

# Hepatitis B Vaccination Coverage among Health Workers in a University Hospital in Northern Cyprus\*

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## BACKGROUND / AIMS

This study aimed to evaluate the hepatitis B vaccination coverage rates among health care workers (HCWs) in a university hospital in Northern Cyprus.

## MATERIAL and METHODS

Our sample consists of 486 HCWs. The study was performed retrospectively on a group of 486 HCWs, whose blood serum samples were evaluated in the microbiology laboratory of the hospital. Laboratory tests were conducted for identification of HBsAg and anti-HBs. Those who were HBsAg positive were excluded. All the data of the participants were obtained from the hospital system, and the data were analyzed using the Statistical Package for the Social Sciences 15.0 software package (SPSS Inc., Chicago, IL, USA).

## RESULTS

Four of the 486 HCWs were HBsAg positive and excluded from the study. From the 482 HCWs in the study group, 113 (23.4%) of whom were male, and 369 (76.6%) of whom were female, altogether had an average age of  $36.11 \pm 11.25$  (20-71 years). Among them, 270 (56%) were nurses, 93 (19.3%) were technicians, 77 (16%) were cleaning personnel, and 42 (8.7%) were doctors. It was found that 375 (77.8%) HCWs were anti-HBs positive and 107 (22.2%) were negative in the current study. Statistically, physicians, nurses, and technicians were found to be immune to hepatitis B virus significantly compared to other hospital workers ( $P < .05$ ;  $P < .0001$ ).

## CONCLUSION

The current vaccination coverage among HCWs at university hospital is as high as in developed countries. Despite a high level of acceptance, nearly one-fifth of the HCW's remains vulnerable to the infection. Efforts to target the unvaccinated staff should be encouraged.

**Keywords:** Vaccine, hepatitis B, health care workers, prevention

## INTRODUCTION

Hepatitis B virus (HBV) infection is one of the significant health problems, with an estimated 260 million chronically infected people. The infection accounts for 887,000 deaths annually due to its complications like hepatocellular carcinoma and cirrhosis.<sup>1</sup> Health care workers (HCWs) are one of the special populations who have particular risks for both acquiring and transmitting HBV infection to patients.<sup>2</sup> It is reported that HCWs have an up to the fourfold incidence of this infection in the general population.<sup>3</sup> Direct contact with infectious material, such as infected blood and body fluid, is the leading risk factor to acquire HBV infection for HCWs. Highly infectious HBV can also be transmitted in the absence of visible blood and remains on environmental surfaces for at least seven days.<sup>4-6</sup> Thus, the infections can occur with no history of apparent exposure. Although most of the HBV infections are attributed to percutaneous exposure, the potential HBV transmission through contact with surfaces has been demonstrated in investigations of outbreaks among patients and staff of hemodialysis units.<sup>7,8</sup>

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TABLE I. The Distribution of HCWs Anti-HBs Results

HCWs	Anti-HBs	Negative (<10, n (%))	Positive (>10, n (%))	Total, n (%)
Doctor		7 (16.7)	35 (83.3)	42 (100)
Nurse		37 (13.7)	233 (86.3)	270 (100)
Technician		24 (25.8)	69 (74.2)	93 (100)
Cleaning personnel		39 (50.6)	38 (49.4)	77 (100)
Total		107 (22.2)	375 (77.8)	482 (100)

A safe and effective HBV vaccine has been available since 1981 and is the crucial strategy to prevent HBV infections.<sup>9</sup> Although the vaccine is recommended for HCWs by the WHO, vaccination coverage remains low.<sup>10</sup>

In Northern Cyprus, there are no data available on the vaccination status of HCWs. We, therefore, aimed to estimate the prevalence of hepatitis B vaccination among HCWs at a university hospital in Northern Cyprus.

## MATERIAL and METHODS

The study was performed retrospectively on a group of 486 HCWs, whose blood serum samples were evaluated in the microbiology laboratory of the hospital. HBsAg and anti-HBs tests were performed on the samples using the chemiluminescence enzyme immunoassay method (Architect i2000 SR, Abbott, A.B.D.). HBsAg positive staffs were excluded from the study group. The study was conducted by the recommendations of the manufacturer, and  $>10 \text{ IU mL}^{-1}$  was accepted as a positive result.

All the demographic data of the participants and laboratory results were obtained from the hospital system, and the data were analyzed using the SPSS 15 statistical software (IBM SPSS Corp.; Armonk, NY, USA). Through applying Pearson's chi-squared test and Fisher's exact test,  $P < .05$  was accepted as significant. Ethical committee approval was not obtained since the study involved only retrospective data.

## RESULTS

Four of the 486 HCWs were HBsAg positive and excluded from the study. From the 482 hospitals HCWs in the study group, 113 (23.4%) of whom were male and 369 (76.6%) of whom were female, altogether had an average age of  $36.11 \pm 11.25$  (20-71 years). Among them, 270 (56%) were nurses, 93 (19.3%) were technicians, 77 (16%) were cleaning personnel, and 42 (8.7%) were doctors. It was found that 375 (77.8%) HCWs were anti-

HBs positive, and 107 (22.2%) were negative in the current study.

While 73.5% of the male HCWs ( $n = 83$ ) and 79.1% ( $n = 292$ ) of the female HCWs were positive for anti-HBs, the relationship between gender and anti-HBs positivity was not statistically significant ( $P = .204$ ). 86.3% ( $n = 233$ ) of the nurses, 83.3% ( $n = 35$ ) of the doctors, 74.2% ( $n = 69$ ) of the technicians, and 49.4% ( $n = 38$ ) of the cleaning personnel were found to be positive for anti-HBs (Table I). Statistically, physicians, nurses, and technicians were found to be immune to hepatitis B virus significantly compared to other hospital workers ( $P < .0001$ ). From among the 375 HCWs who had a positive value for anti-HBs, 24% ( $n = 90$ ) had an anti-HBs value between 10 and 100, while 76% ( $n = 285$ ) were identified to have a value of  $>100$ .

## DISCUSSION

Hepatitis B vaccine is reported to be one of the safest and effective vaccines according to the international literature.<sup>11</sup> The Advisory Committee on Immunization Practices has been recommending hepatitis B vaccine for HCW since 1982.<sup>10</sup> The incidence of acute HBV infection among HCWs has declined, but the risks for exposure persist. Although the vaccine has been recommended for more than two decades, the coverage rate has remained below the average goal of 90%.<sup>12</sup> Suboptimal hepatitis B vaccine coverage is reported to be due to concerns about side effects, lack of availability, and knowledge gaps about the risks of the infection.<sup>10</sup> These barriers to vaccination suggest that additional education about the safety and benefits of the hepatitis B vaccine may increase acceptance. The WHO has reported that the vaccination coverage among HCWs is 18-39% in low- and middle-income countries and 67-79% in high-income countries.<sup>13,14</sup> Some studies showed even lower levels of vaccination coverage. The prevalence of vaccination for HBV among HCWs in Georgia was 12% similar to that for other developing countries such as Uganda 5%, Kenya 13%, and Egypt 16%.<sup>15</sup> These rates are ranging between 50% and 90% in Europe.<sup>9</sup>

According to WHO, vaccine coverage among HCW in the United States is 75 and 77% in Australia and New Zealand.<sup>16,17</sup> Our study was in the same line with developed countries with a coverage level of 77.1%. Nurses have the highest level of 85.9% when compared to other HCWs. Based on previous investigations, raising awareness is the crucial point to vaccination compliance. It is also known that health care personnel viewing their susceptibility to HBV infection as high are more likely to be vaccinated.<sup>18,19</sup> This can be possible with proper education programs.

In conclusion, Cyprus is classified as low-intermediate hepatitis B endemic country with a prevalence of 2-4.9% by the CDC.<sup>20</sup> In a comprehensive study, which is reported from Northern Cyprus, the rate of hepatitis B in the population was 1.5%.<sup>21</sup> Northern Cyprus has implemented universal hepatitis B vaccination to all infants since 1999. However, nationwide vaccination program for high-risk groups including HCWs has not been in place. Comparing with the global picture, our vaccination coverage rate is as high as in developed countries. This is a result of continuous educational programs and initial serological testing of newly recruited staff by an infectious disease control team. Despite these efforts, particular attention has to

### Main Points

- HCWs are at particular risk for both acquiring and transmitting HBV infections.
- Continuous educational programs and initial serological testing of newly recruited staff for HBV can increase vaccine uptake among HCWs.
- Despite the high vaccination coverage among HCWs in Northern Cyprus, attention has to be given to nearly one fifth of them who are still susceptible to HBV infections.

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**Ethics Committee Approval:** Ethical committee approval was not obtained since the study involved only retrospective data.

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