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# Bloodborne Viral Infections Among Employees In a New Turkish University Hospital

# Yeni Bir Türk Üniversite Hastanesi Çalışanlarında Kan Yoluyla Bulaşan Viral Enfeksiyonlar

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## ABSTRACT

**Objectives:** Hepatitis B virus, hepatitis virus and human immunodeficiency virus are the bloodborne pathogens that healthcare workers (HCW) are mostly occupationally exposed. To be aware of the danger of these pathogens makes HCWs protect themselves. The vaccination and continuous education also help decreasing these potential risks.

**Method:** In this study the screening data about these infections among 528 employees in a new university hospital in Istanbul is presented.

**Results:** It's been found that approximately half of the HCWs were vaccinated previously.

**Conclusion:** After the screening, the others were started to be vaccinated and the continuous education programmes were established.

**Key words:** *Bloodborne, Healthcare workers, Hepatitis B virus, Hepatitis C virus, HIV, Occupational, Immunization*

## ÖZET

**Amaç:** Hepatit B, hepatit C ve HIV sağlık personelinin (SP) sıklıkla maruz kaldığı kan yoluyla bulaşan enfeksiyonlardır. Bu patojenlerin tehlikesinden haberdar olmaları SPlerin kendilerini korumalarını sağlamaktadır. Aşılama ve sürekli eğitim bu potansiyel risklerin azalmasına yardımcı olmaktadır.

**Gereç ve Yöntem:** Bu çalışmada İstanbul'da yeni bir üniversite hastanesinin 528 çalışanında bu enfeksiyonlarla ilgili tarama bilgileri sunulmuştur.

**Bulgular:** SPlerin yaklaşık yarısının daha önce aşılandığı bulunmuştur

**Sonuç:** Tarama sonrası, diğer SPler aşılanmaya başlanmış ve sürekli eğitim programları uygulamaya konulmuşur.

**Anahtar Sözcükler:** *Bloodborne, Sağlık Bakım Çalışanları, Hepatit B Virüs, Hepatit C Virüs, Meslek Nedeniyle Oluşan Hastalık, İmmunizasyon*

## INTRODUCTION

Healthcare workers (HCW) are at risk for occupational exposures to viral bloodborne pathogens, including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Blood, fluid containing visible blood, or other potentially infectious fluid (including semen; vaginal secretions; and cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids) or tissue can be infectious for bloodborne viruses. Exposures to these fluids or tissue through a percutaneous injury (i.e., needlestick or other penetrating sharps-related event) or through contact with a mucous membrane are situations that pose a risk for bloodborne virus transmission and require further evaluation (1).

Hepatitis B viruses are largely preventable through vaccination. For HCV, HIV, and also HBV however, preventing occupational exposures to blood can prevent occupational infections with these viruses. This includes using appropriate barriers such as gown, gloves and eye protection as appropriate, safely handling needles and other sharp instruments, and using devices with safety features (2).

Primary preventive strategies, such as standard precautions and the availability of the hepatitis B vaccine to all healthcare workers, have been instrumental in decreasing the potential for life threatening exposures to HBV, HCV, and HIV. Updated work practices and engineering controls, including the use of safer medical devices, will continue to further reduce the potential risk of exposures to workers (3). Therefore screening HCWs is important to monitor these risks.

## MATERIAL AND METHODS

Yeditepe University Hospital is a new hospital in Istanbul. Five hundred and twenty eight hospital employees of this hospital were initially screened for hepatitis B surface antigen (HbsAg), hepatitis B surface antibody (anti HBs), hepatitis C virus antibody (anti HCV) and human immunodeficiency virus antibody (anti HIV). Serum samples were obtained and stored at either 4oC or -20 oC on the day of collection in microbiology laboratory. Details about employees including sex, age, location of employment and occupational group were recorded. Sera were screened by commercial kits for HbsAg, anti HBs, anti HCV and HIV Combo (Abbott, USA) based on microparticle enzyme immunoassay (MEIA) technology. Statistical significance was determined using Pearson Chi-Square test.

## RESULTS

All personnel were screened for hepatitis viruses when they first started to work in our hospital. Most of them were previously employed in another hospital.

Table 1 shows the category of employees according to sex, age and location of employment. Among 528 workers, 336 (63 %) were female and 192 (37%) male, 287 HCWs (55 %) and 241 (%45) administrative staff, 480 (90 %) were between ages 20 and 40.

Among previously vaccinated 287 HCWs and 241 administrative staff, 158 (55%) and of 78 (32%) were antiHBs positive respectively. Correlation between sex and anti-HBs results, and department and anti-HBs results were significant ($p<0.001$). The rate of anti-HBs positive male employees was found lower than expected value whereas this rate was higher in female employees. (Table 2 and 3).

One nurse among healthcare facilities and two personnel from the administration were found anti HCV positive. One housekeeping personnel among healthcare worker was found as HbsAg positive (Table 4) According to the procedure, the serologically positive samples were confirmed by moleculer techniques and the HCWs were examined by an infectious diseases specialist.

## DISCUSSION

Screening studies for hepatitis viruses are performed worldwide to determine the risk factors of occupational hazards and prevention from these pathogens. In a general hospital in Athens (4), a questionnaire survey was carried out on 175 HCWs and vaccination coverage was found 51%. In Libya (5) sera samples were collected from 459 hospital HCWs from different departments. 143 (31%) of these employees showed evidence of previous hepatitis B virus infection. In a study of 595 Turkish nurses (6), 111 (18.7%) had evidence of previous or current HBV infection and 32 (5.4%) of HCV infection. In another Turkish hospital (7) HBsAg, anti-HBc, anti-HBs and anti-HCV antibodies were examined in the serum samples of 190 personnel and no carrier and/or actively infected personnel with hepatitis B and C were detected, while 36 (18.9%) of them had a history of past hepatitis B infection, and 132 (69.5%) had hepatitis B vaccination. In Brazil [8] among 458 personnel in intensive care unit 95.5% were reported to have HBV vaccination, as a high frequency. To find out the risk of hepatitis C virus infection among Belgian HCWs (9) 5064 employees from 22 general hospitals was tested and 21 people were found to be positive. In a training hospital in Istanbul (10), among 702 HCWs HBsAg, anti-HBs and anti-HCV seroprevalence rates were compared with 5670 blood donors during the same period. HBsAg, anti-HBs and anti-HCV were detected in 21 (3.0%), in 480 (68.4%) and in 2 (0.3%) of 702 HCWs respectively. HBsAg and anti-HCV rates were 2.1 and 0.4% in blood donors, respectively. The prevalence of HBV and HCV were found similar with prevalence values detected in randomized blood donors.

Maintenance of immunity is therefore an essential part of prevention and infection control programs for HCWs. Consistent immunization programs could substantially reduce both the number of susceptible healthcare personnel in hospitals and health departments and the attendant risks for transmission of vaccine-preventable diseases to other workers and patients. Any medical facility or health department that provides direct patient care is encouraged to formulate a comprehensive immunization policy for all HCWs (11).

Exposure prevention remains the primary strategy for reducing occupational bloodborne pathogen infections; however, occupational exposures will continue to occur. Health-care organizations should make available to their personnel a system that includes written protocols for prompt reporting, evaluation, counseling, treatment, and follow-up of occupational exposures that might place HCW at risk for acquiring a bloodborne infection. HCW should be educated concerning the risk for and prevention of bloodborne infections, including the need to be vaccinated against hepatitis B.

Employers are required to establish exposure-control plans that include postexposure follow-up for their employees and to comply with incident reporting requirements mandated by the

1992 OSHA bloodborne pathogen standard.

HCW should be educated to report occupational exposures immediately after they occur, particularly because HBIG, hepatitis B vaccine, and HIV postexposure prophylaxis are most likely to be effective if administered as soon after the exposure as possible. HCW who are at risk for occupational exposure to bloodborne pathogens should be familiarized with the principles of postexposure management as part of job orientation and ongoing job training (1).

Our study showed us that approximately half of the HCWs were vaccinated previously. This data illustrates there is an attitude to need of vaccination for preventing themselves from the occupational hazards. The studies show us how importantly vaccination and education affect the surveillance. The rate of vaccination among the other employees could be elevated by continuing education and application of a vaccination program prepared with the hospital management. After this data, we started a vaccination program to unimmunized employees with the vaccines which were provided free from our Ministry of Health after giving information about employees. 69.8% of HCWs were successfully vaccinated during the vaccination program of the hospital management.

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**Table 1: Category of employees in relation to sex, age and departments.**

| Category | Number of employees |
|---|---|
| **Sex** | |
| Male | 192 |
| Female | 336 |
| **Age** | |
| 16-19 | 14 |
| 20-29 | 369 |
| 30-39 | 111 |
| 40-49 | 28 |
| 50-59 | 5 |
| 60-69 | 1 |
| **Department** | |
| Healthcare facilities | 287 |
| Nurse | 183 |
| Doctor | 30 |
| Laboratory personnel | 34 |
| Housekeeping personnel | 40 |
| Administration | 241 |
| **TOTAL** | **528** |

**Table 2: Correlation between sex and anti-HBs results.**

| Sex | anti-HBs positive | anti-HBs negative | TOTAL |
|---|---|---|---|
| Male | 56 | 136 | **192** |
| Female | 181 | 155 | **336** |
| **TOTAL** | **237** | **291** | **528** |

**Table 3: Correlation between department and anti-HBs results.**

| Department | anti-HBs positive | anti-HBs negative | TOTAL |
|---|---|---|---|
| Healthcare facilities | 158 | 129 | **287** |
| Other | 79 | 162 | **241** |
| **TOTAL** | **237** | **291** | **528** |

**Table 4: Positivity of tests in relation to departments.**

| Tests | Number of positivity | Healthcare facilities | Administration |
|---|---|---|---|
| HBsAg | 1 | 1 | 0 |
| Anti-HIV | 0 | 0 | 0 |
| Anti-HCV | 3 | 1 | 2 |
| **TOTAL** | **4** | **2** | **2** |