

Original Article

Seroprevalence of Hepatitis B virus Infection by Quantitative Chemiluminescent in Tabriz (North West of Iran), 2010-2011

Nader Hajizadeh¹, Samad Farhadi², Masoud Hamidi³, Asghar Ashrafi-Hafez^{4,5}, Nayeb Ali Ahmadi^{6*}

¹ Young Researcher and Elite Club, Ilkhchi Branch, Islamic Azad University, Ilkhchi, Iran

² Tabriz University of Medical Sciences, Tabriz, Iran

³ Students' Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran

⁴ Cancer Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

⁵ Medical Education Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

⁶ Proteomics Research Center, Faculty of Paramedical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

Background: Hepatitis B is considered as one of the most common infectious diseases. The contamination of this virus has caused hygienic problems all over the world. Liver cirrhosis and hepatocellular carcinoma are most important consequences of this disease. The purpose of this study is to determine the rate of infection in Tabriz North West of Iran.

Materials and Methods: This study is carried out, on partial and short time basis between 2010 and 2011, on test results of 21421 examined individuals whom have visited clinics in Tabriz. HBsAg of the samples was analyzed with chemiluminescence apparatus and finally, SPSS software was used to conduct the statistical examination of the results.

Results: Among 21421 examined individuals (5021 cases in 2010 and 16400 cases in 2011), 594 samples (2.77%) were reported positive and 20827 samples (97.23%) were reported negative.

Conclusion: According to the results, gender was not a determining factor affecting the susceptibility of patients. Our country is endemic to this disease, so diagnostic and preventive methods are crucial, more over comprehensive national vaccination can help to noticeably reduce the infectious cases caused by the disease.

Keywords: Hepatitis B, HBsAg, Tabriz, Chemiluminescence

***Corresponding Author:** Nayeb Ali Ahmadi. Proteomics Research Center, Faculty of Paramedical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Tel: +98 (21) 22718528, Email: nayebalia@yahoo.com, nayebalia@sbmu.ac.ir.

Please cite this article as: Hajizadeh N, Farhadi S, Hamidi M, Ashrafi-Hafez A, Ahmadi NA. Seroprevalence of Hepatitis B virus Infection by Quantitative Chemiluminescent in Tabriz, 2010-2011. *Novel Biomed.* 2014;2(3):91-94.

Introduction

Hepatitis B infection (HBV) is a major health problem and an important cause of illness and mortality. It has been reported 600 thousands death cases, annually (based on the 2012, July)¹. The genome of the virus is DNA double strand in which one of the strands is shorter than the other. The antigen, HBsAg, is a soluble antigen which is associated with viral replication, high serum titration and the infection induction of serum². HBsAg is

main antigen of HBV. HBsAg is the surface antigen which measurable in the serum. The chronic carriers are the patients who their HBsAg level is stable more than six months despite of existence of HBsAg or Anti HBs. HBsAg may remain stable for several years after disappearing in serum. Envelop of virus is composed of glycoprotein surface antigen (HBsAg). Particles containing HBsAg could be released in the serum of infected individuals much more than the virions. These immunogenic particles can be circular or filamentous^{3,4}.

Radio immunoassay and ELISA test are very sensitive methods for displaying HBV antigens and antibodies. The primary diagnosis could be made based on clinical signs and high level of liver enzymes in blood. However, the serological test against HBV usually indicates the situation of the infection⁵. HBsAg is the first serological indicator which occurs in blood before the appearance of clinical symptoms as well as the blood of patients with clinical symptoms. Serological indicators plays significant role for diagnosis of acute HBV. Existence of HBsAg in serum may indicate acute or chronic infection or even a healthy carrier^{6,7}. Based on the studies the prevalence level of disease in Iran is medium. It seems 35% of Iranians have been exposed to the infection and 2-3% of populations are chronically carrier. Over 50% of Iranian carriers have received the infection through mother to child. Mother-child is one of the most probable routes for being infected in Iran⁸. The different methods of epidemiologic tests for HBV diagnosis have been employed from about 30 years ago. These methods, including radioimmunoassay and enzyme immunoassay, as the molecular methods based on the nucleic acid have been progressing during the time⁹. Evolution of immunity assessment methods continued with methods based on luminescence reactions methods¹⁰. Given the significance of HBV infection in Iran, we conducted this study for determination of seroprevalence of Hepatitis B virus infection by quantitative chemiluminescent in Tabriz between 2010-2011.

Methods

The study has been accomplished cross-sectional of people who were attended the pathological laboratories of Tabriz between 2010 and 2011. The immunological HBsAg of collected blood samples were tested by quantitative chemiluminescent kit (DiaSorin LIAISON[®], Turin, Italy). First a little of sample was poured to the cuvette by the left arm of chemiluminescent LIASSON (Germany), then the solution containing magnetic particles was added by right arm, finally it was incubated. The solution was washed three times by washing solution buffer, and then HBsAg added to the cuvette. In the next step, the conjugating solution was added and was re-incubated. Again the solution was

washed three times and a starter solution was applied for measurement. First, starter 1 was poured into the vial and the indicator was injected to start quantitative chemiluminescent reactions. After about one-tenth of a second delay, the measurement signal was detected and the measurement has been completed in 3 seconds. Moreover, the age and the education level of patients were investigated by a questionnaire. The research results were analyzed by Chi-square test using SPSS software (version 16). A *p* value of <0.05 was considered indicative of a statistically significant difference.

Results

From 21421 examined cases, 5021 individuals were examined in 2010 and 16400 individuals were examined in 2011. 1058 (21.07%) samples of 2010 were men and 3962 samples (78.93%) women. Two thousands three hundreds twenty four samples (14.8%) of 2011 were men and 14076 (85.82%) were women. Annual distribution of hepatitis B cases according to the sex is shown in table 1.

196 and 398 samples were positive in 2010 and 2011, respectively. From 196 positive samples in 2010, 101 samples were men and 95 samples were women. From 398 positive samples in 2011, 216 were men and 182

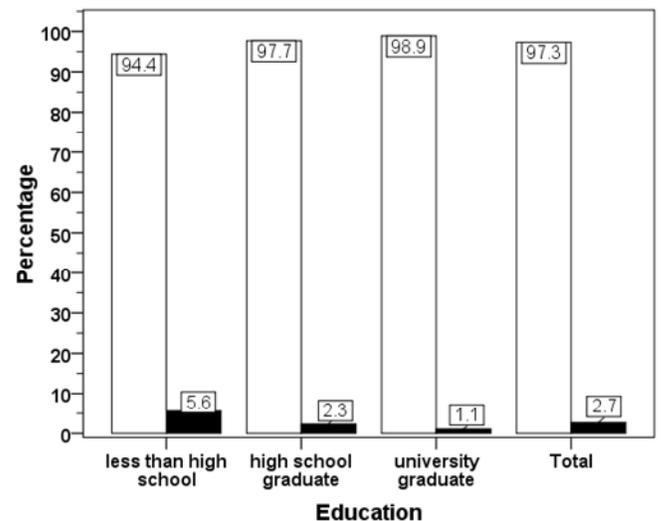


Figure 1. Prevalence of positive and negative of hepatitis B samples by the level of education in Tabriz, north west of Iran, 2010-2011.

Table 1: Annual and gender prevalence of hepatitis B cases in Tabriz, north west of Iran, 2010-2011

Years	No. of samples	No. and (%) of positive samples			No. and (%) of negative samples		
		Females	Males	Overall	Females	Males	Overall
2010	5021	95 (48.47)	101 (51.53)	196 (100)	3872 (98.25)	953 (19.75)	4825 (100)
2011	16400	182 (45.72)	216 (54.27)	398 (100)	13894 (86.83)	2108 (13.17)	16002 (100)
Total	21421	277	317	594	17766	3061	20827

Table 2: Age and gender distributions of hepatitis B cases in Tabriz, north west of Iran, 2010-2011

Years	No. of samples	No. and (%) of positive samples			No. and (%) of negative samples		
		Females	Males	Overall	Females	Males	Overall
< 20	45	2 (33.33)	4 (66.66)	6 (100)	33 (84.61)	6 (15.38)	39 (100)
20-29	6409	59 (45.03)	72 (54.96)	131 (100)	5274 (84.00)	1004 (15.99)	6278 (100)
30-39	11638	149 (47.90)	162 (52.09)	311 (100)	9814 (86.64)	1513 (13.35)	11327 (100)
40-49	2713	55 (46.21)	64 (53.78)	119 (100)	2127 (81.99)	467 (18.00)	2594 (100)
≥ 50	616	12 (44.44)	15 (55.55)	27 (100)	518 (87.94)	71 (12.05)	589 (100)
Total	21421	277 (46.63)	317 (53.36)	594 (100)	17766 (85.30)	3061 (14.69)	20827 (100)

samples were women. Based on the result of Chi square test there is no significant difference between the positive cases of men and women ($\alpha=0.05$).

The cases were aged 18–83 years (mean age 45.1 years), and all age groups appeared to be susceptible to infection. The most proportion of the cases grouped with the age of 30–39 years (with 2.69%). The distribution of hepatitis B cases in relation to the age is illustrated in table 2.

The maximum age of examined individuals is 83 years old, the minimum age 18 years old and average is 45.1 years old. In the women group the oldest patient 83, the youngest 21 and the average is 41.5 years old. The education levels of the infected individuals were: 55.97% under graduated, 31.39% high school graduated and 12.62% university graduated. This study showed that, the most prevalence of infection in the examined individuals was in under graduated (5.62%), followed by high school graduated with 2.26% (Figure 1).

Discussion

Currently, HBV is endemic in many parts of the world^{11,12} and viral Hepatitis caused by HBV is a major health problem¹³⁻¹⁵. Liver cancer caused by Hepatitis B is one of the three primary deadly cancers among men and has been distinguished as the major cause of women cancers in Asian regions¹⁶⁻¹⁸. Over 70% of liver cancers are caused by HB virus. Antigen appearance of HBV infection may occur without clinical signs^{15,19}. In this study 594 cases (2.77%) were reported positive.

Dan Chen carried out a similar study in the Korea and USA in 2004-2007 by Centaur HBsAg methods. In this survey 3.9% of the collected samples showed positive HBV infection. These finding confirmed the result of the present study²⁰. Aminzadeh et al. accomplished a similar research in the infection ward of Loghman Hakim hospital in Tehran cross-sectional study by detecting HBsAg with ELISA²¹. They collected the samples from addicted patients. The rate of positive HBsAg infection was reported 6% which indicated that there is a significant

relationship between the method of drug usage and positive HIV and HBsAg. These findings emphasize the necessity of providing facilities to quit addiction for addicted people of society²¹. Ghorbanalizadegan and et al. in 2006, from among 63 suspected samples, reported 57 (90.5%) positive HBsAg samples in Baghiyatollah hospital with immunochemiluminescence method. Considering that in Ghorbanalizadegan's research all of the tested samples were suspected, difference between the results of researches is justifiable¹⁶. In a specialized clinic of Tehran in 2001-2003, Mohammadalizadeh and et al. carried out a similar study and reported the rate of positive HBsAg 3.3%. The results are consistent with the result of the present research¹⁷. Azarhoosh and et al. in 2006 accomplished the same study in 2003. They have selected 300 individuals of service, medical and administrative staff of five education-treatment centers of Gorgan, including Deziyani, Taleghani and Azarshahr. The infection rate of HBsAg was reported 1% with ELISA method. Since all of the samples were collected from the healthcare staff, the research results in comparison with the result of the present research are justifiable. The research result indicates that there is a significant relationship between HBsAg and vaccination. Therefore, vaccination is necessary to prevent HBV infection¹⁸.

Conclusion

Hence, HBV and HIV spreads in similar ways, healthcare consideration, accurate and rapid diagnosis are necessary for prevention. For rapid detection of virus in HBV infected patients, it is suggested to apply PCR besides serologic methods. Moreover, increasing common awareness regarding the spreading methods of infection and vaccination are substantial actions for decreasing the HBV infected patients.

References

1. Kew M. Epidemiology of chronic hepatitis B virus infection, hepatocellular carcinoma, and hepatitis B virus-induced hepatocellular carcinoma. *Pathol Biol.* 2010; 58: 273-7.
2. Mahoney FJ. Update on diagnosis, management, and prevention of hepatitis B virus infection. *Clin Microbiol Rev.* 1999;12: 351-66.
3. Jarvis L, Cleland A, Simmonds P, Dow B, Munro M, Jordan A, et al. Screening blood donations for hepatitis C virus by polymerase chain reaction. *Vox Sang.* 2000; 8: 57-8.
4. Gerlich WH. Medical Virology of Hepatitis B: how it began and where we are now. *Virology.* 2013;10: 239.
5. Gold E. Textbook of Human Virology. *JAMA* 1991; 266: 282.
6. Özkal P, Ilgın-Ruhi H, Akdoğan M, Elhan AH, Kaçar S, Şaşmaz N. The genotoxic effects of hepatitis B virus to host DNA. *Mutagenesis.* 2005;20:147-50.
7. Bayliss J, Nguyen T, Lesmana CRA, Bowden S, Revill P. Advances in the Molecular Diagnosis of Hepatitis B Infection: Providing Insight into the Next Generation of Disease. *Seminars in liver disease* 2013: Thieme. 2013;113-21.
8. Merat S, Malekzadeh R, Rezvan H, Khatibian M. Hepatitis B in Iran. *Arch Iranian Med* 2000; 3: 192-201.
9. Diepersloot RJ, van Zantvliet-van Oostrom Y, Gleaves CA. Comparison of a chemiluminescent immunoassay with two microparticle enzyme immunoassays for detection of hepatitis B virus surface antigen. *Clin Diagn Lab Immunol.* 2000;7: 865-6.
10. Weber B. Recent developments in the diagnosis and monitoring of HBV infection and role of the genetic variability of the S gene. *Expert Rev Mol Diagn.* 2005; 5:75-91.
11. Funk M, Rosenberg D, Lok A. Worldwide epidemiology of HBeAg negative chronic hepatitis B and associated precore and core promoter variants. *J Viral Hepat.* 2002;9: 52-61.
12. Franco E, Bagnato B, Marino MG, Meleleo C, Serino L, Zaratti L. Hepatitis B: Epidemiology and prevention in developing countries. *World J Hepatol.* 2012; 4: 74.
13. Ismail N, Fish GE, Smith MB. Laboratory evaluation of a fully automated chemiluminescence immunoassay for rapid detection of HBsAg, antibodies to HBsAg, and antibodies to hepatitis C virus. *J Clin Microbiol.* 2004;42:610-7.
14. Sablon E, Shapiro F. Advances in Molecular Diagnosis of HBV Infection and Drug Resistance. *Int J Med Sci.* 2004;2:8-16.
15. Maynard J. Hepatitis B: global importance and need for control. *Vaccine.* 1990;8: S18-S20.
16. Ghorbanalizadegan M, Ranjbar R, Ghodarzi Z. Comparison of immunochemiluminescence method and PCR for detection of Hepatitis B, in Baghitallah hospital laboratory patients. *J Ilam Uni Med Sci.* 2007;15:1-6.
17. Mohammadalizadeh A, Ranjbar M, Hatami S. Virologic characteristics of chronic hepatitis B. *Pajouhesh Dar Pezeshki.* 2005;29:153-156.
18. Azarhoush R, Borghei N, Vakili M, Latifi K. Serologic immunity of Gorgan medical personnels against hepatitis B. *J Gorgan Uni Med Sci.* 2006;8:39-44.
19. Liaw YF. Clinical utility of hepatitis B surface antigen quantitation in patients with chronic hepatitis B: a review. *Hepatology.* 2011;53:2121-9.
20. Chen D, Kaplan L, Liu Q. Evaluation of two chemiluminescent immunoassays of ADVIA Centaur for hepatitis B serology markers. *Clinica chimica acta.* 2005;355:41-5.
21. Aminzadeh Z, Aghazadeh Sarhangipour K. Seroepidemiology of HIV, syphilis, hepatitis B and C in intravenous drug users at Loghman Hakim hospital. *Iran J Med Microbiol.* 2007;1:53-56.