Original Article

The investigation of hepatitis B seropositivity in Sakarya University Students

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ABSTRACT

Objective: Our aim was to determine Hepatitis B seropositivity and contributory factors among students in Sakarya University, Turkey.

Methodology: Two hundred (200) students who met the study criteria were included in the study using random sampling method. The students were informed of the purpose and method of the study and were asked to sign a participation consent form. The data was obtained through questionnaires. The demographic characteristics (age, gender, accommodations, education level and occupation of parents) were compared with HBV seropositive and negative groups. In study, the relationship between risk factors and HBV seropositivity was investigated. The ECLIA technique was applied and the positivity of Hepatitis B surface antigen (HBsAg) and antibody (Anti HBs) were detected.

Results: The average age of the students was 20.9 ± 2.27 years. 67.5% of the students were female and 32.5% were male. In 84% of the students HBsAg and anti HBs was found to be negative; 13% of the students tested positive for Anti HBs only and 3% of the students tested positive for HBsAg only.

Conclusions: When HBsAg or AntiHBs positivity was compared with demographic characteristics, no statistically significant ($p > 0.05$) results were found. Sexual intercourse with multiple partners, having hemorrhagic diseases and blood-transfusion were found to be important risk factors.

KEY WORDS: Hepatitis B, Students, Prevalence.

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INTRODUCTION

Despite the availability of a reliable and effective vaccine, Hepatitis B virus (HBV) infection remains a significant public health problem throughout the world. New cases of HBV infection are still reported. One third of the world's population is infected with HBV and more than 350 million people have chronic Hepatitis B (HB) infection. HB is one of the most important causes of infection-based mortality in the world. HB has an important role in the etiology of many diseases such as chronic liver failure, chronic active hepatitis, fulminant hepatitis, cirrhosis and hepatocellular carcinoma. More than one million people die of HBV-related chronic liver diseases a year.[1-4] The spread of HbsAg as a result of occult infection is an important problem in society.

The epidemiology and transmission tract of the disease is related to the economic development levels of the countries in which it occurs.[5] Turkey is among the countries defined as having medium endemicity in terms of HB infection. The ratio of HBsAg positivity, which might represent chronically HBV carriers, was 7% for this southeastern region, and this ratio was higher in rural than in urban areas (8.2% versus 6.2%).[6] The most important defined risk factors for HB are blood transfusion, sharing of needles amongst intravenous drug-users, contaminated pins used for acupuncture, piercing and tattoos, homosexuality, unprotected sexual intercourse, multiple sexual partners, utilization of contaminated equipment during treatment and care in hospitals and; being a health care personnel.[2,7]

In many developed countries it is reported that the incidence of HB is high in adolescents and young adults. Since young people are more commonly associated with intravenous drug use, tattoo and piercing activities; they have infrequent health controls; they are more sexually active, and; since they consider themselves to be at a low risk of infection disease they have a high HB risk.[2,8,9] Despite this observation, there are few studies which measure awareness of young people regarding HB. Risk perceptions of young people indicate that they rarely have accurate information about disease risks.[8] In our study, we investigated HB seropositivity and contributory factors among students between the ages of 17-24 at Sakarya University, Turkey.

METHODOLOGY

This cross-sectional study was conducted between 01.09.2006 and 30.04.2007. A sample size of 200 was found to be sufficient to provide statistically-representative results by statistical institute in University. Because in the literature, even for multi-variable statistics, 200 of the sample is stated to be sufficient in almost 40 000 students like our university.[10] Students with a history of HB infection and those who were vaccinated were excluded from the study. The study employed a seroepidemiological methodology to test for infection. As participation in the study was voluntary, According to Helsinki Declaration participants were required to sign consent forms after an explanation of the purpose and the method of the study. The fact that study population included young people only in one university was accepted as a limitation.

After receiving the necessary permission from the authorities of the institution, the data collection process began. A questionnaire form was prepared in order to determine the demographic and socio-economic characteristics, pre-existing symptoms and Hepatitis B status of the students. The questionnaire forms for risk factors were organized being 'Yes' or 'No'.

Study participants were presented with the following questions:

1. What are the individual characteristics of the students who were included in the study (age, place of birth, the region where the student lived for a long time, accommodation place, parents' income level and number of the people in the family).
2. Did the student have any complaints which connote hepatitis in the last one year?
3. What is jaundice history, blood products transfusion, insulin dependent diabetes existence?
4. Is the student included in Hepatitis B risk groups?(Hepatitis history in a family member, babies of Hepatitis B mothers or babies breastfed by Hepatitis B mothers, the students who had sexual intercourse with more than one person and had a hemorrhagic disease, had traffic accident and surgery, practice tattoo or piercing, made manicure or pedicure commonly, Intravenous drug users (like insulin), Health personnel (who have contact with blood), the students staying in collective accommodation places, history of blood or blood products transfusion)

Data collection was conducted via face-to-face interviews, followed by collection of blood samples. HB surface antigen (HBsAg) and antibody (AntiHBs) positivity was serologically analyzed using HBsag 2 and AntiHBs test kits in an Elecsys 2010 immunology analyzer (Roche.USA) and Electrochemiluminescence immunoassay (ECLIA) technique in order to find out the seropositivity of HB infection in the students. The demographic characteristics (age, gender, accommodations, education level and occupation of parents) were compared with HBV seropositive and negative groups. In study, it was investigated the relationship between risk factors and HBV seropositivity.

Statistical Analysis: Statistical analysis of the data was carried out using the Statistical Package for Social Sciences program. In data evaluation and in findings about individual characteristics, number, percentage distribution were used; the comparison of the HB positivity according to the individual characteristics was performed by chisquare test., descriptive statistics methods (average, standard deviation)

were used. P<0.05 was accepted as statistically significant.[10,11]

RESULTS

The average age of the students was 20.9 ± 2.27 years. 67.5% of the students were female; while 32.5% were male. 49% resided in state hostels. In 84% of the participants HBsAg and AntiHBs were both found to be negative; in 13% of the participants only AntiHBs was found to be positive and in 3% of the participants only HBsAg was found to be positive.

It was found that the majority of HBsAg negative AntiHBs positive participants were between the ages of 20-22 (73%, 19/26); the majority resided in state hostels (57.6%, 15/26); the ratio of females to males was equal; mothers (57.6%, 15/26) and fathers of (42.3%, 11/26) of the students were primary school graduates; In the majority of families, the mothers of the students did not work (92.3%, 24/26), but fathers worked (80.7%, 21/26)). However, no statistically significant (p>0.05) difference was detected between antiHBs positivity and negativity in terms of demographic characteristics (Table-I).

Due to the low number of participants within the sample group in whom HBsAg positivity was detected (3%), it was not possible to carry out a reliable demographic data analysis. The most significant finding is that the mothers in all of these cases do not work; and that the mothers (66.6%, 4/6) in the majority of the cases were primary school graduates (Table-I).

When the participants were asked if they had experienced disease symptoms within the previous year which connoted hepatitis, no statistically significant relationship was found between the participants who reported symptoms within this timescale and HBsAg positivity or antiHBs positivity (p>0.05). It is striking that the majority of the participants who reported experiencing these kinds of complaints belonged to the HBsAg and antiHBs negative group.

When we investigated which HB risk groups the students belonged to, it was found that there was a significant relationship between the students who had sexual intercourse with multiple partners and those who had a hemorrhagic disease and who had blood transfusion HBsAg or antiHBs positivity. However, when evaluated using a chi-square test, it was found that this relationship was not proven to be reliable. Apart from these three risk factors, no significant relationship was found between other risk factors and HBsAg or antiHBs positivity (p>0.05) (Table-

Table-I: Comparison of Demographic Characteristics and Hepatitis B seropositivity (N=200).

		Hepatitis B Markers		*TOTAL*			
		Negative Cases	*Positive Cases*				
		HBsAg and antiHBs negative	*AntiHBs positive*[b]	*HBsAg positive*[b]			
Demographic characteristics		*n (%)*[a]	*n (%)*[a]	*n (%)*[a]	*n (%)*[a]	χ^2	*p*
Age	19 and below	42 (21)	2 (1)	2 (1)	46 (23)	4.22	0.377*
	20-22	100 (50)	19 (9.5)	3 (1.5)	122 (61)		
	23 and above	26 (13)	5 (2.5)	1 (0.5)	32 (16)		
Gender	Female	118 (59)	13 (6.5)	4 (2)	135 (67.5)	4.206	0.122*
	Male	50 (25)	13 (6.5)	2 (1)	65 (32.5)		
Education of mother	Illiterate	17 (8.5)	1 (0.5)	1 (0.5)	19 (9.5)	6.793	0.559*
	Primary School	100 (50)	15 (7.5)	4 (2)	119 (59.5)		
	Secondary School	21 (10.5)	2 (1)		23 (11.5)		
	High School and University		30 (15)	8 (4)	1 (0.5)	39 (19.5)	
Education of father	illiterate	10 (5)	1 (0.5)	1 (0.5)	12 (6)	2.808	0.946*
	Primary School	64 (32)	11 (5.5)	3 (1.5)	78 (39)		
	Secondary School	33 (16.5)	5 (2.5)	1 (0.5)	39 (19.5)		
	High School	39 (19.5)	5 (2.5)	1 (0.5)	45 (22.5)		
	University	22 (11)	4 (2)		26 (13)		
Occupation of mother	Working	16 (8)	2 (1)		18 (9)	0.704	0.703*
	Not Working	152 (76)	24 (12)	6 (3)	182 (91)		
Occupation of father	Working	126 (63)	21 (10.5)	5 (2.5)	152 (76)	0.593	0.743*
	Not Working	42 (21)	5 (2.5)	1 (0.5)	48 (24)		
Accommodation place	State Hostel	82 (41)	15 (7.5)	1 (0.5)	98 (49)	6.991	0.136*
	With his/her Family	28 (14)	2 (1)	3 (1.5)	33 (16.5)		
	Private hostel or flat with a friend	58 (29)	9 (4.5)	2 (1)	69 (34.5)		
TOTAL		168 (84)	26 (13)	6 (3)	200 (100)		

* No statistically significant difference (p>0.05). [a] Percentage in 200 people

[b] Participants who had encountered Hepatitis B virus: HBsAg or anti-HBs positive cases

II). No significant relationship was found between HBsAg or antiHBs positivity and the field of study, type of accommodation, number of family members and income level (p= 0.189; p= 0.707; p= 0.136; p= 0.992; p= 0.183; p>0.05, respectively).

DISCUSSION

HBV infection remains a significant public health problem throughout the world. It is reported that the incidence of HB is high in adolescents and young adults.[2,8,9] There are few studies which measure awareness of young people regarding HB. In a study from Turkey, Aktas *et al*. found that combined antigen and antibody prevalence was 40.5% in hospital employees and 37% in voluntary blood donors.[12] These percentages carried out in Turkey are significantly higher than us. In our study, the rate of HBsAg and anti-HBs seropositivity was found to be 16%. However, the students who were vaccinated against HB and those with a history of HB infection were excluded from the study.

Our findings indicated that age, gender, accommodation type and the education and occupation of the parents did not affect HB infection occurrence in our cases. However, as the present study-group was aged 17-24, these results can only provide information about university-educated young adults. In a study which was carried out in Turkey in children between the ages of 6-17, no relationship was found between HBsAg prevalence and age. In the same study it was reported that the parental educational level and the number of family members did not affect HBsAg seroprevalence.[5]

Kanra et al stressed that HBsAg and anti-HBs prevalence was similar in both sexes.[13] Demirturk found that HBsAg positivity was 4.6% in females and 9% in males; antiHBs positivity was 27% for both genders.[14] In our findings, gender difference did not affect HBsAg or anti-HBs positivity. This is in agreement with earlier findings from a study by Erden et al.[15]

It was reported that due to poor living conditions and inadequate personal care, military service was a significant risk factor.[14] In a study, HBsAg positivity was found to be 6.6% and antiHBs prevalence was found to be 27.2% in participants with previous military service.[14] Amongst the male participants who had not yet attended military service, the prevalence of HBsAg was found to be 2 (2/6). Half of the antiHBs positive cases were male (13/26).

In a study which evaluated HBsAg test results of more than 6.2 million people who donated blood to 22 Red Cross centers in Turkey, the average HBsAg prevalence was found to be 4.1%.[16] In another study which also included healthy people, HBsAg prevalence was found to be 6.6% and anti-HBs prevalence was found to be 27.2%.[14] In a ''Turkish National Study Team'' study, among 2,683 people, the HBsAg prevalence was found to be 5.4%, anti-HBs prevalence was found to be 17% and it was stressed that after the age of one year, HBsAg seropositivity did not change with age.[13] In the young adult population, in our

Table-II: The Comparison of Hepatitis B Risk Causes and Hepatitis B Positivity (N=200).

	Hepatitis B Markers			*TOTAL*		
	Negative Cases	*Positive Cases*				
	HBsAg and anti HBs negative	*Anti HBs positive*[b]	*HBsAg positive*[b]			
Hepatitis B Risk Groups[b]	*n (%)*[a]	*n (%)*[a]	*n (%)*[a]	*n (%)*[a]	χ^2	*p*
Hepatitis history in a family member	24 (12)	3 (1.5)	1 (0.5)	28 (14)	0.986	0.912*
Babies of HB mothers (and breastfed)	1 (0.5)			1 (0.5)	0.191	0.909*
The students who had sexual intercourse with more than one person		2 (1)	1 (0.5)	3 (1.5)	18.647	0.000**
The students who had a hemorrhagic disease		1 (0.5)		1 (0.5)	6.726	0.035**
The students who had tattoo, piercing	8 (4)	1 (0.5)		9 (4.5)	0.335	0.846*
The students who make manicure or pedicure	5 (2.5)	2 (1)		7 (3.5)	1.707	0.426*
The students who had traffic accident of surgery	13 (6.5)	1 (0.5)	1 (0.5)	15 (7.5)	1.241	0.538*
Intravenous drug users	1 (0.5)			1 (0.5)	0.191	0.909*
Health personnel	2 (11)	2 (1)	2 (1)	26 (13)	2.842	0.241
The students staying in collective99 (49.5) accommodation places	18 (9)	3 (1.5)	120 (60)	1.253	0.534	
Blood or blood products transfusion	54 (27)	6 (3)	1 (0.5)	61 (30.5)	9.062	0.060

*No statistically significant difference (p>0.05). [a] Percentage in 200 people

[b] Participants answered "yes" to disease symptoms were included

[c] Participants who had encountered Hepatitis B virus: HBsAg or anti-HBs positive cases

study, HBsAg prevalence and anti-HBs prevalence was found to be low, 3% and 13% respectively. However, the people who had HB infection and immunization history were excluded from the study. Even though this criterion does not affect our HBsAg data, it may have caused anti-HBs ratios to be lower.

In the literature, many risk factors were determined for HB. However, the significance of risk factors varies in different populations. While in developing countries, transmission via hypodermics due to poor hygiene is held responsible, in developed countries, generally intravenous drug-use and sexual transmission is held responsible.[7] In our study groups which comprised young adults the most important risk factor of HBsAg or antiHBs positivity was found to be sexual intercourse with more than one partner. However, the low number of cases in this group makes it difficult to make further comments. Similarly, in another study, it was reported that higher seroprevalence rates were observed in the post-adolescent period and that the most significant transmission route was sexual transmission.[7]

Having tattoos and piercings may occasionally cause HB epidemics.[17] However, the fact that tattoos or piercings are not common in Turkey reduces the infection transmission prevalence. The fact that in our study, only 9 (4.5%) cases in whole group had a tattoo or piercing, and HBsAg positivity was detected in only one of these students, indicated that this risk factor was not significant in HB seropositivity in young adults in our region. (p=0.846)

In the literature, the geographic regions where more than 8% of the population is HBsAg positive are considered to be high endemicity regions; and the regions where 1-7% of the population is HBsAg positive are considered to be endemicity regions.[2] According to our study and other studies carried out in Turkey, Turkey is medium-level endemicity region for HB.[6,13,14]

The prevalence of HB infection varies according to certain risk factors. Starting a program of vaccination from an early age may reduce the infection risk over time. A universal infant immunization program for HB was implemented in Turkey in 1998.[13] It is reported that for reducing the transmission risk of HB, routine vaccination at birth is not sufficient. For this reason, we suggest adding HB markers to university enrollment transactions of university students to identify those who were not vaccinated as infants can be helpful for the prevention of infection transmission. One of the priorities of public-health practitioners in HBV elimination should be the identification of transmission routes and determining the most important target population for transmission via those risk factors.[3] In our region, unprotected sexual intercourse and taking blood or blood products and having hemorrhagic disease are significant risk factors which increases the prevalence of HBsAg.

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