

# Immunization coverage of health care workers against hepatitis B

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## Abstract

**Introduction:** Hepatitis B virus (HBV) infection remains a serious risk for health care workers (HCWs). Vaccination of the group against HBV therefore is a central part of programs to prevent nosocomial infections in healthcare workers. An evaluation of the anti-HBs level in vaccinated persons is a necessary measurement to handle immunization coverage.

**Material and methods:** We evaluated the Anti-HBs level of 100 randomly selected HCWs in an Educational Hospital 6 months after implementing a vaccination program against HBV to handle the immunization coverage of HBV in the group.

**Results:** 90 (90%) HCWs responded to the immunization program that 72 (72.0%) had anti-HBs titers in an equal range (>10 MIU/L), 18 (18%) were <10 MIU/L and 10 had negative anti-HBs.

**Conclusions:** Immunization coverage should be assessed to find out low-responded or non-responded healthcare workers to immunization. Some factors such as age, gender, race and storage condition of vaccine may interfere with one's response to immunization.

**Key words:** vaccination, immunization, HCW, HBV.

## Introduction

Prevention and prompt identification of infectious illnesses among staff members is one of the most important responsibilities of the hospital employees' health service [1]. Hospitals present a variety of infectious, chemical and physical hazards to their workers [2]. It also cannot be overemphasized that good preventive measures such as universal precautions, good hand-washing techniques, and appropriate personal protection are the mainstay of reducing the risk of nosocomial infections to other patients and health care workers (HCWs) [3]. Immunization of HCWs is an employee health measure and at the same time an important component of infection control activities to reduce the risk of nosocomial infections for patients [4]. Hepatitis B virus (HBV) infection remains a serious risk for HCWs [5]. Vaccination of all HCWs with potential exposure to blood and other secretions therefore is a central part of programs to prevent nosocomial infections in healthcare workers [6]. This article summarizes findings of the recently performed immunization program against hepatitis B virus.

## Material and methods

Current Center of Disease Control (CDC) recommendations suggest that HCWs who receive HBV have anti-HBs titers checked to document protective levels (anti-HBs greater than or equal to 10 mIU/ml) [7]. We evaluated Anti-HBs level of 100 randomly selected HCWs in a hospital 6 months after implementing the vaccination program against HBV to handle the immunization coverage of HBV in the group. Two types of recombinant HBV vaccine have been used in our vaccination program in the hospital in the last 5 years. One was Hepavax-Gene from Green Cross Vaccine Corp of Korea and the other one was Heberbiovac HB from Heber Biotec, SA, Havana, Cuba. The subjects (ages 24-54 year) were evaluated after a 3 dose series of 20 µg at 0, 1 and 6 months and anti-HBs checked within at least 6 months of the last dose. HBV vaccine was given IM in the deltoid using a 23-gauge 1 inch needle. All of them have been working in hospital wards in morning, evening or night shifts.

## Results

The data on 100 HCWs vaccinated at least 6 months ago were analyzed using SPSS version 12.0. Demographics were: mean age 33.4±5.9 year, 2 (2%) smokers (SMK), 77 (77.0%) married. 41 (41.0%) males and 59 (59.0%) females; 68 (68%) nurses (1 Master Science, 46 Baccalaureate, 21 Learning) and 32 workers. 90 (90%) HCWs responded to the immunization program that 72 (72.0%) had anti-HBs titers in an equal range (>10 MIU/L) and 18 (18%) were <10 MIU/L. 10 HCWs had negative anti-HBs. Subjects with negative anti-HBs were vaccinated again as mentioned above. Subjects with Unequal levels of anti-HBV (<10 MIU/L) were given a booster dose of HBV vaccine (Hepavax-Gene) to promote immunization. Only 2% of subjects (male) were smokers, it is due to the screening program during HCWs employment in the hospital. Neither positive HBsAg nor positive HIV-1 (Ag) were found in the subjects.

## Discussion

HBV infection occurs throughout the world and is endemic in Africa, Eastern Europe, the Middle East, Central Asia, China, Southeast Asia, the Pacific Islands, and the Amazon basin of South America. In these areas, up to 70 percent of the adult population tests are positive for prior infection. In Iran, it is estimated that about 3% of people had been affected by the virus [8]. Recent researches in Tehran population showed that 5.2% (3.6 males, 1.6 females) were affected by HBV [9]. Widespread immunization programs against HBV, which have been implemented in more than 100 countries, have dramatically reduced the occurrence of chronic HBV infection and hepatocellular carcinoma, and the vaccine can thus be considered the first anticancer vaccine [10]. Vaccination against HBV was included in the general vaccination program since 1991. Ideally, the antibody response (the anti-HBs antibody level) is determined within one to three months after the last dose of vaccine in persons with risk factors for a lack of response (including an age greater than 30 years, obesity, or immunodeficiency) or those at high risk for exposure to blood or bodily fluids. The antibody response should frequently be tested years after completion of the vaccination series, in which low-response, "waning" or true nonresponse cases (an antibody level of less than 10 mIU per milliliter after the appropriate vaccine series) must be distinguished. Administration of a single dose of the vaccine, followed by measurement of the anti-HBs antibody response 4 to 12 weeks later, will differentiate persons with no response (indicating an absence of protection against disease) from those with waning antibody levels (in whom an anamnestic response will occur, with anti-HBs antibody levels of at least 10 mIU per milliliter). For persons who remain seronegative after this booster dose, a second series, which involves two additional doses of vaccine (i.e., for a total of three doses), will result in seroconversion in 50 to 60 percent of recipients. For those with risk factors for nonresponse, the 400 µg dose should be used [11].

Table I. Gender

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Male	41	41	41	41
	Female	59	59	59	100

Table II. ABV Ab

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Negative	10	10	10	10
	Equal	72	72	72	82
	Unequal	18	18	18	100

Note: Equal = Anti-HBs >10, Unequal = 4 <Anti-HBs <10, Negative = Anti-HBs <4 MIU/L

## Conclusions

Establishing a comprehensive immunization program for healthcare workers should be a high-priority project for hospitals, as immunization of persons will improve the safety of patients and staff. It is also emphasized that immunization coverage following vaccination should be assessed to find out low-responded or non-responded persons to immunization. Then vaccinated persons specially HCWs because of the high risk of probability of HBV infection should be followed after complete vaccination to handle immunization coverage in the group. Age (>40 years), injection site (other than Deltoid), co-morbid infections, storage condition of vaccine (freezing), cigarette smoking, obesity, chronic illnesses (cardiopulmonary), gender, race, genetic factors may influence one's immunization.

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