



## Serosurvey of Hepatitis-B Surface Antigen in Afghan Refugees; the First Report from Qazvin, Iran

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### Abstract

**Background & Aims:** Viral hepatitis B is a substantial contributor of dreadful liver disease and hepatocellular carcinoma (HCC) and imposes ponderous burden on the ministry of health around the world. There are no adequate data on the prevalence of Hepatitis-B surface antigen (HBsAg) among Afghan refugees, especially in one of their favorable host countries, Iran. This seroprevalence study aimed to estimate the prevalence rate of HBsAg among Afghan refugees to schedule much more efficient preventive measures.

**Materials & Methods:** In the current cross-sectional study, data were gathered for a total of 488 Afghan refugees referred to Mehr Medical Diagnostic Laboratory from April 2014 to January 2018. Initial information including age, sex, and education status were extracted. Collected samples from the patients were conducted using the General Biological Corporation (GBC) ELISA Kit to detect seronegative or seropositive HBsAg cases. Following all data were analyzed by SPSS version 16 software.

**Results:** Sixteen cases with positive HBsAg were detected in 488 Afghan patients referred to the Mehr Laboratory from April 2014 to January 2018. The overall prevalence of HBsAg was calculated 3.3% (2.3% in females and 1% in males). The highest frequencies of HBsAg were associated to the age group of 21 to 30 years with 1.2% and none education level group with 1.8%.

**Conclusion:** According to the outcome of current study, free vaccination, treatment and screening seropositive individuals in borders will be applied to assist the design and management of preparatory preventive strategies.

**Keywords:** ELISA, Hepatitis-B surface antigen, Afghan refugees

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## Introduction

Hepatitis-B virus (HBV) is a double-stranded DNA virus, identified for the first time by Mr. Blumberg in 1965 (1). One of the predominant public health problems throughout the world is HBV (2, 3) with 2 billion involved people in the world (4). The prevalence of HBV is inextricably linked to the cultural and economic conditions (5). HBV is responsible for about 500,000 to 1,2 million deaths each year as a result of hepatocellular carcinoma (HCC), cirrhosis, and chronic hepatitis (6), and is considered as the 10th leading cause of death worldwide (7). HBV is transmitted by blood products and other bodily fluids including vaginal, saliva, secretions, semen, and what not (8). Although rather than 240 million people are chronically infected with HBV around the world (2), the distribution of HBV infection in the world is completely different (9, 10). It is estimated that 45% of the world's population live in regions with a high prevalence rate of chronic hepatitis B (CHB) (6). Accordingly, the highest prevalence rate of HBV infection is related to sub-Saharan Africa, the east, the central region of Asia, and the Pacific regions (11). Some contributing factors including violence, war, insecurity, drought, and unemployment have made Afghans immigrate to Iran (12). In Iran, one million Afghan refugees live legally and have access to health and medical facilities, while it is estimated that about two million illegal Afghan migrants live in the countryside of most cities (13) which fence greater infected gang of HBV (14). Qazvin province is located in the north of Iran, where a significant number of Afghan refugees live in the margins of the Qazvin. Undoubtedly, clarifying the prevalence rate of Hepatitis-B surface antigen (HBsAg) among Afghan refugees living in the Eghbaliyeh city located in the Qazvin province seems to be crucial.

## Material and Methods

Mehr Medical Diagnostic Laboratory (MMDL) is located in the Eghbaliyeh city, five kilometers west of the capital of the Qazvin province of Iran. This seroprevalence study was conducted on 488 Afghan refugees referred to MMDL, Qazvin, Iran from April

2014 to January 2018. Initial information and pre-completed questionnaires including age (classified into 7 age groups), sex (male, female), and education status (classified into none, primary, and second or higher) from Afghan patients were extracted. These forms belong to the Iranian ministry of health and they are generally filled out by the staff of laboratory in Iran for all infectious diseases panels. All of these forms are archived in laboratory. Accordingly, by refereeing to the Mehr laboratory archive the current retrospective cross-sectional survey was developed. After taking blood samples from patients all samples were sent to the technical department of laboratory for sera separation through centrifugation at  $1,500 \times g$ . Collected samples from the patients were evaluated using the General Biological Corporation (GBC) ELISA Kit in order to detect seronegative or seropositive cases in terms of HBsAg. Data on the presence and the absence of HBsAg in the serum of patients and statistical comparisons were analyzed by SPSS version 16 software. The frequency of HBsAg was expressed using numbers and percentages within a 95% confidence interval. Fisher's exact test was conducted to determine the correlation between percentages of existent variables and  $p < 0.05$  was considered statistically significant. This project was confirmed by the ethics and scientific committee of Qazvin University of Medical Sciences, Iran (approval code: IR.QUMS.REC.1399.197)

## Result

The current retrospective cross-sectional serosurvey was performed in Eghbaliyeh, Qazvin, Iran, from April 2014 to January 2018. The study population consisted of 488 Afghan refugees, 407 women and 81 men (83.4% females and 16.6% males). The age range of patients was between 0 to 94 years old and it was categorized into 7 age groups. Based on the Iranian ministry of health forms education status was classified into 3 sections including none, primary and second or higher. The overall prevalence rate of positive HBsAg was 3.3% (2.3% in females and 1% in males). In other words, HBsAg was detected in 16 patients consisting of 11 females and 5 males (Table 1). In this current study, the

highest frequency of HBsAg was related to the age group of 21 to 30 years with 1.2% prevalence (Table 2). It should be noted that the prevalence rate of seropositive was remarkable among those with a lower

level of education (1.8%) in comparison to the other educational groups (Table 3). There were no statistically significant differences in gender, age, and education status between HBsAg positive and negative ( $p > 0.05$ ).

**Table 1.** The frequency and percentage of HBsAg based on Gender

HBsAg	Gender		Total
	Male	Female	
Positive	5 (31.2%)	11 (68.8%)	16 (100%)
Negative	76 (16.1%)	396 (83.9%)	472 (100%)
Total	81 (16.6%)	407 (83.4%)	488 (100%)

**Table 2.** The frequency and percentage of HBsAg based on Age

HBsAg	Age							Total
	0 to 10 years	11 to 20 years	21 to 30 years	31 to 40 years	41 to 50 years	51 to 60 years	>61 years	
Positive	0 (0%)	3 (18.8%)	6 (37.5%)	2 (12.5%)	1 (6.2%)	3 (18.8%)	1 (6.2%)	16 (100%)
Negative	2 (0.4%)	99 (21%)	217 (46%)	90 (19.1%)	31 (6.6%)	22 (4.7%)	11 (2.3%)	472 (100%)
Total	2 (0.4%)	102 (20.9%)	223 (45.7%)	92 (18.9%)	32 (6.6%)	25 (5.1%)	12 (2.5%)	488 (100%)

**Table 3.** The frequency and percentage of HBsAg based on Education

HBsAg	Education			Total
	None	Primary	Second or higher	
Positive	9 (56.2%)	7 (43.8%)	0 (0%)	16 (100%)
Negative	167 (35.4%)	278 (58.9%)	27 (5.7%)	472 (100%)
Total	176 (36.1%)	285 (58.4%)	27 (5.5%)	488 (100%)

## Discussion

The HBV virus is known as a worldwide health problem, the significance that most people around the world are tangled in (15). Countries located in the Middle East region have a different prevalence of HBV. Kuwait and Bahrain are classified as low-endemic countries, while countries like Oman, Palestine, Yemen, Egypt, Jordan, and Saudi Arabia are classified as high-endemics (André 2000). The prevalence of HBsAg in Middle Eastern countries varies from 2% to 20% (16). Iran is recognized as a low- to intermediate- endemicity region about the currency of HBV (17). The estimated prevalence of HBV infection in the general population

of Iran from 1990 to 2016 was 2.2% (18). In Iran, the highest prevalence of HBV infection (8.9%) was reported from Golestan province (19) and the lowest prevalence (0.7%) was reported in Kermanshah province (20). The results show that there is a significant difference between the geographical distribution of HBV infection in the whole population of Iran (18). Over the past decade, studies in this domain proved that the prevalence of HBV has declined significantly in Iran (21). Due to the preventive programs like vaccination for infant masses began in 1993, the use of disposable syringes, high-risk people vaccination, and assist in increasing people awareness of HBV risk factors (22).

The prevalence of HBsAg in a population largely depends on the prevalence of unsafe injection practices and immunization coverage against hepatitis B (23). Our study demonstrated that the prevalence of HBsAg among Afghan refugees living in the Eghbaliyeh city that is located in the Qazvin province was 3.3%. Lack of HBV vaccination in the refugees and the preference for injections for common illnesses are the main reasons leading to this level (>3%) of HBsAg prevalence among the Afghan refugee gangs. The seroprevalence study on Afghan refugees in the USA showed a 4.1% prevalence of HBsAg among Afghan refugees (24).

## Conclusion

The seroprevalence of HBsAg among Afghan refugees living in Eghbaliyeh, Qazvin Province is reflective of an approximately highly endemic population. It seems that Hepatitis B vaccination should be practiced as a routine immunization in this population. In addition, general preventive measures like screening migrants for HBV, preventing illegal migration, health educational sessions should be the cornerstones of control measures against HBV infection in this community of refugees.

## Abbreviations

HBsAg: Hepatitis-B surface antigen; HCC: hepatocellular carcinoma; BBD: Blood Borne Disease; HBV: Hepatitis-B virus; CHB: chronic hepatitis B; MMDL: Mehr Medical Diagnostic Laboratory.

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## Conflict of Interest

The authors declare that they have no conflict of interest.

## References

- Blumberg BS. Australia antigen and the biology of hepatitis B. *Science* 1977;197(4298):17-25.
- Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. *Lancet* 2015;386(10003):1546-55.
- Chen DS. Hepatitis B vaccination: The key towards elimination and eradication of hepatitis B. *J Hepatol* 2009;50(4):805-16.
- Ott J, Stevens G, Groeger J, Wiersma S. Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. *Vaccine* 2012;30(12):2212-9.
- André F. Hepatitis B epidemiology in Asia, the middle East and Africa. *Vaccine* 2000;18:S20-S2.
- Mahoney FJ. Update on diagnosis, management, and prevention of hepatitis B virus infection. *Clin Microbiol Rev* 1999;12(2):351-66.
- Parkin DM, Bray F, Ferlay J, Pisani P. Estimating the world cancer burden: Globocan 2000. *Int J Cancer* 2001;94(2):153-6.
- Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures. *J Viral Hepat* 2004;11(2):97-107.
- Liu J, Zhang S, Wang Q, Shen H, Zhang M, Zhang Y, et al. Seroepidemiology of hepatitis B virus infection in 2 million men aged 21–49 years in rural China: a population-based, cross-sectional study. *Lancet Infect Dis* 2016;16(1):80-6.
- Helen ts, Jensen DM. Epidemiology of hepatitis B and C viruses: a global overview. *Clin Liver Dis* 2010;14(1):1-21.
- Roberts H, Kruszon-Moran D, Ly KN, Hughes E, Iqbal K, Jiles RB, et al. Prevalence of chronic hepatitis B virus (HBV) infection in U.S. households: National Health and Nutrition Examination Survey (NHANES), 1988-2012. *Hepatology (Baltimore, Md)* 2016;63(2):388-97.
- Koepke B. Iran's Relations with Afghanistan's National Unity Government. In *The Arab World and Iran*. Springer; 2016. p. 145-63.
- Manenti A. Health situation in Iran. *Med J I.R. Iran* 2011;25(1):01-7.
- Todd CS, Ahmadzai M, Atiqzai F, Miller S, Smith JM, Ghazanfar SAS, et al. Seroprevalence and correlates of

- HIV, syphilis, and hepatitis B and C virus among intrapartum patients in Kabul, Afghanistan. *BMC Infect Dis* 2008;8(1):119.
15. McMahon BJ. Natural history of chronic hepatitis B—clinical implications. *Medscape J Med* 2008;10(4):91.
  16. Qirbi N, Hall A. Epidemiology of hepatitis B virus infection in the Middle East. *East Mediterr Health J* 2001;7(6):1034-45.
  17. Kheirabad AK, Jokari EE, Sajjadi M, Gouklani H. Prevalence of Hepatitis B virus between Qeshm Island people in 2013-2014, Iran. *Journal of medicine and life* 2015;8(Spec Iss 3):173.
  18. Salehi-Vaziri M, Sadeghi F, Hashiani AA, Fesharaki MG, Alavian SMJHm. Hepatitis B virus infection in the general population of Iran: an updated systematic review and meta-analysis. *Hepat Mon* 2016;16(4): e35577.
  19. Gholamreza R, Shahryar S, Abbasali K, Hamidreza J, Abdolvahab M, Khodaberdi K, et al. Seroprevalence of hepatitis B virus and its co-infection with hepatitis D virus and hepatitis C virus in Iranian adult population. *Indian Journal of Medical Sciences* 2007;61(5):263-8.
  20. Alavian SM, Tabatabaei SV, Nourizad S, Mansouri F, Khademi N, Kafi-abad SA, et al. Seroepidemiology of HBV Infection in Kermanshah-West of Iran; a Population Based Study. *Jundishapur J Microbiol* 2012;5(4):564.
  21. Alavian SM, Fallahian F, Lankarani KB. Hepatitis B virus infection in Iran; Changing the epidemiology. *J Gastrointestin Liver Dis* 2010;5(1):51-61.
  22. Poorolajal J, Mahmoodi M, Haghdoost A, Majdzadeh R, Nasseri-Moghaddam S, Ghalichi L, et al. Booster dose vaccination for preventing hepatitis B. *Cochrane Database Syst Rev* 2016; 2016(6): CD008256.
  23. Zhao S, Xu Z, Lu Y. A mathematical model of hepatitis B virus transmission and its application for vaccination strategy in China. *Int J Epidemiol* 2000;29(4):744-52.
  24. Centers for Disease Control (CDC). Screening for hepatitis B virus infection among refugees arriving in the United States, 1979-1991. *MMWR Morb Mortal Wkly Rep* 1991;40(45):784.