Seroprevalence of hepatitis B and C viruses in the province of Tokat in the Black Sea region of Turkey: A population-based study

Tokat ilinde hepatit B ve C virus seroprevalansı: Populasyon çalışması

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Background/aims: *Viral hepatitides are considered a major health problem worldwide. There are only a few studies relevant to the epidemiology of these types of infection in the normal healthy population. In this study, we aimed to determine the seroprevalence of hepatitis B and hepatitis C as well as the frequency of isolated anti-HBc IgG positivity among a normal healthy population in a northern province of Turkey.* ***Methods:*** *This study was conducted in 70 areas (12 urban and 58 rural) in the province of Tokat, which is in the Black Sea region of Turkey, with about 530,000 inhabitants 18 years and older. All urban regions and some rural regions selected by a cluster sampling method were included in the study. The study population of 1,095 subjects (541 male and 554 female; urban 555 and rural 540) was selected by a random sampling method among 530,000 individuals. All individuals were tested for HBsAg, anti-HBs, anti-HBc IgG, anti-HCV, and alanine aminotransferase.* ***Results:*** *The mean age of all participants was 41.4±17 years (range, 18–95). HBsAg, anti-HBs, anti-HBc IgG only, isole and anti-HCV were detected in 60 (5.5%), 250 (22.8%), 132 (12.1%), and 23 (2.1%) individuals of the 1,095 total participants, respectively. We did not find statistically significant differences between hepatitis B and C markers for men versus women or those living in rural versus urban areas. The rate of HBsAg positivity in individuals with a history of marriage to close relatives was higher.* ***Conclusions:*** *We found that the seroprevalences of hepatitis B and C in a northern province of Turkey are similar to the averages reported in other studies that were conducted in a different region of our country. The history of marriage to close relatives was associated with hepatitis B.*

Key words: Hepatitis B, hepatitis C, prevalence study, population

Amaç: *Viral hepatitler dünya genelinde önemli bir sağlık sorunu olarak düşünülür. Normal populasyonlarda hepatit sıklıklarıyla ilgili az sayıda çalışma mevcuttur. Çalışmamızda, Türkiye'nin kuzeyinde bir ildeki normal populasyonda hepatit B ve hepatit C seroprevalansı ve izole anti-HBc sıklığının belirlenmesi amaçlanmıştır.* ***Yöntem:*** *Bu çalışma 18 yaş ve üzeri nüfusu yaklaşık 530.000 olan ve Karadeniz Bölgesi'nde bulunan Tokat iline bağlı 70 merkezde (12 ilçe merkezi ve 58 kırsal bölge) yapıldı. Tüm ilçe merkezleri ve küme örnekleme yöntemiyle seçilen kırsal alanlar çalışmaya dahil edildi. Çalışma populasyonu 530.000 kişi arasından rasgele örnekleme yöntemiyle seçilen 1095 kişiden (541 erkek ve 554 kadın; kente yaşayan 555 ve kırsal bölgede yaşayan 540) oluşturuldu. Tüm katılımcılara HBsAg, anti-HBs, anti-HBc IgG, anti-HCV ve alanine aminotransferase testleri yapıldı.* ***Bulgular:*** *Katılımcıların yaş ortalaması 41,4±17 (aralık, 18–95) yıldı. 1095 katılımcıdan HBsAg, anti-HBs, anti-HBc IgG (izole) ve anti-HCV pozitif kişi sayısı sırasıyla 60 (%5,5), 250 (%22,8), 132 (%12,1) ve 23 (%2,1) olarak bulundu. Erkek-kadın ve kırsal bölgede-kentte yaşayanlar arasında hepatit B ve C marker pozitiflikleri arasında istatistiksel olarak anlamlı fark saptanmadı. HBs Ag pozitifliği akraba evliliği hikayesi olanlarda yüksek bulundu.* ***Sonuç:*** *Tokat ilinde hepatit B ve C seroprevalansı ülkemizde daha evvel elde edilmiş oranlara nispeten benzer bulunmuştur. Çalışmamızda saptanan akraba evliliği hikayesinin hepatit B sıklığıyla ilişkisi dikkat çekicidir.*

Anahtar kelimeler: Hepatit B, hepatit C, prevalans çalışması, populasyon

INTRODUCTION

Hepatitis B (HBV) and hepatitis C (HCV) viral infections are considered major health problems worldwide. These viruses are associated with chronic hepatitis, cirrhosis, and hepatic failure

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and may progress to hepatocellular carcinoma. It is estimated that there are more than two billion people infected with HBV and 170 million infected with HCV worldwide (1, 2). Areas with low levels of endemicity for HBV include North America, Western Europe and Australia. In areas where the prevalence is high, such as Southeast Asia, China, and Africa, more than 8% are chronic carriers of HBV (3). There is a relatively low prevalence of HCV antibodies in blood donors from the United States and Northern Europe (including the United Kingdom, France, and Germany), and the highest prevalences have been reported in the Ukraine and in some central African countries (4). In our country, HBV and HCV prevalence has been investigated in various groups (voluntary blood donors, health care workers, healthy individuals admitted to the hospital, etc.) (5-9). However, at present, there are only a few studies relevant to the epidemiology of these infections in the normal healthy population (10, 11).

In this study, we aimed to determine the seroprevalence of HBV and HCV as well as the frequency of isolated anti-HBc IgG positivity among a normal healthy population in a northern province of Turkey.

MATERIALS AND METHODS

This study was conducted in 70 areas (12 urban and 58 rural) in the province of Tokat, which is in the Black Sea region of Turkey, with about 530,000 inhabitants 18 years and older. All urban regions and some of the rural regions selected by the cluster sampling method were included in the study. The study population of 1,095 subjects (541 male and 554 female; urban 555 and rural 540) was selected by a random sampling method among 530,000 individuals. All subjects gave informed consent, and the study protocol was approved by the Ethics Committee of Gaziosmanpaşa University. These individuals were interviewed face to face by an internist. Demographic data were obtained, a physical examination was performed, and blood samples were drawn for each subject after an 8–12 h fasting period.

The blood samples were tested for HBsAg, anti-HBs, anti-HBc IgG, anti-HCV, and alanine aminotransferase (ALT). Hepatitis B serologies were determined using a Bio-Rad Kit (France). Anti-HCV was determined using third-generation tests and a Radim Kit (Italy). Individuals who were positive for anti-HBc IgG but negative for HBsAg and anti-HBs were considered to have "isolated anti-HBc IgG positivity". Levels of plasma ALT were determined using a Dimension Clinical Chemistry System (Dade Behring Inc.; Newark, DE, USA). The upper limit of the normal range for ALT was 55 U/L, as listed by the test manufacturer.

Statistical analysis

Data are expressed as the mean±SD. We compared the results of serologic tests between males and females with and without residence using the chi-square test. p values less than 0.05 were considered statistically significant.

RESULTS

The mean age of all participants was 41.4±17 years (range, 18–95). HBsAg, anti-HBs, anti-HBc IgG (isole) and anti-HCV were detected in 60 (5.5%), 250 (22.8%), 132 (12.1%), and 23 (2.1%) individuals of the 1,095 study participants, respectively. In these groups, the rates of male/female were 30/30, 129/121, 74/58, and 9/14, respectively. The normal ALT rate in participants who were HBsAg-positive was 88.3% (n: 53) and in participants who were anti-HCV-positive was 78.3% (n: 18). The mean values of serum ALT levels for HBsAg-negative and -positive individuals were 41.1±15.5 U/L and 44.0±14.7 U/L, respectively, with non-significant differences (p=0.161). The mean values of serum ALT levels for anti-HCV-negative and -positive individuals were 41.1±15.2 U/L and 49.5±22.3 U/L, with significant differences (p=0.010), respectively.

We did not find statistically significant differences between men and women or those living in rural versus urban areas for hepatitis B and C markers (Tables 1 and 2).

Table 1. Comparison of hepatitis markers according to gender

	Male (n = 541)	Female (n = 554)	p value	Chi-square
HBsAg	30	30	0.925	0.009
Anti-HBs	129	121	0.430	0.624
Anti-HBc IgG (isole)	74	58	0.076	5.162
Anti-HCV	9	14	0.319	0.992

Table 2. Comparison of hepatitis markers according to residence (rural versus urban areas) of study subjects

	Rural (n = 555)	Urban (n = 540)	p value	Chi-square
HBsAg	32	28	0.673	0.178
Anti-HBs	119	131	0.267	1.233
Anti-HBc IgG (isole)	71	61	0.397	1.848
Anti-HCV	11	12	0.785	0.077

We found that HBsAg-positivity in groups of ages 60 to 69 and anti-HCV-positivity in groups of 70 to 79 years was markedly higher than in others. While this difference was not significant in individuals with HBV, it was significant in individuals with HCV (p=0.328 and p=0.005, respectively) (Table 3).

The rate of HBsAg-positivity in individuals who had a history of marriage to close relatives was higher than in others (p=0.002) (Table 4).

DISCUSSION

Turkey may be considered a region of moderate endemicity for HBV and HCV. HBV has its highest prevalence in the east and southeast regions of the country. Ozsoy et al. (5) evaluated seroprevalence rates in 5,670 blood donors and 702 health care workers. They found that HBsAg and anti-HCV rates were 2.1% and 0.4% in blood donors and 3.0% and 0.3% in health care workers, respectively. Dursun et al. (11) found that prevalence of HCV in the southeastern region of Turkey was 0.6%. Erden et al. (10) found that the prevalences of HBsAg, anti-HBs, and anti-HCV were 6.6%, 28.1%, and 2.4%, respectively, in 1,157 randomly selected patients attending the outpatient clinic. In a metaanalysis from Turkey, it was clarified that the prevalence of HBsAg is lower than 5.2% in blood donors and from 1.7 to 21% in the community (12). In addition, the prevalence of HCV was declared lower than 1.6% in blood donors and from 1.2 to 2.6% in the community (13). However, there are a limited number of studies on the general population regarding the prevalence of hepatitides in Turkey. In our study, we found the prevalences of HBV and anti-HCV higher compared to those in Ozsoy's and Dursun's studies, and lower than in Erden's study. Otherwise, in the present study, we found that the prevalence of HBsAg in our city was higher than another study conducted in another city in the Black Sea region (14).

The isolated anti-HBc IgG seroprevalence rate was found to be 12.1% in our study. It is known that isolated anti-HBc IgG positivity is frequently observed in those co-infected with HBV and HCV (15). However, there was no anti-HCV-positivity in individuals that were anti-HBc-positive in our study.

Dursun et al. (11) showed that there was no difference between the rural and urban regions with respect to HCV prevalence. Similarly, we observed no difference between individuals living in rural versus urban areas for hepatitis B and C markers. These findings support some previous results (16).

The risk for HCV in the age group 35-44 was found

Table 3. Comparison of hepatitis marker positivity in study subjects according to age distribution

			Marker positivity					
Age distribution	**Participants**	**(%)**	**HBsAg**	**(%)**	**Isole Anti-HBc**	**(%)**	**Anti-HCV**	**(%)**
18-29 years	340	(31.0)	22	(6.5)	11	(3.2)	2	(0.6)
30-39 years	238	(21.7)	12	(5.0)	19	(8.0)	2	(0.8)
40-49 years	173	(15.8)	7	(4.0)	23	(13.3)	4	(2.3)
50-59 years	143	(13.1)	5	(3.5)	25	(17.5)	6	(4.2)
60-69 years	118	(10.8)	11	(9.3)	32	(27.1)	4	(3.4)
70-79 years	70	(6.4)	2	(2.9)	20	(28.6)	5	(7.1)
≥80 years	13	(1.2)	1	(7.7)	2	(15.4)	0	(0)

Table 4. The relationship between the history of marriage to close relatives and hepatitis markers

	History of marriage to relatives			
	No (n, %)	**Yes** (n, %)	**p value**	**Chi-square**
HBsAg (+)	52 (5.3)	8 (6.9)	0.002	17.531
Anti-HBs (+)	214 (21.9)	36 (31.0)	0.156	6.639
Anti-HBc IgG (+) (isole)	120 (12.3)	12 (10.3)	0.471	7.623
Anti-HCV (+)	22 (2.2)	1 (0.9)	0.913	0.979

to be higher than in others (11).

Interestingly, anti-HCV-positivity risk in the age group of 70 to 79 was significantly higher than in the age groups of 18 to 29 and 30 to 39. Similarly, we found that HBsAg-positivity in the age group of 60 to 69 was higher than others, but the difference was not significant.

The seroprevalence of hepatitis B and C in blood donors decreased markedly in Turkey between 1989 and 2004 (6). In our individuals, seroprevalence of hepatitis C began decreasing in those younger than 50. This finding may indicate that seroprevalence of hepatitis C has decreased in our population.

We observed that the rate of HBsAg-positivity in individuals with a history of marriage to close relatives was higher than in others in our study.

In conclusion, we found that the seroprevalences of hepatitis B and C in a northern province of Turkey are similar to averages of other studies that were conducted in different regions of our country. The rate of HBsAg prevalence in individuals with a history of marriage to close relatives was higher.

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