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**The rate of HBS Ab titer among dental students and  
residents in dental school of Ahvaz Jundishapur University  
of Medical Sciences during 2014-2015**

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**Abstract**

**Background and Objective:** because of the high prevalence of hepatitis B among dentists, and since hepatitis is one of high-risk infections for the dental community, this study was conducted to determine the rate of HBS Ab titer among dental students in Ahvaz Jundishapur of Medical Sciences. **Materials and Methods:** in this descriptive-analytical study, the antibody titer was measured for 55 students in the Dentistry Faculty of Ahvaz Jundishapur University of Medical Sciences students. **Results:** the evaluation of antibody titer in the students showed that 83.6%, 10.9%, and 5.5% of people had an antibody titer higher than 100iu/l, between 100-10iu/l, and less than 10iu/l, respectively. No significant differences were seen between the groups as well as in the whole of the sample studied between gender and the level of HBSAb titer ( $p > 0.05$ ). There was a significant difference between the date of the vaccination of more than five years ago with the level of the HBSAb titer in the student groups ( $p = 0.05$ ). **Conclusion:** the results of the evaluation of antibody titer in the students indicated that 5.5% of students need to renew a complete period of vaccination.

**Keywords:** HBSAb titer; Hepatitis B; vaccination

**Introduction**

Infection control today is one of the important topics in dentistry. Its most important cause is the high prevalence of certain viral diseases such as AIDS and hepatitis. These diseases, particularly hepatitis, which is very important in terms of contagion, are transmitted through the infected blood and blood products and saliva (1-2). More than 75% of people, who are infected with hepatitis, remain unknown for a long time; so it is essential that physicians and dental practitioners have the ability to identify the patients. Since compared with doctors in other medical areas, dentists are in more contact with blood and saliva of patients so, is essential to have information of high risk groups for catching

hepatitis. highrisk Patients include: kidney patients, thalassemia patients, blood bank personnel, forensic workers, drug addicts, patients with immune deficiency, inpatients and so on (3-4).

During contact with such patients, dentists must use full safety devices such as disposable gloves and masks, goggles and protective clothing. Similarly, they must carefully use devices such as sprays, ultrasonic devices, propipette, handpiece, and turbine, because the hepatitispatients' blood and saliva contain a virus (5).

Now, 350 million people worldwide are suffering from a chronic type of these infections and there is a possibility for them to catch the dangerous effects of this type, especially liver cancer and cirrhosis of the liver. The risk of mortality in these cases is 30% (6).

With all these explanations, the best and safest way to immunity against this dangerous disease is vaccination, which is done at time intervals (zero, one and six months) (7). Vaccination will protect the person over 90% against hepatitis B if it can be used correctly (8).

In our country, since 1988, the Engerix-B vaccine was used specifically for individuals at risk and it is injected in accordance with Schedule 0-1-6 months. Hepatitis b vaccine has been recommended for all health staff, but the non-response rate is approximately 24-25% and its durability of safety is unknown as well as there is no standard procedure after vaccination for fixing, controlling and keeping of the safety. In general, the durability of safety after vaccination against hepatitis b is unknown. A total of 10% of the vaccinated patients that have responded to the vaccination, have lost their Anti-HBs after 5 years. A study shows that the majority of the vaccinated health staff do not measure usually their antibody titer after vaccination (9).

The risk of hepatitis b in our country's population is 2-7 percent and despite that the Islamic Republic of Iran is in the group of leading countries in the field of vaccination, but according to the studies, the safety level of the population among the vaccinated people has been reported differently. This confusion can be seen in the foreign studies, including a study conducted by Alfah in Saudi Arabia, in which safety of vaccinated people after 8 years was reported to be 65 percent and in a study conducted by Zhang on the vaccinated adults, a safety rate of 70% has been reported three years after vaccination (10). The results of some studies demonstrated that the safety level is dependent on the age and sex (6). It is evident that some sources believe that the reduced HBs Ab-titer is associated with the reduced immunity against hepatitis b and vaccination programs will not have virtually their effective performance, So the measurement of antibody titer of safety risk in the high-risk groups of community (including dental practitioners and dental staff) is useful in order to meet the extent of their immunity and determine the best vaccination protocol, injection of reminder vaccines or re-vaccination in the high-risk groups (9). Therefore, this study aimed to assess the extent of the HBs antibodies in the vaccinated dental students in dental school of Ahvaz Jundishapur University of Medical Sciences in the year 2014-2015.

## **Materials and Methods**

This is a descriptive- analytical study on blood serum sample of 55 students and residents of dentistry in Faculty of dentistry in Ahvaz Jundishapur University of

Medical Sciences (22 males and 33 females) that the samples of 12, 12, and 14 were selected from among the students and residents entering in the University in 2010, 2011, and 2012, respectively. In addition, 17 people were selected from among the residents. The exclusion criteria included the history of jaundice in the past, having blood disease need blood, having a positive test for HBs-Ag or absence of a person's willingness to participate in the study. 5 CC of blood was taken from the selected students and sent to the lab. In the laboratory, blood samples were kept after separation in a temperature of -20 ° c and the samples were examined using the method of ELISA and Italy kit Radium 96 -test with cat.nom:KHB31/B specification. The profile of every person that were recorded at the time of blood collection based on personal statements and recorded vaccination card, were grouped by the amount of antibodies obtained from serum analysis registered twice and on the basis of age, sex, number of vaccines received, blood collection interval and to receive the latest of vaccines.

After receiving the results of tests, the names of individuals, their profiles (age, gender, etc.), the number of vaccines received, blood collection interval and to receive the latest vaccine, were checked.

Based on the guidelines of the kit responsible for the national program, the examples that had antibody titers equal to or greater than 10 units, were recorded as a safe person and samples with a titer less than 10 units were recorded as a non-respondent person.

The collected data entered in the SPSS version 18 and then using descriptive statistics, data were calculated, the frequency tables were prepared, and were analyzed by non-parametric tests, including Chi -square test and Kruskal-Wallis.

## **Results**

According to the table 1, the evaluation of the antibody titer among the students and residents was shown that 83.6% of people have a high antibody titer higher than 100iu/l, 10.9% of people have antibody between 10-100iu/l and 5.5% of people have antibody less than 10iu/l; so, these students need to renew a complete period of vaccination.

**Table 1.** Frequency distribution and percentage of the studied groups in terms of HBSAb

Titer HBSAb	Students entering in 2010		Students entering in 2011		Students entering in 2012		Residents		The entire sample	
	N	%	N	%	N	%	N	%	N	%
HBSAb 100	10	83.3	10	83.3	11	78.6	15	88.2	46	83.6
100HBSAb < 10	2	16.7	2	16.7	1	7.1	1	5.9	6	10.9
10HBSAb < 10	0	0	0	0	2	14.3	1	5.9	3	5.5
Total	12	100	12	100	14	100	17	100	55	100

In the present study, considering that the parametric statistics presumptions (normality of distribution of variance and being the same variables) have not been

adhered in the studied groups, so, non-parametric statistical methods (Kruskal-Wallis and Chi-square test) have been used.

**Table 2.** The relationship between HBSAb titer with gender in the studied groups and the entire sample

HBSAb	Gender				Total frequencies observed	coefficient of	P-value	
	Male		Female					
	Observed frequency	Expected frequency	Observed frequency	Expected frequency				
Students entering in 2010	HBSAb 100	4	5	6	5	10		
	100HBSAb < 10	2	1	0	1	2	2.4	0.121
	كل	6	6	6	6	12		
Students entering in 2011	HBSAb 100	6	5	4	5	10		
	100HBSAb < 10	0	1	2	1	2	2.4	0.121
	كل	6	6	6	6	12		
Students entering in 2012	HBSAb 100	4	4.7	7	6.3	11		
	100HBSAb < 10	0	0.4	1	0.6	1	3/6	0.165
	10HBSAb < 10	2	0.9	0	1.1	2		
Residents	كل	6	6	8	8	14		
	HBSAb 100	4	3.5	11	11/5	15		
	100HBSAb < 10	0	0.2	1	0.8	1	0.697	0.706
The entire sample	10HBSAb < 10	0	0.2	1	0.8	1		
	كل	4	4	13	13	17		
	HBSAb 100	18	18.4	28	27.6	46		
	100HBSAb < 10	2	2.4	4	3.6	6	1.014	0.602
	10HBSAb < 10	2	1.2	1	1.8	3		
	Total	22	22	33	33	55		

The results of Chi-square test show that there is no significant difference between the level of HBSAb titer

and gender in the groups as well as the entire samples ( $p > 0.05$ ) (table (2)).

**Table 3.** The relationship between HBSAb titer with vaccination date in the studied groups and the entire sample

HBSAb		vaccination date				Total frequencies observed	coefficient of	P.value
		1-5 years ago		More than 5 years ago				
		Observed frequency	Expected frequency	Observed frequency	Expected frequency			
Students entering in 2010	HBSAb 100	0	0.4	10	6	10	5.33	0.021
	100HBSAb < 10	0	-0.4	2	6	2		
	Total	0	0	12	12	12		
Students entering in 2011	HBSAb 100	2	1.7	8	8.3	10	0/480	0.488
	100HBSAb < 10	0	0.3	2	1.7	2		
	Total	2	2	10	10	12		
Students entering in 2012	HBSAb 100	0	6.3	11	4.7	11	13	0.002
	100HBSAb < 10	0	-3.7	1	4.7	1		
	10HBSAb <	0	-2.7	2	4.7	2		
Residents	Total	0	0	14	12	14	2.13	0.343
	HBSAb 100	6	6.2	9	8.8	15		
	100HBSAb < 10	0	0.4	1	0.6	1		
The entire sampe	10HBSAb <	1	0.4	0	0.6	1	1.84	0.398
	Total	7	7	10	10	17		
	HBSAb 100	8	7.5	38	38.5	46		
The entire sampe	100HBSAb < 10	0	1	6	5	6	1.84	0.398
	10HBSAb <	1	0.5	2	2.5	3		
	Total	9	9	46	46	55		

Date of last vaccination among the studied students was divided between 1 to 5 years ago (16.4%) and more than 5 years (83.6%). Table 3 shows the level of HBSAb in each group in terms of the date of vaccination. In general, the results of Chi-square test show that at a level of  $p > 0.05$ , there is a significant difference between the date of the vaccination more than five years ago with the level of the HBSAb titer in the student groups entering 2010 and 2011. These results suggest that antibody level is reduced when

the vaccination date is reduced that in the level of  $p > 0.05$ , this reduction is statistically significant. Moreover, the results of the Chi-square test show that there is no significant difference between the date of vaccination and the HBSAb titer level in a level  $p > 0.05$  in the student groups entering 2011, residents and of the entire sample. So, it is recommended that persons be examined over time in terms of the safety and, if necessary, the hepatitis B vaccination be renewed for them.

**Table 4.** The relationship between HBSAb titer with students' age in the studied groups and the entire sample

	HBSAb	N	Age	The values using Kruskal-Wallis		
			M±SD	<i>coefficient of <math>x^2</math></i>	Df	P.value
Students entering in 2010	HBSAb 100	10	0.483±24.3	4.33	1	0.037
	100HBSAb < 10	2	4.95±28.5			
	Total	12	25 ± 2.25			
Students entering in 2011	HBSAb 100	10	0.632±23.2	0.375	1	0.540
	100HBSAb < 10	2	± 0.70723.5			
	Total	12	±0.6223.25			
Students entering in 2012	HBSAb 100	11	± 0.50533.36	3.54	2	0.170
	100HBSAb < 10	1	0±23			
	10HBSAb <	2	0±23			
	Total	14	±0.5222.5			
Residents	HBSAb 100	15	3.7±30.53	1.82	2	0.403
	100HBSAb < 10	1	0±27			
	10HBSAb <	1	0±27			
	Total	17	± 3.6530.12			
The entire sample	HBSAb 100	46	4.0925.63 ±	0.424	2	0.809
	100HBSAb < 10	6	3.4425.67 ±			
	10HBSAb <	3	2.3±24.3			
	Total	55	± 3.91 25.56			

In order to compare the age of the students with the HBSAb titer level of the studied groups and the entire sample, the non-parametric test of Kruskal-Wallis was used. As results reported in the table 4 show, the mean and standard deviation for each group of students and the entire sample have been reported separately in terms of HBSAb level. The results of the non-parametric Kruskal-Wallis test show that there was a significant difference between the average age of groups entering in 2010 at different levels of HBSAb ( $p < 0.05$ ). As can be observed, the average age of the students, who have a HBSAb titer level  $100 < 10$ , is higher than the age of the students, who have a HBSAb titer level of  $> 10$  and the differences in the  $p < 0.05$  level is statistically significant. In addition, the results of the non-parametric Kruskal-Wallis test show that there was no significant difference between the average age of groups entering in 2011 and 2012, residents and the total sample at different levels of HBSAb titer at the level of  $p < 0.05$ .

## Discussion

The hepatitis B viral infection is one of the important and noteworthy risks for dental practitioners. Its

causes the dangerous nature of the disease and the mortality caused by the disease, and being chronic disease and the presence of the patients who are its carriers. In order to pay attention to this important issue, this study was conducted on vaccinated dental students and residents of dental school at Ahvaz Jundishapur University of Medical Sciences. As table 1 shows, the results of the evaluation of antibody titer in the students suggest that 5.5% of these students need to renew a complete period of vaccination. In a study in 2005 to evaluate the response to hepatitis b vaccination in the staff of medical professionals in hospitals of Kurdistan province, Haji Bagheri *et al.* investigated 489 people and the situation is 2.6% of the samples lack the safety, safety, and totally 2.6%, 10.4%, and 25.7% of the samples did not have respectively security, protective safety, and weaker safety to hepatitis b. According to the results, they concluded that the safety of personnel working in the hospitals of the province in the field of hepatitis at a modest level and a small percentage of the students will need to prescribe a dose of vaccination and boosters again (11). In a study in 2007, Rostami *et al.* evaluated the amount of the immune response of hepatitis b vaccine among staff at risk with a mean

age of 37 years, 11% of people less than 10 antibody titer less than 10 (non- safe), 14% had antibody titers between 10 to 100 (the relative safety) and 75% had an antibody titer more than 100 (safe); due to the high risk of catching hepatitis b in health staff, non- safe staff must do action for vaccination again in order to prevent the incidence of hepatitis b as possible (12).

In a study conducted by Baharvand *et al.* to assess the extent of the impact of the vaccines and the factors affecting it, Anti-HBs titer in the vaccinated dental students of Shahid Beheshti University in 2002 was evaluated. this result was achieved that 2.8% of individuals were negative in terms of Anti-HBs marker and also from 97.2% were positive for HBs- Ab which of these, 18.2% of the respondents were good and 79% were great (9). In a study (2004) for the evaluation of the immunogenicity level of the surface antigen recombinant vaccine of hepatitis b in a vaccinated medical group and hospital personnel in Borujerd with average age 18-25 years, Khaki *et al.* concluded that the level of safety of the population under study was 90%, and 10% of subjects were non-responsive or NR (10).

In another study in 2009 in order to evaluate the antiviral hepatitis b antibody titer among the nurse aide conservatory students of Naja's Be'sat Hospital, Ali Mohammad Asgharian *et al.* concluded that vaccination in people with hepatitis b, is not an efficiency of vaccination of 100%. The present study showed that more than half of people (57.8%) are unsafe. It should be noted that these people are in continuous contact with patients and it is necessary that they be assessed in terms of Hbs- Ab titer in various intervals (13). In a study performed by Kazemi *et al.* in 2010 in order to determine the level of Anti HBs of blood among the employees of Tehran Khatam-Ol-Anbia Hospital, 78 cases (14.7%) had the amount of antibodies less than normal, 43.2% had a low response rate, and 42.1% had high antibody. According to the statistical results, they concluded that it is better to prescribe a reminder dose in the those who have the good respondent and are among the high risk groups of society (6).

The results reported in table 2 showed that there is no significant difference in terms of gender and the HBSAb titer level between the groups as well as the entire samples, but in a study conducted by Salemi in Shahed University, sex has been mentioned as one of the factors in rate of HBSAb titer (14).

The results obtained from table 3 showed the level of antibody will be reduced along with the increased vaccination date that this decrease is statistically significant; so, it is necessary that the safety of persons be checked again at specific time intervals and, if necessary, hepatitis B vaccinations be done for them (1-7).

As results reported in the table (4) show, there is a significant difference between the average age of 2010 incoming groups at different levels of HBSAb titer. The average age of the students whose HBSAb level is 10100, is more than the HBSAb titer level and the difference is statistically significant. While in the study conducted by Malekzadeh *et al.* have mentioned only age over 50 as one of the contributing factors in low titer antibody.

## Conclusion

The results of the evaluation of antibody titer in students and residents show that 5.5% of students need to renew a complete period of vaccination. High levels of antibodies will be increased along with the reduced vaccination; so, it is necessary that the safety of individuals be checked again in certain intervals and if necessary, the hepatitis B vaccination be renewed for them.

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