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Analysis of Knowledge, Attitudes, and Prevalence of Hepatitis B and C Seromarkers Among Barbers in Tehran

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Abstract

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are major health problem in the world. Hairdressers (barbers) are in continuous contact with scissors and blades, and are considered a high-risk group for these infections.
Objectives: The aim of this study was to analyze the prevalence of hepatitis B and C infections in barbers in Tehran and to evaluate their attitudes and knowledge about the occupational risk of these infections.
Methods: Six hundred eleven barbers were included in this study. A group of 556 bakers were also selected from the same regions, as a low-risk control group. Serum levels of hepatitis B surface antigen (HBsAg), HBsAg-specific antibody (HBsAb), hepatitis B core antigen-specific antibody (HBcAb), and hepatitis C virus-specific (anti-HCV) antibody markers were measured with the enzyme-linked immunosorbent assay (ELISA). Participants were interviewed using a questionnaire consisting of four sections: demographic information, awareness, behavior, and personal attitudes.
Results: There were no significant differences in the frequency of HBsAg between the two groups. However, the frequency of HCV Ab in barbers was significantly higher than that in bakers ($P < 0.005$). In addition, the frequency of HBsAb marker in barbers was significantly correlated with increased awareness ($P < 0.05$) and number of tattoos ($P < 0.001$). HBcAb marker was significantly correlated with age ($P < 0.001$) and duration of professional career ($P < 0.005$). With age, barbers' attitudes improved significantly ($P < 0.05$).
Conclusions: Being a barber alone is not a potential risk factor for HBV infection, while HCV infection is still an occupational health hazards for barbers. We suggest more extensive case-control studies with regard to rates of hepatitis B and C markers among barbers in other Iranian cities to assess the incidence of hepatitis B and C infections among this population.

Keywords: Hepatitis B Infection, Hepatitis C Infection, Hepatitis B Antigen, Hepatitis C Antibody, Barbers

1. Background

Viral hepatitis B infection is a common, serious disease caused by the hepatitis B virus (HBV) (1). HBV is one of the main causes of hepatic decompensation, cirrhosis, and hepatocellular carcinoma (HCC) (1, 2). Worldwide, more than two billion people are infected with HBV and approximately 400 million people are HBV carriers; of these, 75% are Asian (3, 4). The prevalence of HBV carriers differs around the world and can be divided into regions of high, medium, or low endemicity. In low-prevalence areas, including the United States, Northern Europe, Australia, and parts of South America, the incidence of HBV carriers is less than 2%. In moderate-prevalence areas, such as the Middle East, some Eastern European countries, and the Mediterranean basin, the rate of HBV carriers is 2% - 8%. Finally, in high-endemic areas, such as the central Asian republics, Southeast Asia, Sub-Saharan Africa, and the Amazon basin, the HBV carrier rate is over 8% (1). Approximately 45% of the world's population lives in hyper-endemic areas (5). HBV infection is endemic in most Asian countries, and over 80% of liver cancers that occur in Asia are attributable to HBV (6). HBV infection is still the main cause of chronic liver disease in Iran, although its seroprevalence has decreased over the last two decades. Iran has an intermediate-to-low endemicity for HBV infection (7). A systematic review of

HBV infections in Iran revealed that the prevalence is approximately 2.14% (range 1.3% - 6.3%) across the provinces (8), while the rate of HBV carriers varies from 1.7% to 5.4%, with an average of 3.5% (9). So far, chronic hepatitis B remains the cause of more than 50% of cases of cirrhosis and HCC in Iran (10). A rise in general public awareness about HBV transmission, along with the mass vaccination program in place since 1993 for all neonates, healthcare workers, and others at risk of HBV infection, has influenced the outcome of this disease (10). The results of epidemiological studies in Iran showed that the predominant genotype and serotype of HBV are D and ayw2, respectively (11). The most common routes of HBV transmission in Iran are perinatal transmission and intravenous drug abuse; however, during recent years, the epidemiology of this infection is changing from a vertical to a horizontal route (12).

HCV infection also constitutes a major global health problem, and, like HBV, it is a leading cause of cirrhosis and HCC, which is considered as the third cancer-associated cause of deaths worldwide (13). Approximately 85% of individuals infected with HCV will develop chronic HCV infection (14). This infection affects more than 170 million people worldwide and the prevalence ranges from 0.2% to 40% in different countries. The prevalence of HCV infection is less than 0.5% (0.1% in women and 1.0% in men) in the general Iranian population (15).

Any modeling and assessment of burden associated with HBV and HCV infection requires prevalence estimates. So far, the HBV and HCV seroprevalence among high-risk jobs is limited, and comprehensive data are not available for many countries. Therefore, knowledge about the rate of these infections and their related risk factors are necessary for the implementation of any preventive program.

2. Objectives

The aim of this study was to analyze the prevalence of hepatitis B and C infections in barbers (as high-risk workers) compared with barbers (as the control group) in Tehran, and to evaluate their attitudes and knowledge about the occupational risk of hepatitis B and C in order to provide possible solutions for the preservation and promotion of health, the selection of appropriate preventive methods for the health authorities, and general public health.

3. Methods

3.1. Population and Study Design

The ethical standards of this study were approved by the ethics committee of the Avicenna research institute and the Iranian ministry of health. This case-control, cross-sectional study was conducted in Tehran, Iran, during 2008 - 2009. The target population was 611 barbers and 556 bakers who had been working in their professions for at least one year. The control group (bakers) was an occupational group with a lower occupational risk for HBV infection transmission.

Tehran is divided into 22 municipal districts, with almost 900 barbers working in each district. Considering our sample size and the ability of the sampling team to cover almost 35 samples each day, barbers and bakers were selected from 15 different regions by simple random sampling. A minimum number of selected participants from each district was considered to be almost 35; however, more than 35 participants were selected from districts with more than 900 barbers of bakers. Randomization was done using systematic sampling selection from each region based on an alphabetical list of the barbers and bakers provided by the Environmental Health Office of Tehran.

After informed consent was obtained, 5 ml of blood was collected from each participant. The samples were centrifuged and the serum was separated and kept in the freezer until the main tests were conducted.

HBV markers were detected using commercial ELISA kits (HBsAg, HBcAb, and HBsAb, IEMA, Radim, Italy; HCV Ab, Acon Laboratories, Inc. USA). All markers were measured according to the manufacturer's instructions. All markers, with the exception of HBsAb, were qualitatively determined. HBsAb was quantitatively measured based on the standard sample provided by the manufacturer. Serum levels lower than 10 mIU/mL were considered HBsAb-negative.

A questionnaire consisting of four sections (sociodemographic characteristics, awareness, attitudes, and behavior) was designed to measure the knowledge and attitudes of participants with regard to hepatitis B and C infections in the two study groups. The awareness section checklist included 12 closed questions. The knowledge scores in this section were divided into five groups, with the lowest score considered < 10 and the highest score considered between 29 - 34; therefore, 18 was calculated as an average score. The attitude section checklist included 11 questions, which were classified and analyzed based on the Likert scale. The attitude scores were divided into five groups, with the lowest score of 23 and the highest score of 49-55 therefore, 18 was calculated as an average score. In addition, the behavior and performance section of the checklist had 11 questions, which were analyzed based on the type of question. The content validity of the questionnaire was established by a panel of experts in infectious disease, public health, biostatistics, and immunology.

The internal consistency of the final version of the checklists was measured by the coefficient of Cronbach's

alpha test value, which varied from 0.75 to 0.82.

Based on the t-test, there was a significant difference ($P < 0.01$) between the mean age of the bakers (30.7 ± 10.7 years) and the barbers (38.2 ± 12 years). Therefore, the results were analyzed by multiple logistic regression. It was shown that age did not have a significant impact on other dependent variables, so it was excluded from the model.

3.2. Statistical Analysis

The collected data was analyzed with SPSS version 13, using the chi-square test, Fisher's exact test, the logistic regression model, and one-way analysis of variance (ANOVA).

A $P < 0.05$ was considered statistically significant. The statistical review of the study was performed by a biomedical statistician.

4. Results

4.1. Distribution of HBV and HCV Infection Markers in Barbers and the Control Group

Of the 1,167 participants, 52% were barbers and 48% were bakers. They were in the age range of 12 - 82 years, with an average age of 35 ± 3 years.

HBsAg ELISA test was positive in 1.1% of the barbers (7 of 611) and 1.4% of the bakers (8 of 556), with an overall prevalence of 1.3% (Table 1). Although the prevalence rate of HBsAg among the bakers was higher compared with the barbers (1.4% versus 1.1%), this difference was not significant.

The prevalence of HBcAb (only the presence of antibody was determined) among barbers was higher than that among bakers (9.2% versus 6.2%), but this was not significant ($P = 0.063$). Besides, the prevalence of HBsAb among barbers was also higher than that in bakers (31.9% versus 18%), which was statistically significant ($P < 0.001$).

Anti-HCV was detected in 13 individuals, with an overall prevalence of 1.1%. The prevalence rate of anti-HCV in barbers was higher than in bakers (2% versus 0.2%) and this difference was statistically significant ($P = 0.004$). Double infection was detected in only one barber, who was positive for both HBsAg and anti-HCV.

4.2. Attitudes and Knowledge About HBV and HCV

The majority of participants had a high level of knowledge about blood-borne HBV and HCV infections and their risk of transmission (over 50% correct answers for most questions). The difference in awareness regarding the existence of disease risk between the two groups was significant ($P < 0.001$). The difference between the barbers' and the bakers' knowledge about hepatitis B and C infections and the use of special needles for tattooing, drug use, blood, blood products, and contaminated clips and about body fluids capable of transmitting HBV and HCV. Combs was significant ($P < 0.001$) (Table 2). Table 3 reports the barbers' and bakers' knowledge levels about body fluids capable of transmitting HBV and HCV. A clear majority of barbers knew that these viruses can be transmitted by semen and saliva ($P < 0.001$).

Based on the information regarding the frequency of HBsAg and the attitudes of participants about hepatitis B and C, the barbers with greater numbers of tattoos and finger-cuts with needles, blades, and scissors, were more likely to be positive for HBsAg. There was a significant difference between the attitude of barbers and bakers regarding risk of the disease, their role in disease prevention, routes of disease transmission, self-protection against the disease, and staying in their occupation despite being disease carriers (Table 4).

4.3. Demographic Information and Prevalence of Infection

Analysis of the frequency of HBsAg and the demographic information showed that the majority of barbers with a history of divorce (3.1%), barbers without a high school diploma (1.6%), and barbers in the age range of 40 - 49 years (2.1%) were positive for HBsAg. Approximately equal numbers of men and women were HBsAb-positive. The level of HBsAb was higher in barbers aged 50 - 59 years, those who were widows or widowers, those with 21 - 30 years of work experience, and those who had acquired skills through training courses. In addition, barbers with university degrees had higher levels of HBsAb. In addition, a greater number of barbers with positive HBsAb lived in Regions 1 and 8, according to the Tehran regional municipality.

Table 5 demonstrates the practical experiences of barbers and bakers with regard to hepatitis B and C infections. The results showed that there was a statistically significant difference in vaccination histories among the bakers and barbers, as a higher number of barbers had received the 3-dose hepatitis B vaccination ($P < 0.001$). However, there was no statistically significant difference in histories of blood transfusion and drug abuse between the bakers and barbers.

5. Discussion

The results of our study showed that being a barber alone is not a potential risk factor for HBV infection. The results also showed barbers' higher level of knowledge about HBV and HCV routes of transmission and being at risk of the diseases. Barbers in Iran can be considered at high risk for developing HCV infections, and HCV is still an occupational health hazard for these individuals.

Table 1. Prevalence of HBV and HCV Seromarkers Among Barbers and Bakers in Tehran, Iran[a]

Hepatitis Infection Markers	Barbers (n = 611)	Bakers (n = 556)	Total	P Value
HBsAg	7 (1.1)	8 (1.4)	15 (1.3)	0.797
Anti-HCV	12 (2)	1 (0.2)	13 (1.1)	0.004
Anti-HBc	56 (9.2)	36 (6.2)	92 (7.9)	0.063
Anti-HBs	190 (31.9)	102 (18)	292 (25)	0

[a]Values are expressed as No. (%).

Table 2. Knowledge of Barbers and Bakers Regarding Hepatitis B and C Infections[a]

Questions	Group			Age					Total
	Barbers	Bakers	P Value	≤ 20	20 - 30	30 - 40	≥ 40	P Value	
Do you have any risk of hepatitis B/C disease?	454 (74.3)	218 (39.1)	< 0.001	43 (45.3)	209 (51.6)	217 (65.5)	198 (63.5)	< 0.001	667 (58.4)
Is personal hygiene effective for the control of hepatitis B/C?	508 (83.1)	475 (84.7)	0.569	83 (86.5)	339 (83.5)	278 (84.2)	265 (84.4)	0.913	965 (84.2)
Is vaccination effective for the control of hepatitis B infection?	475 (77.7)	451 (80.7)	0.266	67 (69.8)	321 (79.3)	276 (83.6)	243 (77.4)	0.021	907 (79.2)
Is there any association between hepatitis B/C infection with tattoos, earrings, or body piercings?	295 (48.3)	136 (25.5)	<0.001	20(21.7)	131 (33.3)	140 (43.2)	138 (43.9)	< 0.001	429 (38.2)
Is hepatitis B/C infection associated with IV drug use?	355 (58.1)	258 (48.1)	0.001	42 (45.7)	190 (48.1)	188 (58)	183 (58.3)	0.006	603 (53.6)
Is there any risk of hepatitis B/C with blood and blood products?	371 (60.7)	184 (34.3)	< 0.001	37 (40.2)	172 (43.5)	170 (52.5)	171 (54.5)	0.005	402 (48.9)
Is there any risk of hepatitis B/C with unsafe sex?	384 (46.6)	122 (22.8)	< 0.001	22 (23.9)	129 (32.7)	117 (36.1)	134 (42.7)	0.003	402 (35.7)
Is there any risk of hepatitis B/C with the use of contaminated tattoo needles?	380 (62.3)	264 (48.4)	< 0.001	40 (43.5)	210 (52.6)	190 (58.3)	193 (61.5)	0.007	633 (56)
Is there any risk of hepatitis B/C with the use of contaminated blades?	485 (79.4)	332 (60.9)	< 0.001	55 (59.8)	266 (66.7)	245 (74.9)	234 (74.5)	0.004	800 (70.7)
Is there any risk of hepatitis B/C with the use of contaminated scissors?	213 (34.9)	54 (9.9)	< 0.001	7 (7.6)	69 (17.3)	79 (24.2)	109 (34.7)	< 0.001	264 (23.3)
Is there any risk of hepatitis B/C with contaminated semen?	118 (19.3)	27 (5.1)	<0.001	9(9.9)	43(10.8)	43(13.3)	49(15.7)	0.209	144(12.8)
Is there any risk of hepatitis B/C with contaminated saliva?	130 (21.3)	33 (6.2)	< 0.001	2 (2.2)	59 (14.9)	49 (15.1)	50 (16)	0.007	160 (14.3)

[a]Numbers before the parentheses represent the number of barbers or bakers who answered "yes"; numbers in parentheses represent percentages (valid percent) of each group; the total number represents the sum of numbers in each age group; it is not equal to the sum of barbers and bakers because some participants did not give their age on the questionnaire.

Table 3. Barbers' and Bakers' Knowledge About Bodily Fluids Capable of Transmitting Hepatitis B and C[a]

Fluid	Barbers, No. (%)	Bakers, No. (%)	P Value
Blood	533 (82.2)	463 (86.1)	0.551
Semen	118 (19.3)	27 (5)	0.000
Saliva	130 (21.3)	33 (6.2)	0.000

[a]This table shows barbers' and bakers' knowledge about the possibility of transmitting HBV and HCV via bodily fluids; No. represents the number of barbers or bakers who were aware of this information, and % represents the percentage (valid percent) of each group, by comparing the numbers in these groups with the total number of barbers or bakers.

The assessment of hepatitis B and C prevalence in different communities, especially among high-risk occupations, has been considered a basic element of public health programs (8, 16). Rates of HBV and HCV infections vary markedly from one country or region to another, and depend on host characteristics and environmental conditions (17, 18). In the last few decades, the popularity of hairdressing has increased worldwide (19). The prevalence of HBV and HCV infections has been widely investigated in many occupational groups, but few data are available on the prevalence in barbers as a high-risk group. The present study would be considered a complementary study to previous ones in Iran and other countries. The prevalence of HBV infection is approximately 2.14% (range 1.3% - 6.3%) across Iran's provinces, while the prevalence of HCV infection is less than 0.5% in the Iranian general population (8, 15). Our results showed that the prevalence of HBsAg among barbers was about 1.1%, almost the same as in the control group of bakers (1.4%). Thus, we found that being a barber alone is not a potential risk factor for HBV infection, although the opposite has been shown in other countries (18, 20). Based on similar studies in other countries, the prevalence of HBsAg in Egyptian barbers and their clients is 4.2% and 3.9%, respectively, while the rates are 8.5% and 1.9% among Turkish and Moroccan barbers, respectively (18, 21, 22).

We found that HBsAb was present in 31.9% of barbers and only 18% of bakers, which is a significant difference. This demonstrates barbers' greater knowledge about the benefits of hepatitis B vaccination.

In our study, HCV seropositivity was 2% in barbers,

Table 4. Attitudes of Barbers and Bakers Regarding Hepatitis B and C Infections

Attitude Item	Barbers %					Bakers %					P Value
	Strongly Disagree No. (%)	Disagree No. (%)	No Comment No. (%)	Agree No. (%)	Strongly Agree No. (%)	Strongly Disagree No. (%)	Disagree No. (%)	No Comment No. (%)	Agree No. (%)	Strongly Agree No. (%)	
Community is at risk for hepatitis B/C	3 (5)	13 (21)	66 (10)	198 (32.6)	328(53.9)	1 (0.2)	14 (2.7)	79 (15.1)	192 (36.8)	236 (45.2)	0.02
Possibility of hepatitis B/C in people who use needles, razors, blades, or knives is higher than in others	3 (0.5)	12 (2)	40 (6.5)	182 (29.8)	374 (61.2)	1 (0.2)	7 (1.3)	37 (7)	209 (39.7)	272 (51.7)	0.007
I avoid any contact with hepatitis B/C patients	20 (3.3)	74 (12.2)	75 (12.4)	152 (25)	286 (47.1)	15(2.8)	62 (11.5)	74 (13.8)	53 (28.4)	234 (43.5)	0.5
I have been exposed to hepatitis B/C risk	32 (5.3)	78 (12.9)	103 (17)	186 (30.3)	212 (34)	48 (9.2)	99 (19.1)	113 (21.8)	162 (31.2)	97 (18.7)	0.000
I am effective at preventing hepatitis B/C	5 (0.8)	27 (4.4)	55 (9.1)	2.6(35.6)	304 (50.1)	6 (1.2)	59 (11.3)	113 (21.7)	188 (36)	155 (29.8)	0.000
Hepatitis B/C could be transferred to me through infected people	9 (1.5)	48 (7.9)	52 (8.5)	243 (39.9)	257 (42.2)	20 (3.9)	76 (14.7)	81 (15.6)	208 (40.2)	133 (25.7)	0.000
I would leave my job if I am a disease carrier	190 (31.1)	133 (21.8)	122 (20)	115 (18.9)	50 (8.2)	150 (28.4)	145 (27.4)	134 (25.3)	81 (15.2)	19 (3.6)	0.001
Exclusion of hepatitis B/C patients is a good method of prevention	118 (19.3)	95 (15.5)	92 (15.1)	192 (31.4)	114 (18.7)	123 (23.3)	129 (24.5)	97 (18.4)	13 (26)	41 (7.8)	0.000
I need to protect myself at work	5 (0.8)	12 (2)	34 (5.6)	167 (27.3)	393 (64.2)	0	5 (0.9)	29 (5.4)	206 (38.4)	297 (55.3)	0.000
I would keep my job even if I am disease carrier	49 (8)	103 (16.9)	88 (14.4)	159 (26)	202 (34.7)	14 (2.7)	55 (10.4)	74 (14)	187 (35.5)	197 (37.4)	0.000
Disposable blades are effective against hepatitis	8 (1.3)	10 (1.6)	17 (2.8)	101 (16.5)	475 (77.7)	-	-	-	-	-	-

which is significantly higher than that in the control group (0.2%). However, this rate was not significant in Turkey (18). Therefore, the prevalence of HCV was found to be higher in Iranian barbers in comparison with the control group, while the rate was similar for HBV. Thus, barbers could be considered at high risk of developing HCV infections in Iran, and HCV is still an occupational health hazard for them. Our results showed that 9.2% of the barbers were HBcAb-positive compared with 6.2% of bakers. However, the rates of HBcAb in barbers (12.3%) and their clients (12.7%) in some regions of Egypt were almost the same (21).

The use of sharp tools in barbershops could be a potential risk factor for blood-borne disease transmission and infections such as hepatitis. Previous studies have demonstrated that the use of shared and unsterile blades is a risk factor for hepatitis infection in developing countries, such as Italy and Turkey (19, 23, 24).

Our results showed significant differences between barbers and bakers regarding knowledge and awareness of hepatitis and its mode of transmission (Table 2). Attitudes were also assessed in barbers and bakers, and the results showed that in special cases, barbers' attitudes were better than those of bakers (Table 4). All participants who were positive for HBsAg and HBcAb were asymptomatic, with a

Table 5. Practical Experience of Barbers and Bakers Regarding Health and Safety[a]

Question	Group			Age					Total No. (%)
	Barbers No. (%)	Bakers No. (%)	P Value	≤ 20 No.(%)	20 - 30 No. (%)	30 - 40 No. (%)	≥ 40 No. (%)	P Value[b]	
Do your customers use separate accessories?	116 (19.1)	-	-	6 (27.3)	33 (20.5)	32 (15.8)	45 (20.2)	0.127	116 (19.1)
Have your customers used separate accessories for more than 7 years?	79 (13)	-	-	3 (13.6)	12 (7.5)	29 (14.4)	35 (15.8)	0.535	79 (13)
Have you ever been vaccinated with hepatitis B vaccine?	221 (36.2)	145 (26.5)	< 0.001	32 (35.2)	130 (32.4)	103 (31.5)	97 (31)	0.818	362 (32)
Have you completed the 3-dose hepatitis B vaccination?	158 (25.8)	55 (9.9)	< 0.001	16 (40)	60 (42.3)	65 (59.6)	71 (69.6)	> 0.001	212 (53.9)
Have you had any blood transfusions?	43 (7)	22 (4)	0.069	5 (5.7)	16 (4.3)	19 (6.1)	22 (7.3)	0.813	62 (5.8)
Have you had any drug abuse experience?	5 (0.8)	9 (1.9)	0.172	0	6 (5)	4 (1.3)	4 (1.4)	0.500	10 (1)
Did you have tattoos?	120 (19.6)	8 (3.8)	< 0.001	5 (10.6)	33 (12.9)	44 (18.8)	41 (16.1)	0.219	128 (15.7)
Have you had blade-cuts on the fingers more than 5 times?	233 (38.1)	-	-	8 (36.4)	67 (41.6)	74 (36.5)	84 (37.3)	0.972	233 (38.1)
Have you had scissor-cuts on the fingers more than 5 times?	212 (34.7)	-	-	8 (36.4)	69 (36.6)	80 (39.4)	65 (28.9)	0.219	212 (34.7)

[a] No. represents the number of barbers or bakers who answered "yes" to these questions; for example, in the first question, 116 barbers answered "yes", which is 19.1% of the total barbers who participated in the survey.
[b] Chi-square test was used to calculate P values; the total number represents the sum of numbers in each age group; it is not equal with the sum of barbers and bakers, because some participants did not provide their age on the questionnaire.

lack of awareness about their disease, which makes them high-risk candidates for chronic disease and disease transmission in society. In general, the concept of infectious risk associated with blood is well understood by many barbers in Iran.

The results of a study among Egyptian barbers showed that the participants did not have sufficient knowledge, as only 40% were informed about hepatitis B and C protective vaccinations and drugs. Egypt has the highest prevalence of HCV in the world, and the rate of this infection increases steadily with age (21). Awareness, especially about the risk of transmission of blood-borne infectious diseases, is even lower in Pakistan, Morocco, and Ethiopia (21, 22, 24). Some scientists believe that the relatively high prevalence of hepatitis C in Egypt is related to a weakened immune system following common infections such as schistosomiasis; however, no significant correlation between the incidences of these two diseases in Egypt or Brazil has yet been documented (21). Interestingly, in some studies, researchers have not found any correlation between barbershops' hair-cutting tools and an increased risk of viral infections, including hepatitis. Shalaby et al. (21) believe that hepatitis B and C are not considered significant dangers for barbers in Egypt, as there is no significant difference in the incidence of hepatitis between them and the general population.

In 2007, a study was conducted in Pakistan to measure awareness of barbers regarding blood-borne diseases, such as hepatitis and HIV. It was found that approximately 70% of participants had not seen or heard in the media any educational program about these diseases. While nearly 90% of them did not agree on regular public screening programs against blood-borne infectious diseases, 97% were willing to be tested for these infections. The status of these professions becomes even more problematic because barbers in some rural communities in Pakistan also provide other services, such as circumcision, incisions, and wound drainage (25, 26).

Hepatitis B vaccinations in Morocco were begun in 1999; today, more than 90% of infants born in Morocco receive the vaccination while adults remain at risk for both hepatitis B and C. The prevalence rates of hepatitis B and C among barbers in various regions of Rabat in Morocco are approximately 28% and 1.1%, respectively (22). However, only 1.9% of barbers with the active form of HBV infection have been reported by measuring HBsAg. The prevalence of hepatitis B in the age range of 45 - 70 years was significantly higher than that in younger age groups (22). Approximately 70% of participants in these studies had no education or dropped out of primary school, and approximately 94% suffered from low socioeconomic status. Less than 1% of the respondents had no information about hepatitis. Apparently, the risk of hepatitis B in Moroccan barbers and general public was equal. However, similar studies in China, Turkey, and Italy showed that barbers are more likely to acquire active HBV infection (22). Chaudhry et al. (24) studied hepatitis rates and awareness among barbers in Islamabad, Pakistan, and showed that although the majority (89.7%) showed an interest in screening for hepatitis B and C, only 1% were informed about the mode of transmission and prevention of the diseases.

As mentioned above, based on Candan's work, the seropositivity of hepatitis B in barbers in the Sivas region of Turkey was significantly different from the control group. It appears that scissor-cuts and needle-pricks confer a three-times-higher risk of HBV infection acquisition in barbers. They showed that 8.5% of barbers were HBsAg-positive, while the prevalence of HBsAg carriers in the Turk-

ish population is approximately 4% - 5%. They also showed that seropositivity of hepatitis C in the barber group was 2.8%, which was not significantly different from the control group (1.1%) (18, 27).

The use of blades for shaving in barbershops is a mode of hepatitis transmission throughout the world, and also the use of other unsterile tools could be considered an infection-transmission factor (28).

Although the level of awareness about hepatitis and the risk of transmission were good among Iranian barbers, there are still some unsafe practices that may lead to infections due to blood-borne viruses. Therefore, extensive training programs and media campaigns are still essential for raising awareness throughout society. In conclusion, it is expected that educational classes could increase the awareness of high-risk groups about prevention and the signs and symptoms of hepatitis. According to the present results, it is necessary to conduct health-training courses and awareness programs for the general public, not just for high-risk groups. This should be part of a comprehensive media training programs by health policymakers. Finally, the current study provides evidence and a reason for the initiation of larger studies in Iran to obtain more useful information about the incidence, mode of transmission, and transmission patterns of infectious diseases and their associations with certain professional groups such as barbers.

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Footnotes

Authors' Contribution: Fazel Shokri: study concept and design, study supervision; Tahereh Khairkhah: study concept and acquisition of data; Ayat Shamsa and Azam Roohi: acquisition of data; Jalal Khoshnoodi: technical and material support; Vand Fatemeh Rajabpour: drafting of the manuscript; Mina Tabrizi: critical revision of the manuscript; Saeed Zarei: statistical analysis; Forough Golsaz-Shirazi, Fazel Shokri: drafting and critical revision of the manuscript.

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