

Seroprevalence of hepatitis B and C viruses, HIV, and syphilis infections among engaged couples

Ahmet Alim, PhD, Muge O. Artan, PhD, Zeynep Baykan, MD, Betul A. Alim, MSc.

ABSTRACT

الأهداف: تقييم الانتشار المصلي لالتهاب الكبد الفيروسي نوع B و C، فيروس نقص المناعة HIV والتهابات داء الزهري بين المقدمين على الزواج.

الطريقة: أجريت دراسة علي شريحة مقطعية للمقدمين على الزواج والذين أدرجوا في 20 مركزا صحيا، مركزا واحد للأمومة والولادة ومديرية الصحة بمدينة سيفاس - مركز المدينة الأناضولية - تركيا، خلال الفترة ما بين مايو وحتى سبتمبر 2005م. تم تقييم الانتشار المصلي لالتهاب الكبد الفيروسي نوع (HB) B، المستضد السطحي (HBsAg)، مستضد (HBs)، مستضد (HCV)، مستضد فيروس نقص المناعة المكتسبة (HIV) وداء الزهري. تم فحص عينات 1.332 مشارك من 666 زوج.

النتائج: تراوح عمر الأفراد ما بين 15-74 عاماً ومعظمهم (38.4%) كانت أعمارهم ما بين 25-29 عاماً. من بين 1332 فرداً، 22 فرداً (1.7%) كانوا مصابين بمستضد (HBsAg)، و18 فرداً (1.4%) كانوا مصابين بمستضد (HBs)، فرداً واحداً (0.1%) كان مصاباً بالتهاب الكبد الفيروسي نوع (HCV)، فرداً واحداً (0.1%) كان مصاباً بفيروس نقص المناعة المكتسبة (HIV) وفرداً واحداً (0.1%) كان مصاباً بداء الزهري. لم يكن هنالك فروقات إحصائية بين انتشارات الإصابات المصلية وفقاً لمجموعات نوع الجنس والعمر ($p>0.05$).

خاتمة: في بلادنا، يجب على الأزواج الحصول على شهادة الزواج التي تشمل على تقرير صحي يحتوى على نتائج الفحوصات المذكورة أعلاه. نعتقد أن نموذج الفحص هذا جيد جداً لتحديد الالتهابات المهمة. يجب على الأزواج حول العالم بأكمله إجراء الفحوصات لهذه الالتهابات قبل الزواج لكي يتم الاهتمام بالمخاطر.

Objectives: To evaluate seroprevalences of hepatitis B and C viruses, human immunodeficiency virus (HIV), and syphilis infections among engaged couples.

Methods: This is a cross-sectional study of all engaged couples enrolled at 20 Health Centers and one Maternity Center of Sivas Health Directorate between May and September 2005 in Sivas, a central Anatolian city, in Turkey. Seroprevalences of hepatitis B (HB) surface

antigen (HBsAg), hepatitis B surface antibody (anti-HBs), anti-hepatitis C virus (HCV), anti-human immunodeficiency virus (anti-HIV), and syphilis was assessed. Serum samples of 1,332 participants of 666 couples were investigated.

Results: Age range of subjects was 15-74, and most (38.4%) were between 25-29 years. Out of 1,332 individuals, 22 (1.7%) were HBsAg positive, 18 (1.4%) were anti-HBs positive, one (0.1%) was anti-HCV positive, one (0.1%) was HIV positive, and one (0.1%) was syphilis positive. There was no statistical differences between their seroprevalence positivities regarding gender and age groups ($p>0.05$).

Conclusions: In our country, couples should obtain a marriage certificate that includes a health report that contains the tests mentioned above. We think that this is a very good screening model for important infections. In couples all around the world, screening of these infections needs to be performed before marriage to be aware of the risks.

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From the Department of Public Health Laboratory (Alim A), Sivas Health Directorate, Sivas, Department of Health Services (Artan), Halil Bayraktar Health Services Vocational School, and the Department of Medical Education (Baykan), Erciyes University, Kayseri, Department of Health Services (Alim B), Hacettepe University Faculty of Dentistry, Ankara, Turkey.

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Address correspondence and reprint request to: Dr. Ahmet Alim, Public Health Laboratory, Sivas Health Directorate, Sivas, TR-58050, Turkey. Tel. +90 (346) 2253514. Fax. +90 (346) 2245125. E-mail: alim58@gmail.com

Hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), and syphilis are known public health problems through parts of Eastern Europe and Central Asia.¹⁻⁵ In this world, there are 2 billion people infected with HBV, 360 million with chronic infection, and 600,000 died each year from HBV-related liver disease or

hepatocellular carcinoma.¹ Although, there are only few regions of the world that are studied, more than 170 million persons were accepted as infected with the HCV virus worldwide. Acute HCV infection that is the result of sexual and household exposure to HCV was reported in approximately 10-15%.^{2,4} Acquired immunodeficiency syndrome (AIDS) is one of the most important mortality causes in the world, although it is not endemic in our country.⁵ In Turkey, according to the June 2004 statistics of the Ministry of Health, there were 1,802 HIV positive patients cumulatively, 76% of them are sexually active and social individuals aged between 15-49 years. From a total number of HIV positive individuals, approximately 800 of these were AIDS patients.³ Syphilis is also one of the important global health problems, and more than 12 million cases occur worldwide, especially in underdeveloped countries and Eastern Europe.⁶

In our country, couples applying for marriage should obtain a Health Certificate including status of important infectious diseases such as HBV, HCV, and HIV infections and syphilis. After obtaining the Health Certificate, they can marry; if they do not want these test they have to sign a paper as mentioned in section 136 in Turkish Civil Code.⁷ This has been in practice since March 18, 2002 with the 4,134 numbered circular order of the Turkish Ministry of Health.⁸ In Sivas, there is a private center for engaged couples. They apply to this center before marriage, and all the tests are carried out here. We also have a training center, and there are trained personnel providing information on the infectious diseases and their protection methods to the couples whose tests are positive.

Sivas is a good choice to investigate the prevalence of transmissible infections in Turkey, since it is a city of central Anatolia and there is no significant change its population specifications in recent years. In this region, farming is one of the most common activities, and people usually consume dairy products, and it is the second largest province in Turkey. The aim of this study is to evaluate seroprevalences of HBV, HCV, and HIV infections and syphilis among engaged couples in Sivas, a central Anatolian city in Turkey.

Methods. This is a cross-sectional study of all engaged couples enrolled at 20 Health Centers and one Maternity Center of Sivas Health Directorate between May and September 2005 in Sivas, a central Anatolian city in Turkey. Approximately 817 couples attended these centers for completion of application for marriage. Out of 1,332 individuals, the mean age of women was 24.5 (18-65) and men was 29.0 (18-71). The ratio of subjects in each group is shown in Figure 1. Most of

the group was in young age groups. Samples of 1,332 healthy individuals of 666 couples (81.5%) were tested in Sivas Public Health Laboratory after their written approval to enter the study. Ethical approval to carry out this study was given by the local ethics committee of Sivas Health Directorate. Couples that obtained their Health Certificate from other cities (100 couples) and did not give approval for the study (51 couples) were not included. Blood samples were collected aseptically in 5 ml red top vacutainers and left to clot. Sera specimens were separated after centrifugation, aliquoted into tubes and stored at -20°C until the time for assay. The blood samples were tested for antibodies against HBV, HCV, HIV, and *Treponema pallidum*, and also HBsAg by standard techniques. All positive specimens were further tested by confirmation assays. Hepatitis B surface antigen (HBsAg) was detected by Abbott AxSYM [HBsAg (V2), Abbott Laboratories, Diagnostic Division, Abbott Park, Illinois, USA]. Confirmation was carried out by Elecsys HBsAg II (Roche, Basel, Switzerland) test. Anti-HBs was detected by Abbott AxSYM (Abbott Laboratories, Diagnostic Division, Abbott Park, Illinois, USA), and the confirmation was carried out by Elecsys Anti-HBs (Roche, Basel, Switzerland) test. Screening for anti-HCV antibodies was performed by Abbott AxSYM (3.0, Abbott Laboratories, Diagnostic Division, Abbott Park, Illinois, USA), and Western Blot (HCV BLOT 3.0, Genelabs, Singapore) was used for confirmation. Screening for anti-HIV antibodies was carried out by using the following test systems: Abbott AxSYM (Ag/Ab, Combo, Abbott Laboratories, Diagnostic Division, Abbott Park, Illinois, USA), and HIV Western Blot (HIV BLOT 2.2 Western Blot Assay, Genelabs, Singapore) was used for confirmation. Diagnostics of syphilis were performed by Ultra Syphilis test (ACON Biotech Co., Ltd., Hangzhou, China), and Syphilis TPHA test (Chronolab, Switzerland).

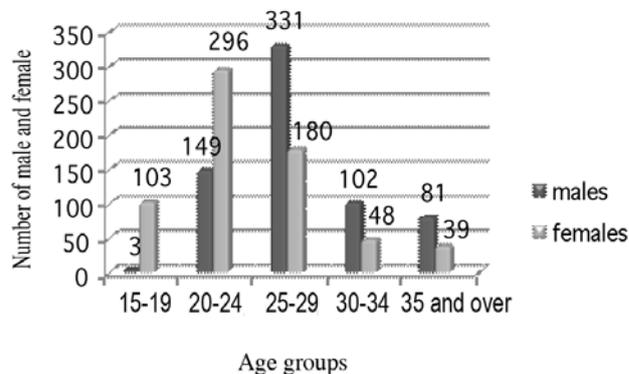


Figure 1 - Age group distribution of the study group by gender.

Statistical analysis. The seroprevalences of HBV, HCV, HIV, Anti-HBs, and syphilis were expressed in percentages for the entire study population by age and gender. Ratios of HBsAg and anti-HBs were analyzed by chi-square test. A *p*-value of less than 0.05 was considered significant.

Results. Table 1 shows the distribution of markers in the study population. There was no statistically significance between genders with regard to the HBsAg positivity (*p*=0.131). Figure 2 show the HBsAg

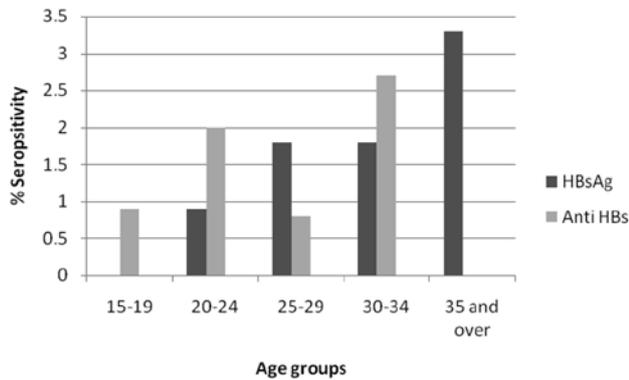


Figure 2 - Hepatitis B surface antigen (HBsAg) and anti-HBs seropositivity according to age groups.

and anti-HBs seropositivities according to age groups. No statistical difference was found among the age groups with regard to the HBsAg positivity (*p*=0.284). No one was HBsAg in the 15-19 age group, or anti-HBs positive in the ≥35 age group. All the people who had HBsAg positivity had negative anti-HBs results. There was no statistically significance between genders with regard to the anti-HBs seropositivity (*p*=0.478). Anti-HBs positivity among age groups is shown in Figure 2, and the difference among groups was not statistically significant (*p*=0.167).

Discussion. This study was carried out for assessment of the seroprevalences of HBV, HCV, and HIV infections and syphilis among engaged couples in a central Anatolian city. In our study population, the prevalence of HBV was 1.7%, HCV was 0.1%, HIV was 0.1%, and syphilis was 0.1%. Seroprevalences of HBV according to age groups and gender was comparable. The seroprevalence of HBsAg increased according to the age of the study population. It may be caused by occupational or environmental factors increasing the risk of being infected. Turkey is accepted as a middle-endemic region (2-10%) for hepatitis B, and there are some studies on HBsAg prevalence on different populations.⁹ Mutlu et al¹⁰ studied 29,049 volunteer blood donors who were admitted to the Blood Center of Kocaeli University Hospital and found

Table 1 - Distribution of the markers in 666 couples.

Markers	n	Males		Females			Total	
		% of total	% of males	n	% of total	% of females	n	(%)
<i>HbsAg</i>								
Negative	651	(49.7)	(97.7)	659	(50.3)	(98.9)	1310	(98.3)
Positive	15	(68.2)	(2.3)	7	(31.8)	(1.1)	22	(1.7)
<i>Anti-HBs</i>								
Negative	655	(49.8)	(98.3)	659	(50.3)	(98.9)	1314	(98.6)
Positive	11	(61.1)	(1.7)	7	(38.9)	(1.1)	18	(1.4)
<i>Anti-HCV</i>								
Negative	665	(50.0)	(99.8)	666	(50.0)	(100.0)	1331	(99.9)
Positive	1	(100.0)	(0.2)	0	-	-	1	(0.1)
<i>Anti-HIV</i>								
Negative	665	(50.0)	(99.8)	666	(50.0)	(100.0)	1331	(99.9)
Positive	1	(100.0)	(0.2)	0	-	-	1	(0.1)
<i>Anti-syphilis</i>								
Negative	665	(50.0)	(99.8)	666	(50.0)	(100.0)	1331	(99.9)
Positive	1	(100.0)	(0.2)	0	-	-	1	(0.1)

HbsAg - Hepatitis B surface antigen, Anti-HBs - HB surface antibody, Anti-HCV - antibodies to HCV, Anti-HIV - antibodies to HIV, and Anti-syphilis - antibodies to *Treponema pallidum*. There was no significant difference with regard to HbsAg and anti-HBs between male and female subjects (*p*=0.131 and *p*=0.471). For other parameters, statistical comparison was not performed due to low case number

2.3% HBsAg positive. These studies were planned on large populations, especially on male gender and took a long-term. Kocak et al¹¹ studied the blood donors over 17 years of age in Istanbul and found that the rates fell from 6% in 1987 to 2% in 2003. Emekdas et al¹² found HBsAg prevalence as 4.2% among blood donors from 22 Red Crescent Centers in Turkey. Nas et al¹³ evaluated pregnant women and found 1.3% HBsAg positive. Papaevangelou et al¹⁴ showed that the carrier rate of HBsAg in the blood donor and army recruit samples ranged between 0.8% and 1.0% in Southern Cyprus. Matee et al¹⁵ studied 1,599 consecutive donors and found 8.8% HBsAg seropositivity in Tanzania. Butashvili et al¹⁶ showed that the carrier rate of HBsAg 4.1% in New York, USA.

In the present study, we evaluated the HBsAg prevalence among couples who were going to marry soon, and the ratio was 1.7%. The investigators, except Nas et al¹³ studied blood donors and the groups were large. We know also that age and gender affect the ratios.^{17,18} Our results could be attributed to good infection control and vaccination program against hepatitis B in Turkey, in the last 10 years. Anti-HCV positivity has been reported as 0.2-6% worldwide.¹⁹ In Turkey, similar to our study this was reported to be 0.6% between 1992 and 1999.²⁰ Kocak et al¹¹ studied 1,773,943 donors and found anti-HCV seropositivity in approximately 0.5%. Altindis et al¹⁷ studied 17,545 cases (13,546 males and 3,999 females) and found 0.5% anti-HCV seropositivity.

In Turkey, the majority of initial cases of HIV/AIDS originate from foreign countries. The proportion of HIV infections due to contaminated blood or blood product has been estimated to be 3-5% worldwide, and it is 3.1% in our country.¹¹ Kocak et al¹¹ screened HBV, HCV, HIV, and syphilis. They found that HBsAg rates fell from 6% in 1987 to 2% in 2003 and that anti-HCV seropositivity was approximately 0.5%, whereas anti-HIV seropositivity was approximately 0.001%. They also found that syphilis seropositivity were 0.04% in 1987, and increased to 0.2% in 2002. They concluded that the decreasing trends observed in the data from the 17 year period of study indicates the value of safety measures taken, particularly the implementation of donor screening procedures in 1997. Altindis et al¹⁷ determined the prevalence of HBV, HCV, and HIV infections among a normal population and Turkish soldiers in Northern Cyprus. They found that HBsAg positivity rate was 2.5%, anti-HCV was 0.5%, anti-HIV was 0.0%, HBV DNA was 2.25%, and HCV RNA was 0.3% in all groups. They concluded that seroprevalences of blood-borne diseases in Northern Cyprus are similar to those of Turkey. Mutlu et al¹⁰ investigated that serological markers for HBV, HCV,

HIV, and *Treponema pallidum* in blood banks. They found that, the seropositivity rates for HBsAg was 2.3%, anti-HCV was 0.37%, and rapid plasma reagin was found positive as 0.02%. In their study, 8 donors were found seropositive for anti-HIV, but they were all accepted as false positive results, since the western blot confirmation tests were all negative. Bhattacharya et al²¹ studied the seroprevalence and the results reported as 1.6% for HBsAg, 1.26% for anti-HCV, 1.51% for anti-HIV, and 1.17% syphilis infections among 106,695 voluntary blood donors screened in 2005. Hakim et al²² studied 3,820 healthy females (95.5%) and found 4.5% positive for HBsAg, 0.5% positive for anti-HBs, and 5.2% positive for anti-HCV. Although, in an Iran study, HBsAg was positive in 0.6%, and anti HCV was positive in 2.3% in the open elderly nursing home population.²³ Syphilis positivity in blood donors in Turkey was reported 0.04% in 1987 and increased to 0.2 in 2002.¹⁰ Mutlu et al¹⁰ found 0.02% in Kocaeli, Turkey.

In a study, analyzing the Russian Ministry of Health statistics from 1989 to 1996, the number of cases of syphilis increased 48-fold over the study period, rising to above 1% in young women.²⁴ In our study, this ratio was 0.1%. In eastern Europe and the Community of Independent States, women leaving their countries to work as sexual workers in other countries constituted an important risk factor for sexually transmitted diseases.²⁵ In Sivas, Directorate of Health, there is a center in the Public Health Department. This center provides some information to the young person with infectious diseases that is going to marry soon, this center does not follow up if they marry or not, they provide information only on the prevention and the precautions they may take. Only persons with syphilis must be treated before marriage, and this situation is followed up by the authorities. We think that screening of important transmissible infections before marriage is a good model for follow-up of seroprevalences of these infections and their trend in our city. Based on seroprevalences of these infections in cities like Sivas, it is possible to determine a high-risk cities for transmissible infections in Turkey. Further studies are needed to identify the specific risk factors such as socioeconomic status and occupation influencing seropositivities of important infections for public health such as hepatitis B and C, HIV, and syphilis in Sivas and other industrialized cities of Turkey.

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Related topics

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