

# Effect of preventive applications on prevalence of hepatitis B virus and hepatitis C virus infections in West Turkey

Serhan Sakarya, MD, Serkan Oncu, MD, Barcin Ozturk, MD, Selcen Oncu, MD.

---

## ABSTRACT

**Objective:** Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are community health problems in developing countries and the most common causative agents of chronic hepatitis, cirrhosis and hepatocellular carcinoma. This study investigates the prevalence and the effect of preventive applications on prevalence of HBV and HCV infections in blood donors.

**Methods:** Blood donors enrolled to the University and State Hospital Blood Banks in Aydin region of Turkey through the years 1993 to 2002 were retrospectively analyzed. Blood donors were investigated in 2 groups, Group I (1993-1997) and Group II (1998-2002) to compare the prevalence difference in 10-years period. Serum hepatitis B antigen (HbsAg) and anti-HCV were tested by commercially available enzyme-linked immunosorbent assay kits and anti-HCV positive results

were confirmed by recombinant immune blot assays HCV test.

**Results:** The prevalence of HBV and HCV infections was determined as 1.5% and 0.19% over the period 1993-2002. Although, the prevalence of HBV infection declined significantly in Group II (1.17%) in comparison with Group I (2.27%) ( $p < 0.0001$ ), there was no significant difference in both groups regarding HCV infection ( $p = 0.238$ ).

**Conclusion:** Preventive applications against blood transfusion related diseases succeed to decrease HBV infection significantly in West Turkey. Vaccination seems to be the most effective method to prevent hepatitis infection.

Saudi Med J 2004; Vol. 25 (8): 1070-1072

---

**H**epatitis B virus (HBV) and hepatitis C virus (HCV) infections are community health problems in developing countries and the most common causative agents of chronic hepatitis, cirrhosis and hepatocellular carcinoma.<sup>1,2</sup> They are most commonly transmitted through direct contact with infected blood, sexual intercourse with infected individuals and by mother-to-child. The illegal activities, such as the dangerous tradition of needle sharing in intravenous (IV) drug users and uncontrolled commercial sex trade, are other risk factors for the potential for rapid spread of HBV and

HCV infections.<sup>1,3</sup> Prevalence of both HBV and HCV infections differ greatly by country, and even within communities.<sup>4,5</sup> The World Health Organization has estimated that 2 billion HBV and 170 million HCV infected people are living in the global population of the world.<sup>4,6</sup> Since the economic burden of the treatment costs of chronic hepatitis; vaccination, use of disposable medical tools, safe blood and blood product transfusion and education studies have an important role in eradication of HBV and HCV infections.<sup>7</sup> Since most of the blood donors are volunteer replacement

---

From the Department of Infectious Diseases and Clinical Microbiology (Sakarya, Oncu, Ozturk), Adnan Menderes University, Medical Faculty and the Department of Microbiology (Oncu), Adnan Menderes University, Institute of Health Science, Aydin, Turkey.

Received 29th December 2003. Accepted for publication in final form 23rd February 2004.

Address correspondence and reprint request to: Dr. Serhan Sakarya, Department of Infectious Diseases and Clinical Microbiology, Adnan Menderes University, Medical Faculty, 09100 Aydin, Turkey. Tel. +90 (256) 2120020 Ext. 109. Fax. +90 (256) 2146495. E-mail: serhansakarya@yahoo.com

donors in Turkey, prevalence of HBV and HCV infections in blood donors may represent general population's prevalence. In previous reports, HBV and HCV prevalence in general population was comparable to blood donors in Turkey.<sup>8</sup> The present study was designed to evaluate the prevalence and the role of preventive applications on the 10-years course of HBV and HCV infections in voluntary blood donors in West Turkey.

**Methods.** This study was carried out in Aydin, Turkey, a city with an approximately 800 thousand residents. To investigate the prevalence and the effect of preventive applications on the prevalence of HBV and HCV infections, 37,866 blood donors enrolled to the University and State Hospital Blood Banks through the years 1993 to 2002 were retrospectively analyzed. The preventive applications such as use of disposable medical tools, safe blood and blood product transfusion, regular education of population has been regulated by low under control of the Ministry of Health (MOH) since 1990. Moreover, MOH designed a HBV vaccination project and put in practice with high risk groups of the population in 1998. In this project, newborn and preschool children, health care workers, partners or the family members of HBV infected patients, prostitute, nursing home residents and population of hyper-endemic region were accepted as risk groups. According to local Infection Control Office of MOH report, 95% of risk groups have been vaccinated since 1998 to date in Aydin, Turkey. Of the 37,866 donors, 36,574 (96.5%) were male and 1,292 (3.5%) were female. Blood donors were evaluated in 2 groups (Group I [1993-1997], n=11334 and Group II [1998-2002], n=26532) to compare the 10-years course of HBV and HCV infections. All sera were collected at the hospital blood bank facilities, and screened for hepatitis B antigen (HbsAg) and anti-HCV by using commercially available enzyme-linked immunosorbent assay (ELISA) kits. All anti-HCV positive samples were further tested by confirmatory third-generation recombinant immune blot assays (RIBA 3.0).

Statistical analysis was performed with Chi-square test with the aid of Graph Pad Prizm version 2.02 computer program. Any  $p < 0.05$  were considered significant.

**Results.** An overall prevalence of HBV infection was 1.5% and HCV was 0.19%. Hepatitis B virus and HCV co-infection in the same individual were not observed. The prevalence of HBV and HCV infections was similar both in males (1.5% HBV and 0.19% HCV) and females (1.5% HBV and 0.2% HCV). The prevalence of HBV infection was higher in Group I (257 of 11334,

2.27%) than in Group II (311 of 26532, 1.17%) ( $p < 0.0001$ ). However, there was no significant difference in HCV infection prevalence between group I (24 of 11334, 0.21%) and group II (47 of 26532, 0.18%) ( $p = 0.238$ ).

**DISCUSSION.** The Turkish Ministry of Health program mandates HIV, HBV, HCV and syphilis screening for all blood donors. The majority of the blood donors are volunteer replacement donors in Turkey. Replacement donors are individuals recruited by patients who need blood transfusion and they are the healthy family members or friends. For this reason, prevalence of HBV and HCV infections in blood donors is similar to healthy population in Turkey. In previous studies, it was shown that the prevalence of HBV infection varied between different regions in Turkey and decreased from east to west from 10% to 4% with an average rate of 6% of the population.<sup>8-14</sup> In this study, HBV infection was detected in 1.5% of the blood donors. This is significantly lower than the rates reported before in Turkey. We also found a significant decrease in HBV infection rate in the past 5-years in comparison with the previous 5-year period. These variations and decrease in the prevalence were strongly related with the regional characteristic. Aydin region is well-developed region of the west part of Turkey. The population has a high level of education, income and health care system. Vaccination program against HBV, disposable use of needle and medical device, screening of blood donors against blood born disease and education of the population have been seriously applied in this region. Of the neighboring or nearby countries in the Middle East, Bahrain, Iran, Israel, Kuwait and Kingdom of Saudi Arabia, which have reached over 80% of the population with the hepatitis B vaccination as a part of their Expanded Programmed on Immunization (EIP), have shifted to low endemicity region with HBsAg carrier rates of below 2%.<sup>15-17</sup> Cyprus, Iraq, Georgia and the United Arab Emirates are in the intermediate endemicity area with 2-5% rates.<sup>15,18,19</sup> These countries in their EIP reached 68-90% of the population. High endemicity in this region includes Egypt, Jordan, Oman, Palestine and Yemen, in which HBV prevalence range from 2-18.5%.<sup>15,20,21</sup> Our results were similar with the low endemicity areas.

The prevalence of HCV infection ranged between 0.6-2% with an average rate of 1% in previously reported studies in Turkey.<sup>8,12,14,22</sup> In nearby countries, HCV infection prevalence ranges between 0.1-2% for Czech Republic, Poland, Ukraine, Russia, Greece and Italy.<sup>23-25</sup> In endemic regions, a large component of HCV transmission probably occurred through non-sterile medical, dental and other health-care procedures that involved blood-to-blood contact. In Egypt, where

HCV prevalence is greater than 20% in many areas, unsafe injection practices related to mass schistosomiasis eradication campaigns from 1960-1987 appear to have contributed to rapid HCV spread.<sup>26</sup> In our study, the prevalence of HCV infection was also lower than the rest part of the Turkey and other nearby countries as in HBV infection. Although the prevalence of HCV infection was lower in the last 5-year period (0.18%) than the previous 5-years (0.21%), it was not statistically significant. Since the HCV vaccine is not available, the other preventive applications may not be enough to decrease the HCV infection significantly.

In this study, it is obviously seen that preventive applications have lowered the prevalence of HBV and HCV infections in blood donors. The slight decrease in HCV prevalence considers that, the preventive strategies other than the vaccination may not be enough to control the blood born diseases. But, increase in illegal activities, such as the IV drug use and uncontrolled commercial sex trade may slow down the decrease or increase the prevalence of HBV and HCV infections in next 10-years.

## References

1. Lee WM. Hepatitis B virus infection. *N Engl J Med* 1997; 337:1733-1745.
2. Shobokshi OA. Hepatitis C infections. From diagnosis to treatment. *Saudi Med J* 2003; 24 Suppl 2: S65-S66.
3. Lauer GM, Walker BD. Hepatitis C virus infection. *N Engl J Med* 2001; 345: 41-52.
4. Kao JH, Chen DS. Global control of hepatitis B virus infection. *Lancet Infect Dis* 2002; 2: 395-403.
5. Kim WR. The burden of hepatitis C in the United States. *Hepatology* 2002; 36: 30-34.
6. Global surveillance and control of hepatitis C. Report of a WHO Consultation organized in collaboration with the Viral Hepatitis Prevention Board, Antwerp, Belgium. *J Viral Hepat* 1999; 6: 35-47.
7. Sylvan S. WHO spearheads global initiative to eradicate hepatitis B. *Lakartidningen* 2000; 97: 3738-3740.
8. Mistik R, Balik I. Epidemiological analysis of viral hepatitis in Turkey. In: Kilicturgay K, Badur S editors. *Viral Hepatitis*. Ankara (Turkey): VHSD; 2001. p. 9-55.
9. Mistik R, Tore O, Kilicturgay K. Distribution characteristics of hepatitis B surface antigen positivity in Bursa. *Mikrobiyol Bul* 1991; 25: 167-172.
10. Kanra T, Pirnar A. Hepatitis Bs-antigen among blood donors in Ankara. *Turk J Pediatr* 1979; 21: 1-3.
11. Erden S, Buyukozturk S, Calangu S, Yilmaz G, Palanduz S, Badur S. A study of serological markers of hepatitis B and C viruses in Istanbul, Turkey. *Med Princ Pract* 2003; 12: 184-188.
12. Doganci L, Haznedaroglu T. Prevalence of hepatitis A, B and C in Turkey. *Eur J Clin Microbiol Infect Dis* 1992; 11: 661-662.
13. Ariogul S, Akalin E, Kanra T. HBsAg among Turkish blood donors. *Infection* 1987; 15: 456.
14. Aydin F, Cubukcu K, Yetiskul S, Yazici Y, Kaklikkaya N. Retrospective evaluation of HBsAg, anti-HCV, anti-HIV and syphilis reagin antibody seropositivity in blood donors at the Trabzon Farabi Hospital. *Mikrobiyol Bul* 2002; 36: 85-90.
15. Andre F. Hepatitis B epidemiology in Asia, the Middle East and Africa. *Vaccine* 2000; 18: 20-22.
16. Ghavanini AA, Sabri MR. Hepatitis B surface antigen and anti-hepatitis C antibodies among blood donors in the Islamic Republic of Iran. *East Mediterr Health J* 2000; 6: 1114-1116.
17. Ayoola AE, Tobaigy MS, Gadour MO, Ahmad BS, Hamza MK, Ageel AM. The decline of hepatitis B viral infection in South-Western Saudi Arabia. *Saudi Med J* 2003; 24: 991-995.
18. Papaevangelou G, Roumeliotou A, Chatziminis M, Kotsianopoulou M, Ioannou P, Trichopoulou E, et al. Epidemiological characteristics of hepatitis B virus infection in Cyprus. *Eur J Epidemiol* 1988; 4: 150-153.
19. Butsashvili M, Tsertsvadze T, McNutt LA, Kamkamidze G, Gvetadze R, Badridze N. Prevalence of hepatitis B, hepatitis C, syphilis and HIV in Georgian blood donors. *Eur J Epidemiol* 2001; 17: 693-695.
20. Attia MA. Prevalence of hepatitis B and C in Egypt and Africa. *Antivir Ther* 1998; 3: 1-9.
21. Haidar NA. Prevalence of hepatitis B and hepatitis C in blood donors and high risk groups in Hajjah, Yemen Republic. *Saudi Med J* 2002; 23: 1090-1094.
22. Yenen OS, Badur S. Prevalence of antibodies to hepatitis C virus in blood donors and risk groups in Istanbul, Turkey. *Eur J Clin Microbiol Infect Dis* 1991; 10: 93-94.
23. Roth WK, Weber M, Buhr S, Drosten C, Weichert W, Sireis W, et al. Yield of HCV and HIV-1 NAT after screening of 3.6 million blood donations in central Europe. *Transfusion* 2002; 42: 862-868.
24. Zervou EK, Boumba DS, Liaskos C, Georgiadou S, Tsianos EV, Dalekos GN. Low prevalence of HCV, HIV, and HTLV-I/II infection markers in northwestern Greece: results of a 3-year prospective donor study (1995-1997). *Eur J Intern Med* 2003; 14: 39-44.
25. Botte C, Janot C. Epidemiology of HCV infection in the general population and in blood transfusion. *Nephrol Dial Transplant* 1996; 11: 19-21.
26. Quinti I, Renganathan E, El-Ghazzawi E, Divizia M, Sawaf G, Awad S, et al. Seroprevalence of HIV and HCV infections in Alexandria, Egypt. *Zentralbl Bakteriol* 1995; 283: 239-244.