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Hepatitis B seroprevalance and risk factors in urban areas of Malatya*

Malatya il merkezinde hepatit B seroprevalansı ve etkileyen faktörler*

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Background/aims: *To determine the prevalence of hepatitis B viral markers and to assess possible risk factors in urban areas of Malatya.* ***Methods:*** *This was a sero-epidemiological, community based cross-sectional study and included 646 participants(female 352, male:294) from 192 houses. A face to face questionnaire was carried out and HBsAg, anti-HBc and anti-HBs markers were analyzed from blood samples using Micro ELISA technique.* ***Results:*** *The prevalence of HBsAg, anti-HBc and anti-HBs were found to be 6.0%, 29.3% and 30.3% respectively. In the final logistic regression, HBV infection (=anti HBc+) was independently associated with the age group of 21 years and older (OR=3.7, 95% CI=1.884-7.494), in illiterate subjects (OR=2.1, 95% CI=1.180-3.326), in farmers and labourers (OR=2.8, 95% CI=1.042-7.953) and in these with multiple sexual partners (OR=2.1, 95% CI=1.574-8.168). In addition, HBV infection was signficantly higher in circumcised male children compare to uncircumcised ones ($\chi 2$=5.58, P=0.01), in ones who gave birth to child at home compare to in ones who gave birth to a child at hospital ($\chi 2$=13.86, P=0.0001).* ***Conclusion:*** *The results of our study indicate that Malatya province has a moderate endemicity with regard to HBV infection.*

Key words: Hepatitis B, prevalance, epidemiology.

Amaç: *Bu araştırmanın amacı Malatya il merkezinde Hepatit B seroprevalansını belirlemek ve etkilemesi olası risk faktörlerini ortaya çıkarmaktır.* ***Yöntem:*** *Bu çalışma toplum temelli kesitsel türde, sero-epidemiyolojik bir çalışmadır. Tabakalı örnekleme yöntemiyle Malatya il merkezini temsil eden 192 haneden, her yaş grubundan, 352 kadın ve 294 erkek toplam 646 kişi seçilmiştir.* ***Bulgular:*** *Araştırmacı tarafından geliştirilen anket formu yüzyüze tekniğiyle uygulanmış ve elde edilen serumlar ELISA tekniğiyle ve Organon hazır kitleriyle HBsAg, anti-HBs, anti-HBc belirleyicileri yönünden analiz edilmiştir. HBsAg sero-pozitifliği %6.0, anti-HBc sero-pozitifliği %29.3, anti-HBs sero-pozitifliği %30.3'dür. HBV ile infekte olma durumu (=anti-HBc sero-pozitifliği) yaşla birlikte artış göstermektedir. Lojistik regresyon son modeline göre, 21 ve üzeri yaşta olmak (OR =3.7, %95 CI =1.884-7.494), okuma yazma bilmemek (OR=2.1, %95 CI =1.180-3.326), işçi ve çiftçi olmak (OR=2.8, %95 CI=1.042-7.953) ve birden çok kişiyle cinsel ilişkide bulunmak (OR =2.1, %95 CI =1.574-8.168) ile HBV enfeksiyonu arasında ilişki vardır. Bunlara ek olarak sünnet olan çocuklarda olmayanlara göre ($\chi 2$=5.58, P=0.01), evde doğum yapanlarda hastanede doğum yapanlara göre ($\chi 2$=13.86, P=0.0001), HBV enfeksiyon prevalansı anlamlı düzeyde yüksektir.* ***Sonuç:*** *Elde ettiğimiz veriler Malatya ilinin HBV enfeksiyonu açısından orta endemisite bölgesinde olduğunu göstermektedir*

Anahtar kelimeler: Hepatit B, prevalans, epidemiyoloji.

INTRODUCTION

Hepatitis B is a disease seen throughout the world and plays an important role in the etiology of a number of diseases, especially chronic insufficiency of the liver, chronic active hepatitis, fulminated hepatitis, cirrhosis and hepato-cellular carcinoma. It is estimated that over 300 million people are carriers of hepatitis B (1). Epidemiology and transmission routes of the disease are associated with developmental levels of countries. In developed countries it is most commonly transmitted by the parenteral route and by sexual activity. In developing countries however, its transmission is horizontal and vertical. Although the disease is not seen to be a problem in developed countries of the West, 100 000 people are infected with hepatitis B in Germany every year and 240 000 people in the USA. Moreover, 1.25 million people become carriers of the disease and 6000 people die of liver cancer and cirrhosis due to hepatitis B each year (1-3).

It has been reported that 25% of HbsAg carriers contract chronic active hepatitis, with 2% of those patients developing cirrhosis and 20% of these cirrhotic patients dying from hepatocellular carcinoma.

To our knowledge, there has been no study on sero-prevalence of hepatitis B in a sample repre-

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sentative of Turkey or in a sample including all age groups representative of a city in Turkey.

The aim of this study was to determine the seroprevalence of hepatitis B in upper, middle and lower socio-economic classes and in all age groups in Malatya, Turkey, and to detect various independent variables likely to affect the sero-prevalence of the disease.

MATERIAL AND METHODS

This study was carried out on a cross section of a population of 400, 248 people of all age groups living in Malatya, Turkey.

WHO estimates that the prevalence of hepatitis B in Turkey is 2.7%. Based on p=0.04 and α=0.01 according to median prevalence of 4% and assuming that a standard deviation of d=0.02 could be acceptable, we estimated that the study sample should consist of 647 people using the formula $n=N.t^2(p.q)/d^2(N-1)+t^2(p.q)$. In proportion to their income per capita and the number of households of the districts studied, 192 households were randomly selected by stratified sampling from the list made by Devlet İstatistik Enstitüsü (State Statistics Institute) in 1997 to count the population.

A questionnaire developed by the investigators was completed at interviews with each subject at home visits. Blood samples were obtained from all patients and centrifuged. The obtained sera were analyzed by ELISA autoanalyzer for HBsAg, anti-HBs and anti-HBc. Data were evaluated using Windows 9.0 SPSS package program. Median values and their standard deviations were determined. Chi-square significance test and logistic regression model were used for analysis of data. Having decided the final model to incorporate into the logistic model, we showed the exact convenience of the model with logistic regression model using Hosmer-Lemeshow (χ2=4.286, p=0.830).

RESULTS

The overall rate of HBsAg positivity was 6.0%, anti-HBs positivity 30.3% and anti-HBc positivity 29.3% in the study sample of 646 people. The rate of anti-HBc positivity alone was 3.6%.

Table 1 shows anti-HBc positivity of the participants and their socio-demographic features. 33.3% of males and 27.3% of females were infected by hepatitis B virus (HBV). The rate of infection among people aged between 0-9 years was 7.4%. However, this increased in later years and amounted to 52.8% of those aged 40 years. As to the relationship between education and infection, the rate of infection was 48.9% in illiterate people, 6.7% in university graduates and 23.7%-29.8% in others. It was 35.8% of housewives, 33.3% of medical staff, 21.7% of students, 58.8% of farmers and 45.7% of labourers and 27.9-25.8% in others were infected with HBV. 19.4% of people never married and 41.1% of married people and 33.8% of widows and widowers were infected by HBV. The rate of infection was 28.4% in small families, 29.6% in large families and 40.3% in broken families. It was 30.5% in people with low socio-economic status, 31.4% in those with middle socio-economic status and 23.9% in those with high socio-economic status.

Table 2 shows the association between infection and blood brotherhood, sexual relationship and medical procedures. The rate of HBV infection was 64.3% in people with more than one sexual partner, 37.1% in people with only one sexual partner and 19.2% in people without experience of a sexual relationship. It was 39.8% in those with a blood brother and 28.3% in those without a blood brother. 40.6% of people who had undergone an operation had HBV infection, but only 28.0% of people who had not undergone an operation had the infection. The infection rate was 41.7% in people noting that their dentists had not worn gloves during dental care, but only 28.0% in those noting that their dentists had worn gloves. The infection occurred in 56.6% of people administered blood or blood products at any time of their lives without testing for HBV or not known to be tested for HBV, but only in 20% of those receiving blood or blood products tested for HBV.

Table 3 shows sex specific medical procedures and the rate of HBV infection. The infection was present in 26% of boys with circumcision, but only in 3.8% of those without circumcision. 34.9% of women with a history of curettage and 33.3% of those without a history of curettage had the infection. The infection was present in 46.4% of women who had given birth and 24.7% of those who had not birth, with a rate of 55.6% in home births 24.7% in hospital births and 32.3% in either home or hospital births.

Logistic regression was used to analyze the association between HBV infection and certain demographic features, social behaviors and the medical

Table 1. Socio-demographic features of cases with and without HBV infection

		Presence of HBV infection			
		Infection		*No infection*	
		n	%	*n*	%
Sex N=646	Men	26	33.3	268	67.7
	Women	13	27.3	343	73.3
Age Group N=646	0-9 years	8	7.4	100	92.6
	10-19 years	16	13.3	104	86.7
	20-29 years	42	30.0	98	70.0
	30-39 years	34	34.3	65	65.7
	40 + years	94	52.8	85	47.2
Level of education N=646	Illeterate	46	48.9	48	51.1
	Literate	9	23.7	29	76.3
	Primany school	74	29.6	176	70.4
	Junior school	42	29.8	99	70.2
	Lise	19	30.2	44	69.8
	Higher education	4	6.7	56	93.3
Occupation N=491	House wife	68	35.8	122	64.2
	Labourer	43	45.7	51	54.3
	Healthcare worker	4	33.3	8	66.7
	Student	25	21.7	92	78.3
	civil servant	17	27.9	44	72.1
	Farmer	10	58.8	7	41.2
Marital status N=526	Married	133	41.0	191	59.0
	Single	34	19.4	141	80.6
	widow	178	33.8	348	66.2
Family status N=646	Small	108	28.4	272	70.6
	Large	62	29.6	150	70.4
	Broken	21	40.3	30	59.7
Socio. economic level N=646	High	21	23.9	67	13.7
	Middle	89	31.4	194	43.8
	Low	84	30.5	191	42.5

Table 2. Features of subjects infected with hepatitis B with respect to blood brotherhood, sexual behaviors and history of some medical procedures.

		Presence of HBV infection			
		Yes		***No***	
		n	%	*n*	%
Sexual intercourse N=248	Multiple	18	64.3	10	35.7
	Single	72	37.1	122	62.9
	None	6	19.2	20	76.9
Blood brotherhood N=646	Yes	39	39.8	59	60.2
	No	155	28.3	393	71.7
Previous surgery N=646	Yes	43	40.6	62	59.4
	No	151	28.0	390	72.0
Dentist's use of Glovers N=514	Used	70	28.0	180	72.0
	Not used	70	41.7	98	58.3
Blood transfusion N=646	Yes	16	41.0	39	59.0
	No	178	29.3	607	70.7

procedures other than circumcision, curettage and labor (Table 4). The final logistic regression model showed a significant relationship between HBV infection and the age of 21 years or more (OR=3.7, 95% CI=1.884-7.494), illiteracy (OR=2.1, 95% CI=1.180-3.326), being a labourer or farmer (OR=2.1, 95% CI=1.042-7.953) and having sexual relationship with more than one partner (OR=2.1, 95% CI=1.574-8.168). However, there was no significant relationship between HBV infection and socio-economic status, family type, sex, marital status, blood transfusion, blood brotherhood, surgical operation and dental care.

DISCUSSION

The rates of HBsAg (6.0%) and anti-HBs seroprevalence (30.4%) found in this study were similar to those (6.1% and 34.6% respectively) found in a meta-analysis performed in Turkey (5). The findings revealed that hepatitis B was moderately endemic. It is therefore suggested that Ministry of Health determine hepatitis B sero-prevalence in samples representative of Turkey and establish a system of survey sufficient to follow trends in the future.

There was no significant difference in the risk of HBV infection between men and women, which was consistent with findings from a study performed by Ekren in İstanbul (6). Prevalence of HBV infection increases with age. In fact, the risk of HBV infection was 3.7 times higher in people aged over 20 years than in those aged less than 20 years, which is compatible with the rates found in a study by Ceylan et al. performed in İstanbul (7) and in another study by Kılıç et al performed in Elazığ (8). These findings suggest that a vaccine against hepatitis B should be included in the present vaccination program in Turkey. The risk of HBV infection was 2.2 times higher in illiterate

Table 3. Presence of HBV infection with respect to gender specific medical procedures.

		Presence of HBV infection					
		Yes		*No*			
		n	*%**	*n*	*%**	*P*	$\chi 2$
Circumcision N=76	Yes	13	26.0	37	74.0	5.58	0.010
	No	1	3.8	25	96.2		
Currettage N=142	Yes	15	34.9	28	65.1	0.850	0.500
	No	33	33.3	66	66.7		
Birth N=205	Yes	90	46.4	104	53.6	1.535	0235
	No	3	27.3	8	72.7		
Birth N=170	Hospital	21	24.7	64	75.3	13.86	0.001
	Home**	30	55.6	24	44.4		
	Home-Hospital	10	32.3	21	67.7		

*row percentage, ** Group which creates difference

people than literate people. Similarly, Aslan et al found that the rate of HBV positivity was two times higher in children whose parents were literate than those whose parents were not so (9). These findings indicate that primary education, is an effective and inexpensive means of preventing hepatitis B infection and other infectious diseases, should be provided for everyone in a community. The risk of hepatitis B infection was two times higher in farmers and workers than people practicing other professions. This result is supported by the findings of Dal-re et al (10). However, further studies are needed to elucidate why the rate of hepatitis B infection is high in such people. Although the rate of infection was higher in the married and in widows and widowers than the single and in members of broken families than small and large families, a significant increase in the risk of infection could not be demonstrated. Likewise, there was no significant difference in the risk of infection between people with different socio-economic status.

As to the relationship between the rate of infection and blood brotherhood, sexual relationship and medical procedures, the infection rate was

Table 4. The investigation of relationship between HBV infection and demographic features, social behaviors and history of some medical procedures with logistic regression model.

	Regression coefficient B	*Deviatiop n SE(B)*	*P*	*OR*	*Confidence interval % 95.0 CI*	
Low socio-economic status	0.234	0.365	0.522	1.263	0.618	2.581
Broken family	0.492	0.423	0.244	1.636	0.714	3.748
Male gender	0.488	0.393	0.450	1.253	0.819	4.749
Age>21	1.021	0.471	0.001	3.775	1.884	7.494
Illeterate	0.807	0.205	0.010	2.214	1.180	3.326
Labourer and formers	1.011	0.620	0.021	2.875	1.042	7.953
Married and widow	0.454	0.457	0.133	0.995	0.634	8.294
Multiple sexual partner	0.873	0.447	0.024	2.166	1.574	8.168
Blood transfusion (+)	0.215	0.804	0.789	1.240	0.256	5.995
Blood brotherhood (+)	-0.060	0.501	0.952	1.061	0.396	2.590
Dental procedures (+)	0.746	0.378	0.621	1.323	0.895	1.956
Surgery	0.715	0.582	0.146	1.404	0.877	2.343
Constant	0.120	1.231	0.923	1.127		

higher in people with a blood brother than those without, but the difference was not significant. Similarly, higher rate of children who had undergone circumcision than those who had not. Considering that circumcision is also a surgical procedure, the necessary amendments should be made that urologists, general surgeons or general practitioners should be tramed to perform this procedure in health centers. The risk of infection was 2.1 times higher in people with more than one sexual partner than those with one partner. This is a phenomenon which has long been known (11).

Although the prevalence of infection was higher in people who had undergone surgery in those noting that their dentists had not worn gloves and in those who had received blood or blood products, this increase was not significant. These findings suggest that medical and surgical procedures performed by physicians or under hospital supervision do not cause a considerable risk of the infection (12). There was no significant difference in contraction of the infection between women who had undergone curettage and those who had not, which indicates that the Law on Population Planning brought about provision of safe curettage for every woman who needed it. There was no significant difference in the risk of infection between women who had and not who had not given birth although the prevalence of the infection was higher in home than hospital births. According to the results of the Population and Health Survey in Turkey, 27% of births occur at home (13). It should be given priority that all births should be performed by educated health staff in health centers in our country.

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