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IMMUNITY LEVEL TO HEPATITIS B VIRUS IN VACCINATED MEDICAL STUDENTS

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ABSTRACT

Hepatitis B is a wide world disease and more than 1/3 of people in the world are HBs Ag positive. HBV causes chronic hepatitis, acute hepatitis, chronic cirrhosis and hepatocellular carcinoma in adults and children. This research was done for evaluation of immunogenicity of HBV vaccine with HBs Ab measurement after vaccination. This descriptive cross-sectional study was done on 135 medical students of Jahrom University of medical science who had been vaccinated three times. The obtained serum was tested by Elisa method to determine for Anti-HBs antibodies. All collected data were entered in statistical software program SPSS (version 16) and were analyzed by descriptive statistics and chi-square and t-test. Out of 135 medical students, 102(75.6%) were women. In this study 13(9.6%) subjects had anti-HBs titer of 10-100(mIu mL^{-1}) and 122(90.4%) subjects had anti-HBs titer of >100 mIu mL^{-1}. There was no correlation between immunity level and age, sex, BMI, time after last vaccination and past record of needle stick at work place. Although immunity to hepatitis B was in protective level among all participants, assessment of immunity in healthcare workers after complete vaccination recommended.

Keywords: HBV, Immunity, Vaccination, Medical Students

1. INTRODUCTION

Hepatitis B infection play a significant role to disturbe public health (Zajac *et al*., 1986). Despite acute infection, severe morbidity and mortality from cirrhosis and hepatocellular carcinoma is more common in Chronic HBV infected people. Hepatitis B is an significant, infectious, for healthcare workers and medical students unprotected to human blood (Gunson *et al*., 2003). The high prevalence of virus carriers in the supported population (Zaman, 2006) the high frequency of exposure to blood and other human fluids, needle stick and sharps injuries at work place and the highly contagious nature of Hepatitis B Virus (HBV) is the risk of infection. Universally, it is estimated that more than 2 billion persons have evidence of past HBV infection, more than 350 million are chronic carriers and each year one million deaths occur by HBV-related diseases (Zuckerman *et al*., 2007). Studies display that, the prevalence of HBs Ag with moderate endimicity in different part of Iran is 2-7% (Hou *et al*., 2005). In a study among Indonesian health-care workers in 2005, sharp injuries led to an estimated 1445 infections with HBV (Agustian *et al*., 2009). Sobia *et al*. (2011) study HCWs showed 2.18% prevalence of positive HBV. In a study conducted in pakistan the main promotion factors for HBV was unscreened blood transfusion 56 (27.86%) (Tassaduqe *et al*., 2004). Since 1982, considerable progress has been made to reducing the risk for HBV infection in adults and eliminating HBV transmission in children (Armstrong *et al*., 2001).

Although many progresses has been made in medical science but there is no effective treatment for Hepatitis B infection yet, so immunization, by means of recombinant

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vaccination, is necessary to prevent the clinical disease, the progress of carriers and the transmission of the HBV to high risk persons. Cause, medical and paramedical students are at risk of exposure to vaccine-preventable diseases the vaccination by Healthcare Workers (HCWs) is very necessary for hospitals (Stewart *et al*., 2002; Askarian and Malekmakan, 2006). Host factors that may affect the immune response include: increasing age, smoking cigarettes, obesity and having a medical disorder that compromises the immune system (Zajac *et al*., 1986). In a study in Lahore, Pakistan only 42.2% of medical student and 49.0% of healthcare workers were vaccinated (Nasir *et al*., 2000).

Although different studies show high rates of immunization after a three-dose vaccination program, more than 10% may have non protective antibody titers (Zajac *et al*., 1986).

As there was no study on the immunity level to hepatitis B virus in hbv vaccinated medical students in this area and also there is no information about HBV immunity status of these students.

So the present study was conducted to determine the serum HBs Ab levels and HBV immunity status in the medical students following vaccination. This is the frist study about determination immunity level to HBV in vaccinated medical students in south of Iran.

2. MATERIALS AND METHODS

This descriptive and cross-sectional study was carried out during January-February 2010 at Motahari and Peymaineh Hospitals. One hundred-thirty and five medical students of Jahrom University of medical science who had been vaccinated three times were enroled in this study. All participants provided informed consent, allowing access to their hepatitis B antibody titer results. The study was approved by the appropriate ethics committees. All students present were asked to complete a self-administered, anonymous questionnaire containing: Age, sex, BMI and duration from last vaccination. Heights and weights were measured to the nearest 0.1 cm and 0.1 kg, respectively, by the research team, using a SECA-marked stadiometer.

Body Mass Index (BMI), calculated as weight in kilograms divided by squared height in meters system (kg m^{-2}), was determined for each subject (Garrow, 1983). According to their BMI, subjects were divided to:

Underweight (18.49≥BMI), normal (18.5≤BMI≤24.9), Overweight (25≤BMI≤29.9) and obese (30≤BMI)(15). HBs-Ab titers were determined by enzyme linked immunosorbent assay (ELISA) method by use of Diapro kit (CE-0318, Italy). According to the serum HBs-Ab levels, the subjects population was classified as non-immune (less than 10 mIU mL^{-1}); moderately immune (between 10 and 100 mIU mL^{-1}) and fully immune (more than 100 mIU mL^{-1}).

Participants who were HBs Ag positive as well as subjects which did not receive vaccination or those who had incomplete vaccination against the HBV and subjects who had no tendency to enter this study were excluded. All collected data were entered in statistical software program SPSS (version 16) and were analyzed by descriptive statistics, chi-square and t-test.

3. RESULTS

Among 135 medical students, 33 (24.4%) were male and 102 (75.6%) were female. The mean age (± SD) was 23.6±1.5 years. According to the results of serologic tests, all of participants showed seropositivity for HBV infection. Thirteen subjects (9.6%) were moderately immune and 122 subjects (90.4%) were fully immune. So, the majority of our study students fell outside the fully immune group.

Mean age of the subjects in moderately immune group was 24.10±2 years and in the fully immune group was 23.50±1.4 years (p>0.05).

In our study there was a higher percentage of males in the fully immune category (93.9%), but there was no significant association between sex and HBs-Ab Level (p>0.05).

One hundred and twenty six students had normal weight (18.5≤BMI≤24.9) in which 115 (91.3%) of them were fully immune. There was no significant association between BMI and HBs-Ab level (p>0.05) (**Table 1**).

Table 1. Frequency of immunity against hepatitis B in medical students

		Moderately immune no (%)	Fully immune no (%)	Total no (%)
Sex	Male	2(6.1%)	31(93.9%)	33(100%)
	Female	11(10.8%)	91(89.2%)	102(100%)
	Total	13(9.6%)	122(90.4%)	135(100%)
BMI	Underweight (18.49) ≤BMI	0(0%)	3(2.5%)	3(2.5%)
	Normal (18.5≤BMI≤24.9)	11(8.7%)	115(91.3%)	126(93.3%)
	Overweight (25≤BMI≤29.9)	2(40%)	3(60%)	5(3.7%)
	Obese (30≤BMI)	0(0%)	1(100%)	1(0.7%)
	Total	13(9.6%)	122(90.4%)	135(100%)

All P values were not significant (>0.05)

Mean time after last vaccination in moderately immune subjects was 51.9±13.3 month and in fully immune subjects was 48±15.1 month ($p>0.05$).

4. DISCUSSION

The results of this study were were agree to the results of other researches were done in other cities of Iran. The immunity status of HBV vaccine among three time vaccinated medical students in different cities of Iran are: Mazandaran (98.4%), Borojerd (90%), Rasht (95.1%), Hamadan (94%) (Ghavamian and Khaki, 2005; Ghanaei *et al*., 2006; Ranjbar *et al*., 2002).

In different countries worldwide immunization of HBV vaccine on HCWs is acceptable: Michigan of America (85.8%), Italy (81.6%) and Brazil (93.3%) (Havlichek *et al*., 1997; Floreani *et al*., 2004; Tele *et al*., 2007).

Ghorbani *et al*. (2008) study found that two doses of HBV vaccine can produce immunity for five years compare to one dose of vaccine.

Louther *et al*. (1998) study in New York City hospital increasing age was the only risk factor for lesser response to HBV Vaccine.

Results of two studies on health care workers and one study on medical students about immunization of HBV Vaccine in Yasuj, Shahrekord and Rasht cities of Iran respectively, showed that females had higher titer than male (Sarkari *et al*., 2007; Parmar *et al*., 2011; Ghanaei *et al*., 2006).

Martinez *et al*. (1998) study showed that increasing BMI is a risk factor for lesser response to HBV Vaccine.

In our study there was no significant association between immunity level and age, sex, BMI and time after last vaccination in this study122 subjects had anti-HBs titer>100 IU L^{-1}.

Although Results of our study and other studies in Iran and other countries mentioned above shows a good response to HBV vaccine in HCWs; but as a high risk group evaluation of HBs-Ab should be considered after vaccinations in these subjects and also continuation of anti-HBV vaccination in spread program of immunization in Iran is recommended.

5. CONCLUSION

According to our results (more than 90% full immunity) hepatitis B vaccines have a good highly immunogenicity and its immunogenicity has not any difference in male and female genders. The main mission of this study is concluded as.

As medical students are a high-risk group to be contaminated by HBV, it is preferable to be evaluated for anti-HBs titer 1-3 months after full three- dose (0, 1 and 6) vaccination especially when these factors are present.

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There is no conflict for this study.

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