted in 1998.

In comparison to another study the results were 0.7% prevalence among high school literate first-time family blood donors HCV positive persons. The rate for hepatitis B infection (0%) is significantly lower than the earlier reported 4.2% prevalence rate (22). The high prevalence of hepatitis C infection suggests that operation room personnel may have an occupational risk of acquiring HCV infection. The same things are mainly considered here that its due to well

knowledge, attitude, practice and facilities that HBV, HCV and HIV are very low in prevalence.

Conclusion:

It is concluded by the study and experiments that the parenteral exposure of HBV, HCV and HIV among operating room personnel is zero in Gulab Devi Hospital and Masood Hospital and it is due to good knowledge, practice, attitude and facilities available in both hospitals.

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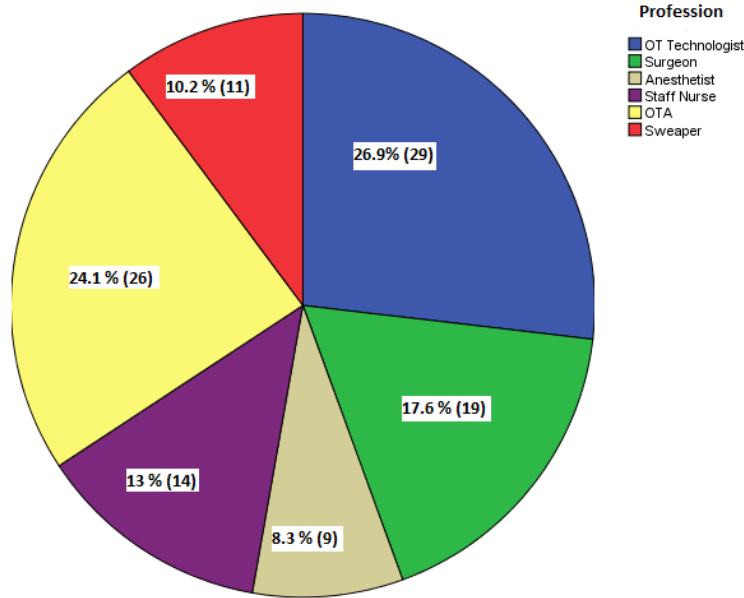


Figure 1. Profession of Personnel in Operating Room

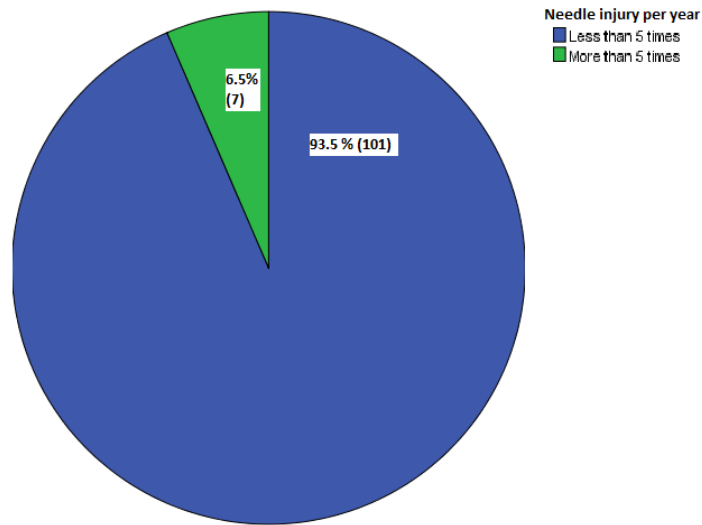


Figure 2. Parenteral Exposure in Operating Room Personnel Per Year

Supplementary File 1:

Study Questionnaire

Operating room personnel name:(confidential) _____

S/O, D/O, W/O: _____

Age: _____ years

Gender: Male Female

Address: _____

Rank: _____

Hospital: _____

Job duration: _____ years

Date: ____/____/____

Marital status: Married Unmarried

Smoking: Yes No

Needle stick injury per year: Less than 5 More than 5

Blood transfusion: Yes No

If yes: Screened Unscreened

Dental procedure: Yes No

Previous surgery: Yes No

Dentist or surgeon: Local Specialist

Have you any tattoo on your body: Yes No

Saliva exchange (using same utensils): _____ per year

Unprotective sex: Yes No

If yes then: Less then 5 times: More than 5 times:

Shaving: Yes No

If yes: From barber By yourself

Vaccination: NO HBV HCV HIV

If yes then: _____ years ago

Undergo any screening: NO HBV HCV HIV

If yes how much years ago: _____ years

Positive Results: None HBV HCV HIV

Final results:

HBsAg: Positive Negative

Anti-HCV: Positive Negative

HIV Ag/Ab: Positive Negative

CONSENT: It is informed me that Investigator is conducting a research on Frequency of parenteral exposure and seroprevelence of HBV, HCV and HIV among Operating room personnel to improve health facilities related to these infections and ensured me that my data will not be misused. So I am agreed to give my personal data to him.

Name: _____

Signature: _____