

Prevalence of Hepatitis B, Hepatitis C and HIV and Related Risk Factors in Contact Sportsmen in Zanjan: A Letter to Editor

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Dear Editor,

Hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV are known as major health problems, worldwide. According to the World Health Organization (WHO) reports, there are more than 50 million people with HIV (1). Also, WHO reported a high rate of Hepatitis B and C, which might lead to serious diseases, such as liver cirrhosis and primary liver cancer, among carriers and infected subjects. Hepatitis B, C and HIV are transmitted through similar routes, such as parenteral exposure to blood and blood components and, also, contamination of open wounds or mucous membranes, by infected blood (1, 2). Consequently, in theory, the virus could be transmitted during sport activities and, particularly, during contact sports, because of close contact of the subjects and bleeding due to combat activities and collisions (2). There are also several reports of viral infection among athletes, associated with needle sharing by drug abuser athletes. The first cases of these diseases were reported in 1982, in which five to 10 people from a sum wrestling club, in Japan, were found to be HBV positive (3). Besides, the outbreak of HBV epidemic, via unknown source, among Swedish orienteering athletes, has been reported (4, 5).

Considering the warnings of sports medicine societies, regarding the increasing rate of blood borne viral infections among athletes, more attention was given to this issue. However, there still are many controversies, regarding the vaccination and prevention policies of the athletes (6). Several recent studies aimed to investigate the prevalence of HBV and HCV markers in the population of high risk athletes, such as wrestlers, although

these reports might be influenced by the prevalence of these infections among the nonathletic population of those regions. Considering the existing controversial reports, regarding the prevalence of blood borne infections among combat sports and popularity of wrestling, boxing and judo, in Iran, we designed this pilot study to investigate the prevalence of HCV, HBV and HIV among athletes who are practicing wrestling, boxing and judo.

In this cross-sectional survey, of athletes competing at the provincial champion competitions in Zanjan, Iran, inclusion criteria were: 1) being a member of a wrestling, boxing, or judo club, in Zanjan, with at least 6 months experience of training for the sport, 2) not being previously vaccinated against HBV, 3) age < 30 years old. All 160 athletes (103 athletes in wrestling, 27 in boxing and 33 in judo), who attended the competitions, were asked to participate in the study. Participation in the study was voluntary and all subjects received written and oral information about the study procedures, before participation. The study protocol was approved by the ethical committee of our institution. To collect data, all the subjects were asked to fill out a previously designed questionnaire and, also, two blood samples were drawn from all the athletes. The study questionnaire was designed, based on previous studies and consultation with a group of experts. General characteristics, such as age, height, weight, field of sport, as well as the medical history and risky behaviors of the participants, were asked. Two blood samples were taken from each participant. The samples were sent to the laboratory of our institution, which is approved by the Ira-

nian Blood Transfusion Organization. Sera of all participants were tested for hepatitis B surface antigen (HBsAg), anti-hepatitis B virus core antigen (anti-HBcAg), HCV and HIV antibodies.

In total, blood samples were taken from 160 athletes, participating in combat sports, with the Mean \pm Standard Deviation age of 20 (5.67) years old. All of the subjects completed the questionnaire. About 50% of the athletes had the experience of participation in national competitions, during the past 2 years. Based on the laboratory serum marker study, none of the subjects had HIV or Hepatitis B and C infections. The frequencies of several risk factors of blood borne infections are shown in Table 1 of the study.

Table 1. The Frequency of Several Risk Factors of Blood Borne Infections Among Participants^a

| Condition | Frequency ^b |
|--|------------------------|
| Educational level | |
| High school and below | 137 (86.2) |
| Academic education | 23 (1.8) |
| Field of sports activity | |
| Judo | 33 (20.6) |
| Boxing | 27 (16.9) |
| Wrestling | 103 (62.5) |
| Years of sports experience, y | |
| < 5 | 100 (69.2) |
| 5 - 10 | 29 (15.2) |
| > 10 | 31 (15.6) |
| Level of sports activity | |
| Elite | 73 (46) |
| Amateur | 87 (54) |
| History of blood borne infections in family | |
| Negative | 160 (100) |
| Positive | None |
| History of surgery | |
| Negative | 106 (66.2) |
| Positive | 54 (32.8) |
| Skin scar due to stab wound | |
| Negative | 106 (66.2) |
| Positive | 23 (14.4) |
| History of tattooing | |
| Negative | 145 (91.6) |
| Positive | 15 (9.4) |
| History of blood transfusion | |
| Negative | 160 (100) |
| Positive | None |
| Serum markers | |
| HIV-Ab | None |
| HCV-Ab | None |
| HBsAg | None |

^aAbbreviations: HBsAg: hepatitis B surface antigen; HCV-Ab: hepatitis C virus antibody; HIV: human immunodeficiency virus.

^bValues are reported as No. (%).

In this study, the serum HVB, HVC and HIV, in all 160 recruited subjects, were negative. These findings are in contrast with the previous findings, in this regard. The prevalence of HVB among Cuban athletes has been reported to be 1.3% (7). The study results, of an American football team, revealed that 11 out of 65 were infected with HBV, during a 19-month period (8). Morrison et al. (9) suggested shared steroid syringes, as the possible cause of blood borne infections, among athletes (10). Also, in body building and weight lifting, syringe sharing has been suggested as the possible risk factor for transmission of the viral infections, among athletes (9). Besides, in a study among Turkish wrestlers, a significant relationship between blood HBV DNA and body perspiration was found ($r = 0.52$) (11). In theory, HBV transmission is estimated to be one in 10000 - 50000 thousand contacts, in sport activities (12, 13). However, no transmission of hepatitis B has been reported, during sport activities, as in our study, by the Centers for Disease Control and Prevention (14).

While there are limited data, regarding the transmission of blood borne viral infections among athletes, non-athletic population have been the subject of many studies. A study on the prevalence of HBV and HCV, in servicemen, suggests that out of 370 subjects, 2.2% and 0.8% had positive HBVAg and anti-HCVAg antibody, respectively. The comparison between the risk factors of transmission of viral infections, between the athletic and non-athletic population, showed that the history of surgery and blood injections are less common among athletes.

Reports regarding the prevalence of blood borne infections, in different societies, could be influenced by the prevalence of these infections among the nonathletic population of those regions. A study performed on blood donators in Tehran (12%), Guilan (45%) and Ardabil (4%), showed that history of surgery and dentistry were the main causes of infection, among subjects with positive markers (15). The infection rate in health workers were 0.29% - 6.5%, 1.8% - 10% and 2% - 40% for HIV, HCV and HBV, respectively (16). In a meta-analysis conducted by Alavian et al. (17), it was shown that the prevalence rate of hepatitis had increased and ranged 1.2% - 4.7%, in different parts of the country. The mean prevalence rate of hepatitis B was reported to be 2.5% in the country (17, 18). The lower prevalence of blood borne infections, in Zanjan province, might be explained as another cause of low prevalence rate of these infections among subjects. Similar to our findings, a study conducted on Australian football players indicated no case of hepatitis B infection among the athletes. This might be due to the low prevalence rate reported from Australia, which is reported to 0.16% percent among blood donators (19). The role of sports activity, in improvement of the immune system, has also been suggested as possible cause of lower rate of viral infections among athletes.

The results of the current survey showed no case of HBV, HIV and HCV among subjects. This could be considered as a starting point for future studies, which should be run

among nonathletic and athletic populations of Zanjan province, to provide effective and sports specific preventive protocols, for athletes.

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Footnotes

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References

- Kordi R, Neal K, Pourfathollah AA, Mansournia MA, Wallace WA. Risk of hepatitis B and C infections in Tehranian wrestlers. *J Athl Train*. 2011;**46**(4):445-50. [PubMed: 21944078]
- Mast EE, Goodman RA, Bond WW, Favero MS, Drotman DP. Transmission of blood-borne pathogens during sports: risk and prevention. *Ann Intern Med*. 1995;**122**(4):283-5. [PubMed: 7825765]
- Kashiwagi S, Hayashi J, Ikematsu H, Nishigori S, Ishihara K, Kaji M. An outbreak of hepatitis B in members of a high school sumo wrestling club. *JAMA*. 1982;**248**(2):213-4. [PubMed: 7087113]
- Karjalainen J, Friman G. Blood-borne pathogens in sports. *Ann Intern Med*. 1995;**123**(8):635-6. [PubMed: 7677312]
- Ringertz O, Zetterberg B. Serum hepatitis among Swedish track fencers. An epidemiologic study. *N Engl J Med*. 1967;**276**(10):540-6. doi: 10.1056/NEJM196703092761003. [PubMed: 6019763]
- Kordi R, Wallace WA. Blood borne infections in sport: risks of transmission, methods of prevention, and recommendations for hepatitis B vaccination. *Br J Sports Med*. 2004;**38**(6):678-84. doi:10.1136/bjism.2004.011643. [PubMed: 15562159]
- Rodriguez Lay LL, Diaz Mendiondo B, Aragon Rodriguez U, Delgado G, Ante G, Barrios Olivera J. [Infection by hepatitis B and C viruses in high-performance athletes]. *Rev Cubana Med Trop*. 1997;**49**(3):222-4. [PubMed: 9685992]
- Tobe K, Matsuura K, Ogura T, Tsuo Y, Iwasaki Y, Mizuno M, et al. Horizontal transmission of hepatitis B virus among players of an American football team. *Arch Intern Med*. 2000;**160**(16):2541-5. [PubMed: 10979068]
- Morrison CL. Anabolic steroid users identified by needle and syringe exchange contact. *Drug Alcohol Depend*. 1994;**36**(2):153-5. [PubMed: 7851283]
- Human immunodeficiency virus and other blood-borne viral pathogens in the athletic setting. Committee on Sports Medicine and Fitness. American Academy of Pediatrics. *Pediatrics*. 1999;**104**(6):1400-3. [PubMed: 10585997]
- Bereket-Yucel S. Risk of hepatitis B infections in Olympic wrestling. *Br J Sports Med*. 2007;**41**(5):306-10. doi: 10.1136/bjism.2006.032847. [PubMed: 17331974]
- Szabo E, Lotz G, Paska C, Kiss A, Schaff Z. Viral hepatitis: new data on hepatitis C infection. *Pathol Oncol Res*. 2003;**9**(4):215-21. doi: 10.1007/bf02893380. [PubMed: 14688826]
- Brown LS, Drotman DP, Chu A, Brown CL, Knowlan D. Bleeding injuries in professional football: estimating the risk for HIV transmission. *Ann Intern Med*. 1995;**122**(4):273-4. [PubMed: 7825762]
- Richards CF. Transmission of blood-borne pathogens during sports: Risk and prevention. *J Emerg Med*. 1995;**13**(6):870.
- Khodabandehloo M, Roshani D, Sayehmiri K. Prevalence and trend of hepatitis C virus infection among blood donors in Iran: A systematic review and meta-analysis. *J Res Med Sci*. 2013;**18**(8):674-82. [PubMed: 24379843]
- Beltrami EM, Williams IT, Shapiro CN, Chamberland ME. Risk and management of blood-borne infections in health care workers. *Clin Microbiol Rev*. 2000;**13**(3):385-407. [PubMed: 10885983]
- Alavian SM, Hajarizadeh B, Ahmadzad-Asl M, Kabir A, Bagheri-Lankarani K. Hepatitis B Virus infection in Iran: A systematic review. *Hepat Mon*. 2008;**8**(4):281-94.
- Alavian SM, Tabatabaei SV, Ghadimi T, Beedrapour F, Kafi-Abad SA, Gharehbaghian A, et al. Seroprevalence of Hepatitis B Virus Infection and Its Risk Factors in the West of Iran: A Population-based Study. *Int J Prev Med*. 2012;**3**(11):770-5. [PubMed: 23189228]
- Siebert DJ, Lindschau PB, Burrell CJ. Lack of evidence for significant hepatitis B transmission in Australian Rules footballers. *Med J Aust*. 1995;**162**(6):312-3. [PubMed: 7715495]