



# Seroprevalence of Hepatitis B and C among Patients Admitted to a Tertiary Hospital

Bir Eğitim Hastanesine Başvuran Hastalar Arasında Hepatit B ve C Seroprevalansı

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## ABSTRACT

**Objectives:** To evaluate seroprevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) among patients admitted to a tertiary hospital in southeast Turkey.

**Materials and Methods:** A retrospective study of patients admitted to the Diyarbakır Training and Research Hospital during February 2010 and July 2011. The study population consisted of patients who gave blood and tested for HBV and HCV. Data were collected from the database of our hospital. Data were analyzed using SPSS program.

**Results:** A total of 43.131 patients tested for hepatitis B surface antigen (HBsAg) were included in this study. 4.472 patients (10.4%) were positive for HBsAg (6.8% male, 3.6% female,  $p < 0.05$ ). 323 (1.2%) of 28.276 patients, who underwent anti-HCV testing, were positive for anti-HCV. 381 (13.1%) of 2.899 HBsAg-positive patients were positive for hepatitis B e antigen (HBeAg).

**Conclusion:** Although similar to that in the other regions of Turkey, the seroprevalence of hepatitis B is still high. Community awareness about the transmission and prevention of hepatitis B infection should be strengthened by health education. (Viral Hepatitis Journal 2014; 20(3): 120-124)

**Key words:** Hepatitis B, hepatitis C, seroprevalence

**Conflict of interest:** The authors reported no conflict of interest related to this article.

## ÖZET

**Amaç:** Türkiye'nin güneydoğusunda bir eğitim hastanesine başvuran hastalarda hepatit B ve C seroprevalansını araştırmak.

**Gereç ve Yöntemler:** Şubat 2010-Temmuz 2011 arasında Diyarbakır Eğitim ve Araştırma Hastanesi'ne başvuran hastalar retrospektif olarak değerlendirildi. Hepatit B ve C testi yapılan tüm hastalar çalışmaya dahil edildi. Veriler hastanemizin veri tabanından elde edildi ve SPSS programı kullanılarak analiz edildi.

**Bulgular:** Hepatit B surface antijeni (HBsAg) bakılan toplam 43,131 hasta değerlendirildi. HBsAg pozitif olan 4472 (%10,4) hastanın %6,8'i erkek, %3,2'si kadındı ( $p < 0,05$ ). Hepatit C virüs antikoru (anti-HCV) bakılan 28,276 hastanın 323'ü (%1,2) pozitif. HBeAg bakılan 2,899 hastanın 381'i (%13,1) pozitif.

**Sonuç:** Güneydoğuda HCV seroprevalansı Türkiye'nin diğer bölgelerine benzer oranda olmasına rağmen, hepatit B seroprevalansı hala yüksek orandadır. Hepatit B enfeksiyonunun geçişi ve önlenmesi konusunda halkın farkındalığı halk eğitimleri verilerek güçlendirilmelidir. (Viral Hepatit Dergisi 2014; 20(3): 120-124)

**Anahtar kelimeler:** Hepatit B, hepatit C, seroprevalans

**Çıkar çatışması:** Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemişlerdir.

## Introduction

Viral hepatitis is the common cause of liver diseases. Hepatitis B virus (HBV) and hepatitis C virus (HCV) are among the principal causes of severe liver disease, including hepatocellular carcinoma (HCC) and cirrhosis-related end-stage

liver disease (1). An estimated 400 million people worldwide are living with chronic HBV infection. Each year, an estimated 500.000 people die as a result of cirrhosis and hepatocellular carcinoma caused by chronic infection and, an additional 40.000 people die due to acute hepatitis B. The prevalence of

HBV infection is uneven throughout the world, with significant burdens in Asia, the Pacific Islands, sub-Saharan Africa, the Amazon Basin, and Eastern Europe (2). HBV is highly infectious and transmitted mainly via blood, body-fluid contact, and vertical transmission (3).v

HCV represents a major health problem with approximately 3% of the world population, with more than 170 million people infected. While only 20-30% of individuals exposed to HCV recover spontaneously, the remaining 70-80% develop chronic HCV infection. Moreover, 3-11% of those people will develop liver cirrhosis within 20 years, with associated risks of liver failure and hepatocellular carcinoma (HCC) (4).

Viral hepatitis is one of the most common infectious diseases in our country. HBV is a major health problem in our country, especially in Eastern and Southeastern Turkey where socio-economic levels are lower (5,6). Approximately 5% of people living in our country (3.5-4 million people) are carriers of HBsAg. Although reduced risk of HBV infection with vaccination programs, it is still important. HCV affects 1% of our society (7,8). The aim of this study was to determine the prevalence of HBV and HCV in healthy people, who attended a training and research hospital in Southeastern Turkey, in the light of the literature.

## Materials and Methods

This retrospective study involved patients who were admitted to the Diyarbakır Training and Research Hospital in Diyarbakır (population 1.5 million) between February 2010 and July 2011. Diyarbakır Training and Research Hospital is 1067-bed tertiary state hospital serving in Diyarbakır in the Southeastern Region of Turkey. It serves as a referral centre for patients from surrounding cities (Muş, Bingöl, Mardin, Batman, Siirt, Şırnak). The study population consisted of patients who received blood for HBV and HCV at Diyarbakır Training and Research Hospital from February 2010 to July 2011. Data were collected from database of our hospital. Serum samples were obtained to study hepatitis B surface antigen (HBsAg), antibody to hepatitis B surface antigen (anti-HBs), hepatitis B e antigen (HBeAg), antibody to HBeAg (anti-HBe), and antibody to hepatitis C virus (anti-HCV) assays by enzyme-linked immunosorbent assay (ELISA) (Roche, USA) in the microbiology laboratory at the Diyarbakır Training and Research Hospital. All collected data were analyzed using the SPSS program. Differences in proportions were evaluated by Pearson's chi-square and, a p value of <0.05 was considered statistically significant.

## Results

A total of 43131 patients tested for HBsAg were included in this study. Of these, 22272 (51.6%) were males and 20859 (48.4%) were females. The average age of the patients was 39.9±18 years. Of the 43131 patients, 4472 (10.4%) were positive for HBsAg (6.8% male, 3.6% female). The average age of the patients was 37±15 years. Of the 28276 patients were tested for anti-HCV assay, 15238 (53.9%) were male and 13038 (46.1%) were female. Their mean age was 39.4±19.7 years. The positivity of anti-HCV was determined in 323 (1.2%) patients. The mean age of these patients was 49.7±19 years. 2899 (64.8%) of the 4472 HBsAg seropositive subjects were tested for HBeAg. 381(13.1%)

of 2899 HBsAg positive patients were tested positive for HBeAg assay. The other 2518 patients were identified as HBeAg-negative, anti-HBe positive. Of the 381 HBeAg positive subjects, 256 were males (67.2%) and 125 were females (32.8%).

## Discussion

This study is one of the most comprehensive studies examining HBV and HCV seroprevalence in Diyarbakır, a city in Southeast Turkey. We sought to determine the seroprevalence of HBV and HCV in healthy people who visited our hospital. HBV and HCV infections are common all over the world, and are important community health problems in developing countries. Viral hepatitis in Turkey is one of the most common infectious diseases. HBV is especially a major health problem (9). Each year, 10.000 to 15.000 people are lost as a result of cirrhosis and complications of chronic hepatitis and, 5000 people die due to HCC (hepatocellular carcinoma) in our country. Chronic hepatitis B (CHB) and chronic hepatitis C (CHC) treatment is very expensive. Hospital beds occupied for a long time cause a financial loss (7).

HBV carriers vary by region, however, Turkey is considered among moderately endemic areas. The studies were made in our country are shown in Table 1 (10,11,12,13,14,15,16,17,18, 19,20,21,22,23,24,25,26,27,28,29,30,31,32,33). According to the results of the studies, the seropositivity has been reported to be between 25% and 60% in our country. Studies from the different parts of our country have reported different percentages for HBsAg positivity, however, the average prevalence has been considered to be at 7.1%. The screening rate for HBsAg positivity in the general population is between 1.7% and 21% (34). In the Western Provinces of Turkey, HBsAg positivity was reported to be lower than in the Eastern Provinces (35). Dursun et al. (36) reported HBsAg positivity of 7% in their study covering Diyarbakır, Şanlıurfa, Batman and Mardin provinces. Karabay et al. (37) reported HbsAg positivity rate of 2.85% in 4234 people. Demir et al. (38) found HbsAg positivity rate of 3.5% in Isparta. In our study, HBsAg positivity rate was determined to be 10.4%.

Our study revealed higher rate of HBsAg seropositivity in males than in females (p<0.05). These results are similar to those reported in recent studies from other parts of Turkey (14,39). The reason for this may be due to high rates of risk factors for HBV in men.

In general, the natural course of chronic HBV infection consists of 4 phases, although not all patients go through all phases. The initial immune-tolerant phase is characterized by the presence of HBeAg, high serum HBV DNA levels, and persistently normal levels of alanine aminotransferase (ALT). Most patients in the immune tolerant phase have minimal liver injury, and prognosis is favorable during follow-up up to 10 years. There is usually no, or only minimal, disease progression while serum ALT concentrations remain normal. This is followed by an immune clearance phase when the HBeAg-positive patients have raised ALT levels. During this phase, spontaneous HBeAg seroconversion occurs at a rate of 10-20% per year. HBeAg seroconversion is frequently, but not always, accompanied by a sudden increase in ALT levels. Patients who undergo spontaneous HBeAg seroconversion before the age of 40 have a good prognosis. They then enter an inactive (carrier) phase, which is characterized by the absence of HBeAg,

<b>Table 1.</b> HBsAg and anti-Hepatitis C virus positivity in the different regions of our country					
<b>Publication, author, year, (Ref)</b>	<b>Cases, n</b>	<b>Male/Female</b>	<b>Region</b>	<b>HBsAg (%)</b>	<b>Anti-Hepatitis C Virus (%)</b>
Erden et al. 2003 (10)	1000	322/678	İstanbul	9.6	2.1
Kurt et al. 2003 (11)	3515	1970/1545	Ankara	5.5	0.5
Kacar et al. 2003 (12)	384	195/189	Erzurum	9.1	NA
Tosun et al.2003 (13)	568	0/568	İzmir	3.5	
	392	0/392	İzmir		0.5
Kacmaz et al. 2003 (14)	4196	1567/2629	Ankara	1.9	0.3
Tekay et al. 2006 (15)	2335	0/2335	Şanlıurfa	5.1	
	2066	0/2066	Şanlıurfa		0.9
Tekay et al. 2006 (16)	3633	NA	Hakkari	2.7	
	3854	NA	Hakkari		1
Demirturk et al. 2006 (17)	1320	606/714	Afyon	6.6	2.2
Sacar et al. 2007 (18)	480	130/350	Denizli (Acıpayam)	10.6	NA
Madendag et al. 2007 (19)	123 565	0/123565	Ankara	2.06	
	86724	0/86724	Ankara		0.15
Karaca et al.2007 (20)	7237	2570/4677	İzmir	1.35	NA
Asan et al. 2007 (21)	6478	3164/3314	Tunceli	4.22	
	6187	3046/3141	Tunceli		0.95
Yildirim et al. 2009 (22)	1095	541/554	Tokat	5.5	2.1
Kurdoglu et al. 2009 (23)	4870	0/4870	Van	1.54	
	2397	0/2397	Van		0.54
Akcam et al. 2009 (24)	2852	967/1885	Isparta	2.5	1
Motor et al. 2010 (25)	12969	0/12969	Hatay	1.6	
	12784	0/12784	Hatay		0.4
Tunc et al. 2011 (26)	10630	NA	Siirt	10	
	7711	NA	Siirt		0.62
Günel et al. 2011 (27)	3782	1498/2283	Tokat	3.4	
	3736	1484/2251	Tokat		2.2
Kandemir et al. 2011 (28)	2800	1372/1428	Mersin	4.1	1.1
Baryaman et al. 2011 (29)	1700	1197/503	İstanbul	2.1	NA
Coskun et al. 2011 (30)	795	0/795	İstanbul	3.65	0.75
Demirpence et al. 2012 (31)	11131	5956/5175	Batman	12.6	
	9666	5230/4436	Batman		1.9
Cetinkol et al. 2012 (32)	12965	8755/4210	Kars	4.6	
	11763	7468/4295	Kars		1.5
Cicek et al. 2012 (33)	56275	0/56275	Şanlıurfa	3.6	
	16858	0/16858	Şanlıurfa		0.8
Our article	43131	22272/20859	Diyarbakır	10.4	
	28276	15238/13038	Diyarbakır		1.2

NA: Not available

the presence of HBe antibody (anti-HBe), persistently normal ALT levels, and low or undetectable levels of serum HBV DNA. Patients in this phase have a favorable prognosis (39). In our study, 13.1% (381 patients) of the HBsAg-positive subgroup (2899 patients in

total) were seropositive for HBeAg. The Mediterranean area and Middle East and Asian countries have the highest proportions worldwide of HBeAg-negative chronic HBsAg carriers (40,41). The precise seroprevalence of HBeAg in chronic HBsAg carriers in

Turkey is unknown because no study to date has involved adequate numbers of such patients. Demirturk et al. (17) found HBe Ag positivity as 9% in Afyon.

Although HCV is endemic worldwide, there is a large degree of geographic variability in its distribution. Countries with the highest reported prevalence rates are located in Africa and Asia; areas with lower prevalence include the industrialized nations. In the European Region, the prevalence of HCV in the general population varies from 0.4% in Sweden, Germany, and The Netherlands to more than 2-3% in some Mediterranean countries (42). In our country, anti-HCV prevalence varies between 0.3 and 1.8% in blood donors (43). A study on the prevalence of anti-HCV conducted in our region has found the similar ratios (44). In our study, the rate of anti-HCV positivity was 1.2%.

In conclusion, in order to determine the actual prevalence of HBV and HCV in more comprehensive, multi-center studies are needed, especially in endemic regions. Thus, the development of preventive strategies will be provided. Our findings suggest that the incidence of hepatitis B infection is still high in Southeast of Turkey, especially in males. Immunization and public education about the transmission, prevention and awareness of viral hepatitis infection should be strengthened.

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