

Seroprevalence of Hepatitis B and C Virus Infection Among Barbers in Isfahan Province, Iran

Parisa Shoaie¹; Behrooz Ataei^{2,*}; Amir Mohammad Ataie³; Zary Nokhodian⁴; Payman Adibi⁵

¹Nosocomial Infection Research Center, Isfahan University of Medical Sciences, Isfahan, IR Iran

²Infectious Diseases and Tropical Medicine Research Center, Isfahan University of Medical Sciences, Isfahan, IR Iran

³School of Medicine, Isfahan University of Medical Sciences, Isfahan, IR Iran

⁴Acquired Immunodeficiency Research Center, Isfahan University of Medical Sciences, Isfahan, IR Iran

⁵Department of Gastroenterology, Integrative Functional Gastroenterology Research Center, Isfahan University of Medical Sciences, Isfahan, IR Iran

*Corresponding author: Behrooz Ataei, Infectious Diseases and Tropical Medicine Research Center, Isfahan University of Medical Sciences, Isfahan, IR Iran. Tel: +98-3113359359, E-mail: ataei@med.mui.ac.ir

Received: January 19, 2015; Revised: July 2, 2015; Accepted: July 4, 2015

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are among the most occupational hazards in the world, including Iran. Barbers have continued to expose to different infectious diseases. They may often be exposed accidentally to the blood and body fluids of their customers, through needle pricks, scissor cuts, tattooing and other beauty treatments.

Objectives: The aim of the present study was to determine the seroprevalence of HBV, and HCV infections and to investigate the correlation between the HBs-Ab titer and some of the risk factors in the barbers of Isfahan city, Iran.

Patients and Methods: This cross-sectional seroepidemiological study was performed on 479 male and female barbers during July to September 2012 in Isfahan Province, Iran. Data were collected using a self-reporting questionnaire including demographic characteristics and main risk factors for HCV and HBV infections. A 5-mL venous blood sample was obtained from each subject. The levels of antigen and antibodies (HBs Ag, HBc Ab, HBs Ab, and HCV Ab) were measured by the enzyme-linked immunosorbant assay (ELISA). Data were analyzed using descriptive statistics by SPSS software, version 16.

Results: The mean age of the individuals was 39.6 ± 11.4 years. Two hundred and thirty-three cases (48.6%) were men and 246 (51.4%) were women. All the subjects were negative for HCV Ab. The seropositivity of HBV was 6.6%. No significant correlation was found between risk factors and being HBV-seropositive. Among our participants, it was found that most barbers had been exposed to razors or scissor cuts.

Conclusions: Our findings indicate that both HCV and HBV infections may not constitute occupational hazards for barbers; however, it is essential to promote awareness of these risks among barbers and effective HBV vaccination should be performed among them.

Keywords: Occupational Diseases; Hepatitis B; Hepatitis C; Risk Factors

1. Background

Hepatitis B virus (HBV) and Hepatitis C Virus (HCV) infections have emerged as a serious global public health problem (1, 2). These viruses lead to severe liver disease like as hepatocellular carcinoma, cirrhosis, and end stage liver disease. According to the world health organization (WHO), 2 billion people have been infected with HBV of which more than 350 million have chronic infections and 170 million people have been infected with HCV worldwide (3). It is estimated that nearly 2.6% of Iranian population are HBV carriers and 67.8% of chronic hepatitis patients are positive for at least one of the serologic markers of HBV although in Isfahan province HBV prevalence is 1.3% that is lower than the other parts of Iran (4, 5). Alavian et al. studied the general population of Iran and estimated a low HCV infection prevalence rate (0.16%) in Iran (6). Barbers may be exposed unexpectedly to the blood and body fluids of their clients and can be infected. Important factors contributing to HBV and HCV spread among barbers

include razor sharing of customers, tattooing, piercing, pedicure, manicure and other beauty treatments. In developing countries, HBV and HCV infections have been implicated as an occupational hazard of the barbers (7). Previous studies have indicated that in developed countries, certain beauty treatments play an important role in the spread of HBV and HCV infection among barbers and their clients (8). Hepatitis B virus can survive on the instrument, tabletops and workbenches for at least seven days; therefore, it is important for the barbers to know their HBV status by being screened for the HBV surface antigen and antibody and to be vaccinated against HBV if found to be unprotected (4, 9). Safe and protective vaccine against HBV is available throughout world including Iran. Many barbers have a low awareness about viral hepatitis and the risk of transmission of infectious agents by reuse of razors and scissors on multiple clients; therefore, many barbers remain at high risk of acquiring infections (6, 10). Both

HBV and HCV infections have been determined in many groups; however, there is no published data on the seroprevalence rate of them among barbers in Isfahan. The aim of this study was to determine the prevalence of HBV and HCV infection and associated factors among barbers in Isfahan province, Iran.

2. Objectives

The aim of the present study was to determine the seroprevalence of HBV, and HCV infections and to investigate the correlation between the HBsAb titer and some of the risk factors among the barbers in Isfahan province, Iran.

3. Patients and Methods

3.1. Design and Subjects

This cross-sectional sero-epidemiological study was conducted on male and female barbers who worked in the barber shops and beauty salons in Isfahan province, Iran, from July to September 2012.

Four hundred and seventy-nine licensed barbers that officially registered in Isfahan barbers syndicate were selected using systematic random sampling. The research protocol was approved by the ethics committee of Isfahan university of medical sciences in Iran and the necessary professional coordination was performed with the Isfahan barber syndicate. A written informed consent was obtained from the participants. Demographic characteristics of the participants including age, gender, educational status, previous blood transfusion, intravenous drug use, hepatitis history, surgery, duration of profession as a barber, tattooing, barbers' instruments, dental procedures, duration of health care training courses and other beauty treatments were gathered using a self-reporting questionnaire. The participants were informed that their personal information was kept privately and then they took part in the study voluntarily and filled out the consent form.

3.2. Laboratory Procedures

Five mL of venous blood was obtained from each participant. The blood sera obtained from the barbers were stored at -20 C until they were analyzed to determine the makers of both hepatitis B and C virus infections. Hepatitis B virus infection markers consisted of surface antigen (HBs Ag), core antibody (total HBc Ab) and surface Ab (HBs Ab). Each marker was evaluated by a commercial enzyme-linked immunosorbant assay (ELISA test system, DIA-PRO Kit, Diagnostic Bio probes S.R.J Italy) according to the manufacture recommendations. Antibodies to HCV were tested using a third-generation ELISA (DIA-PRO kit).

3.3. Statistical Analysis

Statistical analysis was performed using SPSS software (version 15.0, 2007, SPSS Inc, Chicago, Illinois, USA). De-

scriptive statistics of demographic variables and other characteristics of the subjects were computed. Mean and standard deviation (SD) were calculated for quantitative variables and proportions for categorical variables. Univariate analysis was used to assess relation between being HBV-positive and related risk factors.

4. Results

4.1. Demographic Profile of Respondents

From a total of 479 barbers included in the study, 233 cases (48.6%) were male and 246 (51.4%) were female. The age range of barbers was 28 - 51 years with the mean age (mean \pm SD) of 36.9 ± 11.4 years. Duration of working ranges from 1 - 28 years with the mean duration of working was 14.6 ± 13.4 years. Approximately, half of the barbers (49.8%) had diploma and college education and only 2.7% were illiterate and about two thirds of the subjects (85.9%) were married (Table 1).

Table 1. Characteristics of the Barbers Participated in This Study

Characteristics	Values ^a
Sex	
Male	233 (48.6)
Female	246 (51.4)
Age, y	36.9 \pm 11.4
Education	
Illiterate	13 (2.7)
Read and write	52 (10.9)
Preliminary	78 (16.3)
Secondary	97 (20.3)
Diploma and above	239 (49.8)
Marital Status	
Single	52 (10.4)
Married	404 (85.9)
Widow	15 (2.4)
Divorced	9 (1.3)
Health Care Training^b	
Yes	244 (59.6)
No	186 (40.4)
Duration of health care training courses, y	2.8 \pm 7
Tattooing	87 (18.3)
Cupping	79 (16.7)
Surgery	240 (51.2)
Ear piercing	171 (36.2)
Blood transfusion	31 (6.5)
Dental work	450 (95.1)
Intravenous drug use	1 (0.2)
Sharp instruments	330 (69.2)

^a Data are presented as mean \pm SD or No. (%).

^b Missing data.

4.2. Definition

HBV seropositivity was defined as a positive HBs-Ag or anti-HBs or HbC Ab test, indicating past or current infection with HBV in unvaccinated population. Samples with anti-HBs antibody titer of >10 mIU/mL were taken as protected and samples with antibody titers <10 IU/mL were considered as nonprotected (3).

Safe practice and science of standard barbering toward HBV and HCV include washing hands before each client, cleaning instruments with disinfectant between clients, using new blade on a new client, changing disinfectant frequently, using disinfectants for skin cuts and disposing of used blades in the garbage (8, 11).

4.3. Serologic Tests

From a total of 479 barbers, 22 cases (6.6%) were seropositive for HBV and all of them were negative for HCV. Active HBV as recognized by a positive HBs-Ag was present in 4 cases (0.8%). Three cases (0.6%) were HBs-Ag positive, anti-HbC positive, indicating chronic HBV infection. Both anti-HBs and anti-HbC antibodies were detected in 3 (0.6%) of vaccinated barbers. Six people (1.3%) were positive for anti-HbC antibodies and their HBV DNA was negative that indicated they were healthy people with a history of previous HBV infection. Among unvaccinated barbers, 6 cases (3.3%) were HBs Ab positive. Overall, 457 cases (95.4%) of the study participants had never been exposed to HBV infection. At the time of sampling, 296 cases (61.8%) had completed the program of vaccination earlier and 183 (38.2%) had not. Distribution of HBV infection markers are shown in Table 2. No significant association was found between tattooing, cupping, surgery, blood transfusion, dental work, ear piercing, intravenous drug using and a history of using sharp instruments ($P > 0.05$).

4.4. Coverage of Hepatitis B Vaccine Among Barbers

The result of the study showed that out of 479 barbers, 202 cases (42.6%) were immunized (anti-HBs Ab >10 mIU/mL) and 277 (57.8%) were nonimmunized against HBV infection (HBs Ab <10 mIU/ml). The majority of the barbers had participated in health care training courses related to their job and the mean duration of these courses was 2.8 ± 7 years.

Table 2. Distribution of Hepatitis B Virus Infection Markers in Study Population

Positivity	Values ^a
HBs Ag and anti-HbC	3 (0.6)
Anti-HBs and anti-HbC	3 (0.6)
Only anti-HbC	6 (1.3) ^b
Only anti HBs (unvaccinated)	6 (3.3)
Only HBs Ag	4 (0.8)
HBV seropositivity	22 (6.7)

^a Data are presented as No. (%).

^b All of them were negative for HBV DNA.

5. Discussion

In this study, we determined the seroprevalence of hepatitis B virus and hepatitis C virus infection and several risk factors associated with this occupation among barbers. The prevalence of HBV and HCV is known to differ across countries and may also differ based on the individual characteristics and conditional factors (7, 8). Hepatitis B virus and HCV infections are common causes of occupational blood-borne diseases that can be transmitted between barbers and their clients and frequently lead to a chronic asymptomatic carrier condition for a long time before the development of severe end-stage liver diseases. Therefore, barbers with HBV or HCV infection may be unaware of their diseases or carrier condition and infect other persons such as their customers or families (12). Our results determined that none of the barbers over the study period showed the presence of antibodies to HCV. Based on the low HCV seropositivity rate (0.16%) in general population, our results can be expected (5). In other similar studies that performed among traditional barbers in developing countries it was found that HCV was 0.4% in Turkey, 12.3% in Egypt and 5% in Morocco (2, 13, 14). Sharp instruments have been identified as a key risk factor for transmission of HCV. Skin tattooing is mentioned as an independent risk factor for being HCV-positive in our country; however, there was nobody infected with HCV in our study (5). Health care training courses, education teaching about risk of occupational contacts with body fluids and low infection prevalence in community might be the reasons for a lack of detectable antibodies to HCV among the barbers (5, 13, 14).

In a seroepidemiological study that performed in Isfahan province, Iran, 1.3% of the general population was HBs Ag carriers and there was a total of 17.6% HBV seropositive cases (15). In other similar seroepidemiological studies conducted among barbers in Sivas region of Turkey and Huanshi of China, Candan et al. and She et al. reported that HBV and HCV seropositivity was elevated in traditional barbers compared to the general population (7, 16). Our study showed that 0.8% of our subjects were HBs Ag carriers and there was a total of 6.6% HBV seropositivity. The rate of HBs Ag among our subjects was lower than that reported among barbers in Italy (1.8%), Izmir of Turkey (2.2%), and Egypt (4.2%) and in Morocco (2%) (2, 13, 14, 17). The most important cause of the reduction of HBs Ag seropositivity is related to the effective Expanded Program on Immunization (EPI) and vaccination of high risk groups in Iran (4, 15). In our study nearly 40% of the participants were not vaccinated against HBV and they might be at the risk of HBV infection; therefore, a standard vaccination course is recommended in unprotected barbers. Certain beauty treatments play an important role in transmission of HBV and HCV infection. The results of the study that performed in Rome, showed that there was a significant association between shaving and tattooing and the prevalence of HBV and HCV infections among barbers (17).

The results of various studies have been shown that HBV and HCV can be transmitted through razor shaving,

sharing and other instrument among barbers and their clients (6, 7). Most of our subjects (69.2%) had a history of sharp instruments, such as razors and scissors that repeatedly were used for different customers without intervening sterilization; however, we did not find a significant relation between hepatitis B or C infection and history of sharp instruments ($P > 0.05$).

Here we found that nearly 50% of the all barbers were educated; therefore, most of them might be aware of the route of transmission of HBV and HCV infections. Formal education of barber shop personnel in health care training courses and vaccination against HBV could reduce the rate of infection among them.

Although HBV and HCV infection might constitute occupational hazards for the barbers in our study, HBV seropositivity did not exhibit a significant association ($P > 0.05$) with risk factors such as time in job, tattooing, blood transfusion and other related factors (Table 1).

According to the prevalence of HBV and HCV infection among barbers in Isfahan province, it can be concluded that both HCV and HBV infections may not constitute occupational hazards for barbers; however, it is essential to promote awareness of these risks among barbers and effective HBV vaccination programs should be exposed among them.

Furthermore, efforts should be continued for HBV and HCV screening, immunization programs and formal education to promote knowledge among barbers about health hazards in barbering profession. Also, similar studies are needed to be conducted in barber shops of other cities in our country.

Acknowledgements

This article is extracted from a research (grant number 185072) that performed in infectious disease research center, Isfahan university of medical sciences, Isfahan, Iran. The authors would like to express their gratitude to the vice chancellor of Isfahan University of medical sciences for its financial support.

Authors' Contributions

Design of the study: Behrooz Ataei. Preparation of the samples: Zary Nokhodian. Writing the draft, and analyzing the data: Parisa Shoaei. Editing the manuscript: Payman Adibi. All of the authors read the final manuscript. The idea of the subject: Behrooz Ataei, Amir Mohammad Ataie: writing the manuscript.

Funding/Support

This article is a result of research number 185072 that performed in infectious disease research center, Isfahan University of Medical Sciences, Isfahan, Iran. The authors

would like to express their gratitude to the vice chancellor of Esfahan University of medical sciences for their financial support.

References

1. Belbacha I, Cherkaoui I, Akrim M, Dooley KE, El Aouad R. Seroprevalence of hepatitis B and C among barbers and their clients in the Rabat region of Morocco. *East Mediterr Health J.* 2011;**17**(12):911-9.
2. Beg A, Kharal TH. Frequency of risk factors for hepatitis B (HBV) and Hepatitis C Virus (HCV). *Ann Pak Inst Med Sci.* 2010;**6**(3):161-3.
3. Floreani A, Baldo V, Cristofolletti M, Renzulli G, Valeri A, Zanetti C, et al. Long-term persistence of anti-HBs after vaccination against HBV: an 18 year experience in health care workers. *Vaccine.* 2004;**22**(5-6):607-10.
4. Alavian S-M, Fallahian F, Lankarani KB. Comparison of seroepidemiology and transmission modes of viral hepatitis B in Iran and Pakistan. *Hepat Mon.* 2007;**7**(4):233-8.
5. Waheed Y, Saeed U, Safi S, Chaudhry WN, Qadri I. Awareness and risk factors associated with barbers in transmission of hepatitis B and C from Pakistani population: barber's role in viral transmission. 2010.
6. Alavian SM, Asl MA, Lankarani KB, Shahbabaie MA, Bahrami Ahmadi A, Kabir A. Hepatitis C Infection in the General Population of Iran: A Systematic Review. *Hepat Mon.* 2009;**9**(3):211-23.
7. Candan F, Alagozlu H, Poyraz O, Sumer H. Prevalence of hepatitis B and C virus infection in barbers in the Sivas region of Turkey. *Occup Med (Lond).* 2002;**52**(1):31-4.
8. Al-Rabeei NA, Al-Thaifani AA, Dallak AM. Knowledge, attitudes and practices of barbers regarding hepatitis B and C viral infection in Sana'a city, Yemen. *J Community Health.* 2012;**37**(5):935-9.
9. Kose S, Mandiracioglu A, Oral AM, Emek M, Gozaydin A, Kuzucu L, et al. Seroprevalence of hepatitis B and C viruses: awareness and safe practices of hairdressers in Izmir: a survey. *Int J Occup Med Environ Health.* 2011;**24**(3):275-82.
10. Eroglu C, Zivalioglu M, Esen S, Sunbul M, Leblebicioglu H. Detection of hepatitis B virus in used razor blades by PCR. *Hepat Mon.* 2010;**10**(1):22-5.
11. Wazir MS, Mehmood S, Ahmed A, Jadoon HR. Awareness among barbers about health hazards associated with their profession. *J Ayub Med Coll Abbottabad.* 2008;**20**(2):35-8.
12. Deuffic-Burban S, Delarocque-Astagneau E, Abiteboul D, Bouvet E, Yazdanpanah Y. Blood-borne viruses in health care workers: prevention and management. *J Clin Virol.* 2011;**52**(1):4-10.
13. Shalaby S, Kabbash IA, El Saleet G, Mansour N, Omar A, El Nawawy A. Hepatitis B and C viral infection: prevalence, knowledge, attitude and practice among barbers and clients in Gharbia governorate, Egypt. *East Mediterr Health J.* 2010;**16**(1):10-7.
14. Zahraoui-Mehadji M, Baakrim MZ, Laraoui S, Laraoui O, El Kabouss Y, Verger C, et al. [Infectious risks associated with blood exposure for traditional barbers and their customers in Morocco]. *Sante.* 2004;**14**(4):211-6.
15. nokhodian Z, Kassaian N, Ataei B, Javadi AA, shoaei P, Farajzadegan Z, et al. Hepatitis B Markers in Isfahan, Central Iran: A Population-Based Study. *Hepat Mon.* 2009;**9**(1):12-6.
16. She SL, Shi LY, Wu YJ, Li ZZ, Zheng CZ, Wu Yp, et al. A seroepidemiologic study of hepatitis B virus infection among barbers in Huangshi city, Hubei, China. *microbiol Immunol.* 1988;**32**(2):229-33.
17. Mele A, Corona R, Tosti ME, Palumbo F, Moiraghi A, Novaco F, et al. Beauty treatments and risk of parenterally transmitted hepatitis: results from the hepatitis surveillance system in Italy. *Scand J Infect Dis.* 1995;**27**(5):441-4.