

Original Research Article

Prevalence of Hepatitis B Virus Infection among Barbers and Butchers

Sura Mustafa Qasim^{1*}

¹College of Dentistry, Tikrit University, Tikrit, Iraq

***Corresponding Author:** Sura Mustafa Qasim
College of Dentistry, Tikrit University, Tikrit, Iraq

Article History

Received: 10.07.2026

Accepted: 04.09.2026

Published: 08.09.2026

Abstract: **Background:** Certain occupational groups, particularly barbers and butchers, face an increased risk of hepatitis B virus (HBV) infection. HBV is a partially double-stranded DNA virus from *Hepadnaviridae* family and a major global health concern for occupational health professionals due to their frequent contact with sharp instruments and the potential for blood borne pathogen transmission. Also The virus can remain infectious on environmental surfaces for seven days or more and has a very low minimum infectious dose, making contaminated razors and knives effective vectors of infection. This study aimed to determine the prevalence of hepatitis B surface antigen (HBsAg) positivity among barbers and butchers in Salah al-Din Governorate, Iraq, and compare it to a control group that had not been exposed to the virus. It also aimed to describe some demographic and occupational characteristics of participants infected with HBsAg using a survey. **Method:** A cross-sectional study conducted in Salah Al-Din Governorate, Iraq, specimen collected from January to June 2025. The study included 900 specimen with 20–70 years in age, encompassed 300 Barbers, 300 Butchers, and 300 healthy individuals as a control group. Demographic and occupational data were collected through survey, while Serum samples were tested for hepatitis B surface antigen (HBsAg) using ELISA, with statistical significance considered at $P < 0.05$. **Results:** This study included 900 samples, equally divided into 300 samples each for barbers, butchers, and a control group. A positive result of (HBsAg) appearance in 34 (11.3%) barbers and 28 (9.3%) butchers, while no positive cases in the control group. The prevalence of hepatitis B infection differed significantly among the three study groups ($\chi^2 = 34.229$, $df = 2$, $p < 0.001$). Among barbers, infection was significantly associated with age, with the highest prevalence observed among participants aged 31–40 years (20.0%). In contrast, no significant association between age and hepatitis B infection was found among butchers. Notably, most HBsAg-positive participants did not report any symptoms, indicating that infection was frequently asymptomatic. Occupational factors also showed a considerable risk of exposure, with accidental cuts reported more frequently among butchers (71.4%). In addition, the methods used to decontaminate and sterilize working tools varied between barbers and butchers, reflecting differences in occupational hygiene practices **Conclusion:** The results showed that the prevalence of hepatitis B surface antigen (HBsAg) was higher among barbers compared to butchers. In addition, most HBsAg infections were asymptomatic. These results show the need to target occupational health professionals more through hepatitis B vaccination and continuous periodic screening, along with taking infection control measures in these professions specifically, given their importance in increasing the spread of the disease among other groups. Further studies should be conducted by taking samples from different locations and performing confirmatory molecular tests.

Keywords: Hepatitis B Virus, HBsAg, Prevalence, Occupational Exposure, Barbers, Butchers, ELISA, Iraq.

INTRODUCTION

Hepatitis B virus (HBV) is an enveloped DNA virus belonging to the family *Hepadnaviridae*. It has a small, partially double-stranded DNA genome of approximately 3.2 kb that contains four overlapping genes encoding the surface, core, polymerase, and X- proteins. HBV replicates through reverse transcription, which contributes to its genetic diversity. Ten genotypes (A–J) have been identified, D genotype being the predominant genotype in the Middle East, including Iraq [1–3]. Hepatitis B surface antigen (HBsAg) is the main serological and the first detectable marker following of HBV infection, also persistent for more than six months indicates chronic infection. HBV is of particular concern in occupations

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

CITATION: Qasim, S. M. (2026). Prevalence of Hepatitis B Virus Infection among Barbers and Butchers. *South Asian Res J Med Sci*, 8(5), 169-176. <https://doi.org/10.36346/sarjms.2026.v08i05.001>

involving frequent contact with blood and sharp instruments because the virus can remain infectious on surfaces and equipment for several days, allowing contaminated razors, blades, scissors, and knives to act as potential sources of transmission [4].

Globally, HBV remains a major public health problem, with about 240 million people living with chronic infection in 2024 and around 1.1 million deaths annually, mainly from cirrhosis and hepatocellular carcinoma, although vaccination is highly effective, many infected individuals remain undiagnosed and untreated. Iraq is considered a low-to-intermediate endemic area for hepatitis B virus (HBV), with an estimated national HBsAg prevalence of around 1.6%. Nevertheless, higher prevalence rates have been reported among certain populations and in specific regions, suggesting that the burden of HBV infection is not evenly distributed across the country [2-8].

Barbers and butchers may face a higher occupational risk of hepatitis B virus infection, as their work often involves exposure to blood and the use of sharp instruments. The prevalence of hepatitis B virus surface antigen (HBsAg) among barbers has varied considerably between countries, while studies in butchers have generally indicated lower rates; however, infection remains a significant occupational concern [9-13]. Poor awareness of HBV prevention and inadequate handling or disinfection of sharp instruments may further increase the risk of transmission [9-16].

Aim of Study:

To identify the prevalence of hepatitis B surface antigen (HBsAg) among Barbers and Butchers in Tikrit, Iraq; to compare it with out-exposed controls; and to characterize the demographic and occupational profile of positive individuals by survey.

MATERIALS AND METHODS

A cross-sectional study was conducted in Salah Al-Din Governorate-Iraq. The samples collation during January to June 2025. The study included 900 participants aged 20–70 years, divided equally into three groups: 300 barbers, 300 butchers employed in meat shops and the municipal abattoir, and 300 apparently healthy controls. Participants who agreed to participate provided informed consent. Demographic and occupational information was collected through a survey, involving: residence, age, symptoms, marital status, education, and years of employment, occupational cuts, blood exposure, and instrument-cleaning practices. About 5 mL sample collected under aseptic conditions and put in to a plain tube without anticoagulant. After that, the samples were centrifuged at 4500 rpm for 10 minutes, and separated serum and stored at -80°C for subsequent use. HBsAg detected using an enzyme-linked immunosorbent assay (ELISA), and positive results were confirmed by repeat testing. Associations between HBV infection and the studied variables were assessed using the chi-square test, with statistical significance set at $P < 0.05$.

Exclusion Criteria:

Individuals with known chronic viral hepatitis receiving treatment, recent blood transfusion, hemodialysis, or immunosuppression.

RESULT AND DISCUSSION OF DATA

A total of 900 participants were enrolled in the study, with 300 individuals in each group: barbers, butchers, and controls. HBV infection was detected in 34 barbers (11.3%; 95% CI: 8.2–15.4%) and 28 butchers (9.3%; 95% CI: 6.5–13.2%), whereas no positive cases were identified among the control group (0%; 95% CI: 0–1.3%). Accordingly, (88.7%) barbers, (90.7%) butchers, and all controls (100%) were negative for HBV infection. A statistically significant difference in HBV infection distribution was observed among the three groups ($\chi^2 = 34.229$, $df = 2$, $P < 0.001$), with the highest prevalence recorded among barbers, followed by butchers, while no infection was detected in the control group. The distribution of HBsAg positivity across the study groups is summarized in Figure 1.

The distribution of HBV infection across the different age groups showed distinct patterns among barbers and butchers. Among barbers, the highest proportion of infection was observed in the (31–40-year) age group, with 12 infected participants (20.0%), and followed by the (41–50-year) group, with 10 cases (16.7%). The lowest proportion was recorded among those aged (20–30 years), with 3 cases (5.0%) Infection. A statistically significant association was observed between age group and infection status among barbers ($\chi^2 = 10.42$, $df = 4$, $P = 0.034$). Among butchers, the highest proportion of infection was found in the (51–60-year) age group, with 9 infected participants (15.0%). In contrast to the findings among barbers, the association between age group and infection status among butchers was not statistically significant ($\chi^2 = 3.39$, $df = 4$, $P = 0.495$). These findings that age was significantly associated with HBV infection status among barbers, whereas no statistically significant age-related association among butchers. The different patterns observed between the two occupational groups may reflect differences in occupational exposure, work practices, duration of employment, or other behavioral and demographic factors. The age-specific distribution of HBsAg prevalence is presented in Table 1.

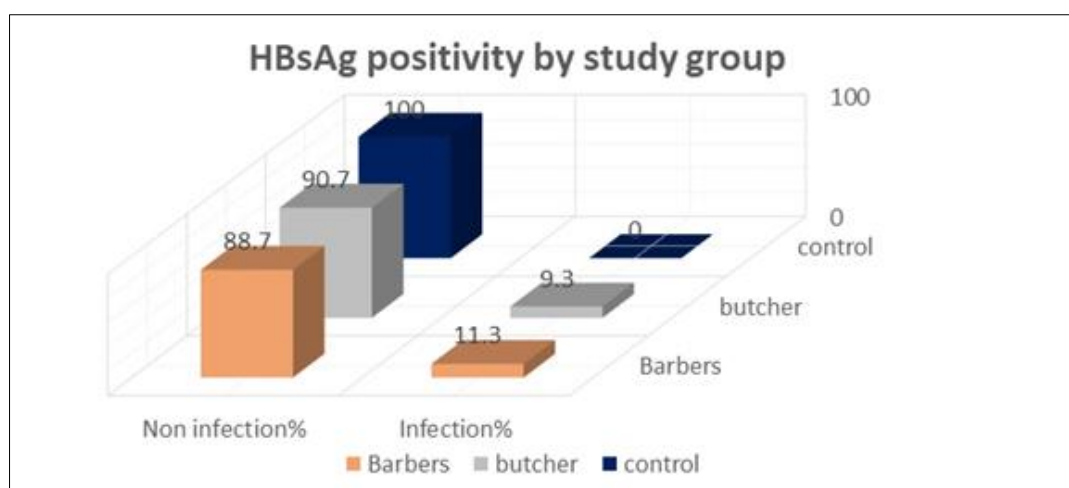


Figure 1: Prevalence of HBsAg positivity by study group (N = 900) ($\chi^2 = 34.229$, df = 2, $P < 0.001$), According to Age

Table 2: Prevalence of HBsAg among barbers and butchers according to Age

Age group	Barbers		Butchers	
	Infection	Non-infection	Infection	Non-infection
20–30	3 (5.0%)	57 (95.0%)	6 (10.0%)	54 (90.0%)
31–40	12 (20.0%)	48 (80.0%)	4 (6.7%)	56 (93.3%)
41–50	10 (16.7%)	50 (83.3%)	5 (8.3%)	55 (91.7%)
51–60	4 (6.7%)	56 (93.3%)	9 (15.0%)	51 (85.0%)
61–70	5 (8.3%)	55 (91.7%)	4 (6.7%)	56 (93.3%)

Chi-square test: barbers, $\chi^2 = 10.42$, df = 4, $P = 0.034$; butchers, $\chi^2 = 3.39$, df = 4, $P = 0.495$.

Symptom Status among Positive Participants

Among the HBsAg positive participants, most were asymptomatic in both occupational groups. Among positive barbers, 21 (61.8%) reported no symptoms, while 13 (38.2%) were symptomatic. A similar pattern was observed among positive butchers, with 17 (60.7%) being asymptomatic and 11 (39.3%) reporting symptoms. Overall, asymptomatic participants accounted for the larger proportion of HBsAg-positive cases in both groups. However, the difference in symptom distribution between barbers and butchers was not statistically significant ($\chi^2 = 0.007$, df = 1, $P = 0.933$). The result Shaw in Figure 2.

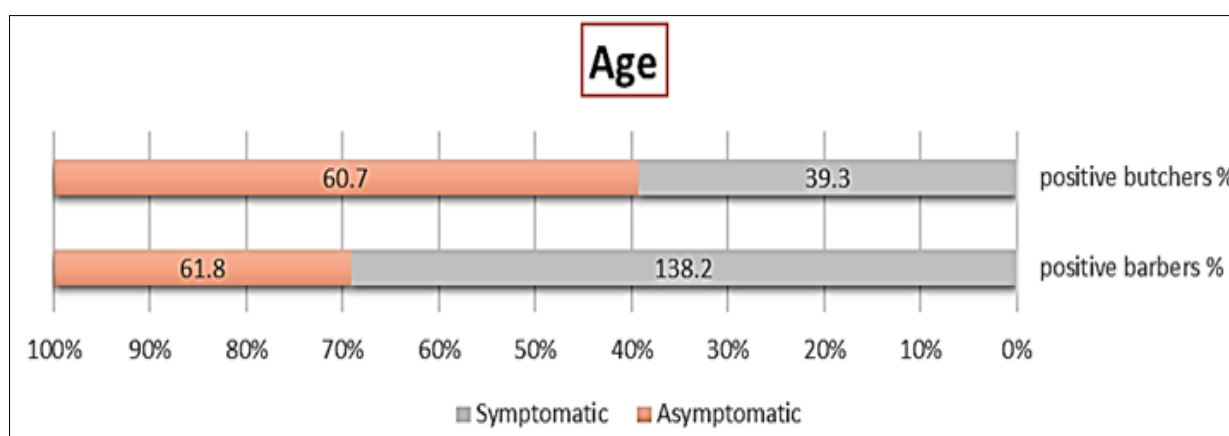


Figure 2: Prevalence of HBsAg among barbers and butchers according to Age ($\chi^2 = 0.007$, df = 1, $P = 0.933$)

Residence of Positive Participants

The distribution of HBsAg-positive participants differed between the two occupational groups according to place of residence. Among positive barbers, the majority were from urban areas (55.9%). While 44.1% were from rural areas. In contrast, most positive butchers were from rural areas, accounting for 75.0% of the positive cases, compared with 25.0% from urban areas. This difference was statistically significant ($\chi^2 = 6.014$, df = 1, $P = 0.014$), the result Shaw in Figure 3.

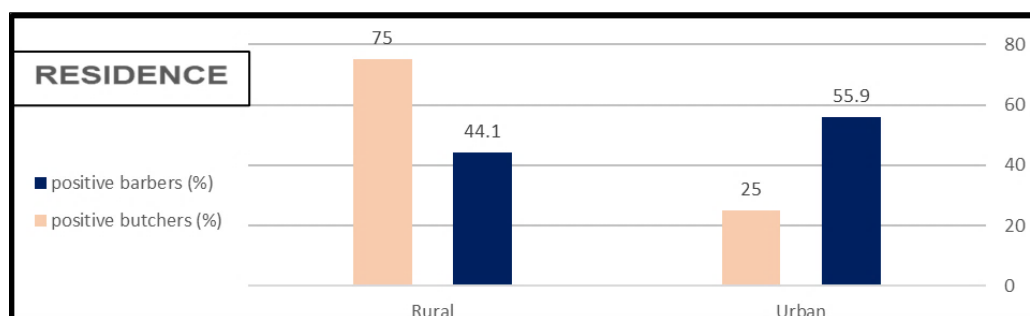


Figure 3: Prevalence of HBsAg among barbers and butchers according to Residence. $\chi^2 = 6.014$, $df = 1$, $P = 0.014$

Marital Status among Positive Participants

Regarding marital status, married participants represented the largest proportion of HBsAg-positive cases in both occupational groups. Among positive barbers, 52.9% were married, followed by 29.4% who were single and 17.6% who were divorced. A similar pattern was observed among positive butchers, where married participants accounted for 67.9% of the positive cases, while 25.0% were single and 7.1% were divorced, this difference was statistically significant ($\chi^2 = 6.014$, $df = 1$, $P = 0.014$). The result Shaw in Figure 4.

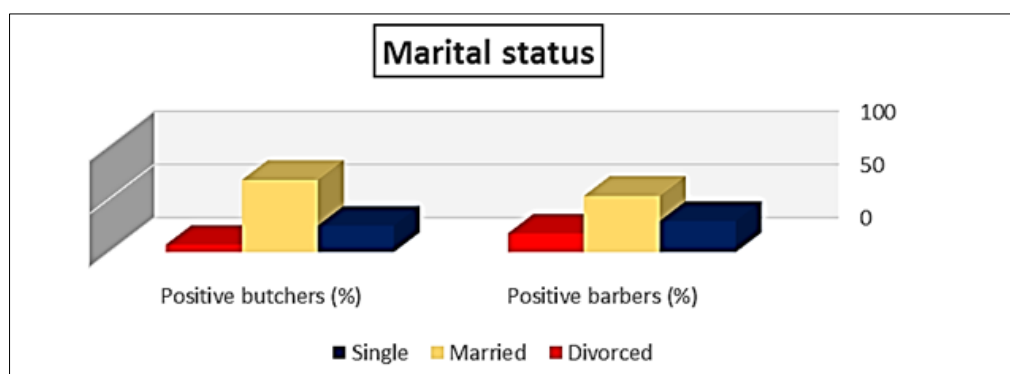


Figure 4: Prevalence of HBsAg among barbers and butchers according to marital status. ($\chi^2 = 6.014$, $df = 1$, $P = 0.014$)

Accidental Cuts of Positive Participants

Accidental cuts during work were reported by 52.9% of HBsAg-positive barbers, whereas 47.1% had not experienced a work-related cut. Among positive butchers, the proportion reporting accidental cuts was higher, reaching 71.4%, while 28.6% reported no history of such injuries. However, this difference between the two occupational groups was not statistically significant ($\chi^2 = 2.257$, $df = 1$, $P = 0.133$). The result Shaw in Figure 5.

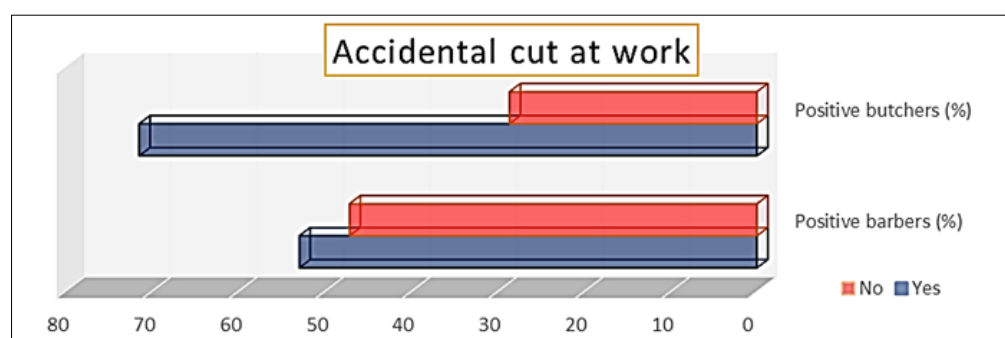


Figure 5: Prevalence of HBsAg among barbers and butchers according to accident cuts at work. ($\chi^2 = 2.257$, $df = 1$, $P = 0.133$)

Instrument Decontamination Methods among Positive Participants

The methods used to decontaminate work instruments differed between the two occupational groups. Among HBsAg-positive barbers, alcohol or other disinfectants were the most commonly used method (58.8%), followed by sterilization devices (29.4%) and soap and water (11.8%). None of the barbers reported using water alone. In contrast, most positive butchers reported using soap and water for instrument decontamination (89.3%), while 10.7% reported using alcohol or disinfectants. No butchers reported using water alone or a sterilization device. The result Shaw in Figure 6.

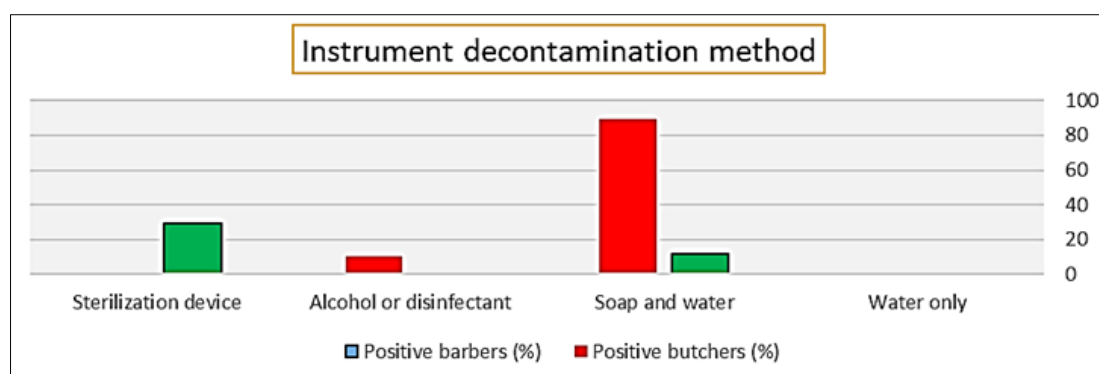


Figure 6: Prevalence of HBsAg among barbers and butchers according to Instrument decontamination methods

Duration of Occupational Exposure and HBV Infection

The distribution of HBV infection according to the duration of employment showed some variation between barbers and butchers. Among barbers, the highest number of infected participants was observed among those who had worked in the occupation for 1–5 years, with 15 cases, followed by 8 cases among those with 6–10 years of experience and 2 cases among those who had worked for less than one year. Among butchers, 8 infected participants had 6–10 years of occupational experience, while 7 had worked for 1–5 years and 5 had worked for less than one year. The result Shaw in Figure 7.

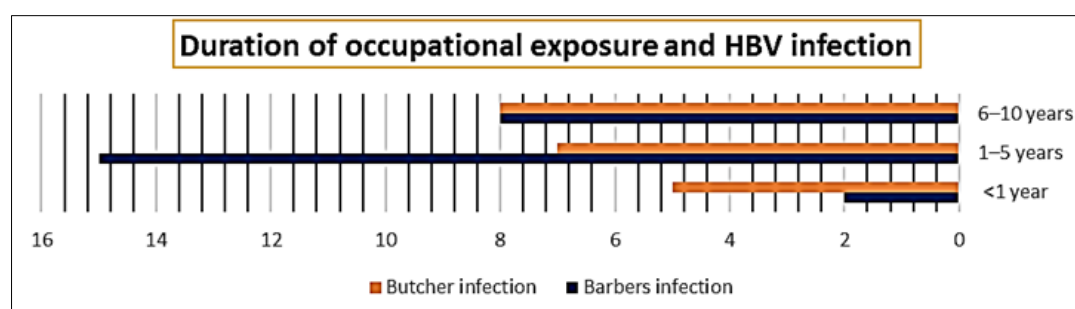


Figure 7: Prevalence of HBsAg among barbers and butchers according to Duration of occupational exposure

Educational Level among Seropositive Participants

The distribution of HBsAg-positive participants according to educational level showed some variation between barbers and butchers. Among barbers, the highest proportion of positive participants had a diploma or institute-level education (32.4%), followed by those with secondary education (26.5%) and those who were illiterate (23.5%). Participants with primary education accounted for 14.7%, while only 2.9% had a university education or higher. Among butchers, primary education represented the largest proportion of HBsAg-positive participants (39.3%), followed by illiterate participants (32.1%). Those with secondary education accounted for 14.3%, while 10.7% had a diploma or institute-level education. The lowest proportion was observed among participants with a university education or higher (3.6%). Although the educational distribution differed between the two occupational groups, the difference was not statistically significant ($\chi^2 = 8.300$, $df = 4$, $P = 0.081$). The result Shaw in Figure 8.

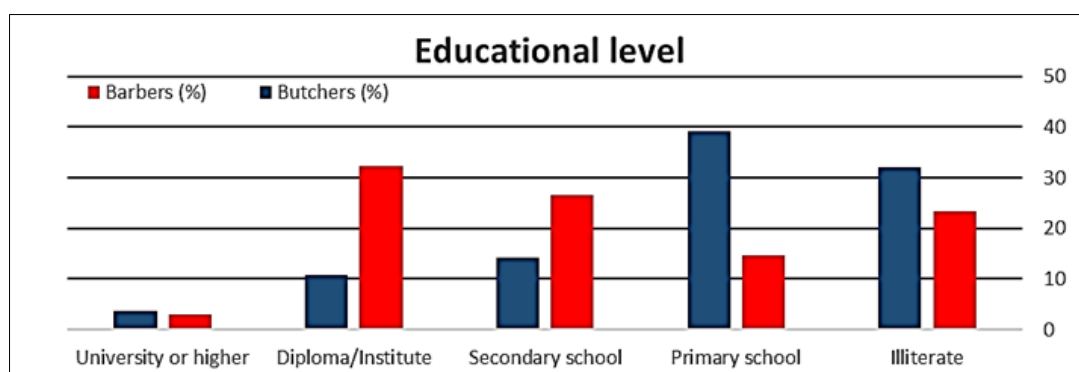


Figure 8: Prevalence of HBsAg among barbers and butchers according to educational level ($\chi^2 = 8.300$, $df = 4$, $P = 0.081$)

DISCUSSION

The main finding of this study was the higher prevalence of HBsAg among barbers and butchers compared with the control group. HBsAg positivity was detected in 11.3% of barbers and 9.3% of butchers, whereas no positive cases were identified among controls ($P < 0.001$). The prevalence among barbers was higher than that reported in Egypt (4.2%) and India (2%), but lower than rates reported in Ghana (14.5%), Cameroon (15.0%), and China (16.8%). Among butchers, the prevalence observed in the present study was higher than that reported in Sudan (3.1%) and comparable to findings from Nigeria (9.4–11.6%) [4-19].

These differences may reflect variations in study populations, geographical settings, healthcare access, vaccination coverage, and occupational practices. The relatively high prevalence observed in both occupational groups also indicates the importance of considering barbers and butchers as groups potentially exposed to HBV through work-related contact with blood and contaminated instruments with poor knowledge of transmission and prevention [15].

Age was significantly associated with hepatitis B infection among barbers, with the highest prevalence observed in the 31–40-year age group and the lowest in those aged 20–30 years. This pattern may be related to longer occupational exposure and repeated contact with sharp instruments.

However, no significant association was found among butchers, suggesting that other occupational or demographic factors may play a greater role in this group. Since the study was cross-sectional, these findings indicate an association rather than a causal relationship between age, occupational exposure, and HBV infection [18]. HBsAg-positive participants also showed a different residential pattern between the two occupational groups. Most infected barbers were from urban areas, whereas infected butchers were predominantly from rural areas. This variation may be related to differences in healthcare access, vaccination, occupational practices, or awareness of infection control. Nevertheless, residence alone cannot be considered an independent risk factor based on these findings [8].

Approximately three-fifths of HBsAg-positive participants in both occupational groups were asymptomatic. This finding is particularly important because HBV infection may remain clinically silent, allowing infected individuals to remain unaware of their infection and potentially transmit the virus [5].

The predominance of asymptomatic infection demonstrates that symptom-based identification is insufficient and supports the use of serological screening among occupational groups with potential exposure to blood. A previous report describing four acute hepatitis B cases in a single butcher shop associated with an asymptomatic infected worker further illustrates the possibility of unnoticed transmission in occupational settings [20].

The occupational findings further support the need for preventive measures targeting these workers. Accidental cuts were reported by more than half of HBsAg-positive barbers and by approximately three-quarters of positive butchers, while the methods used for instrument decontamination varied between the two groups. These findings highlight the importance of consistent infection-control practices, including the use of single-use blades where appropriate, proper sterilization of reusable instruments, safe handling of sharp materials, and adequate training of workers. Hepatitis B vaccination should be encouraged among barbers and butchers as an important preventive measure, also regular HBV screening and treatment could also help identify infected individuals at an early stage, especially those without symptoms. These measures are in line with WHO recommendations for HBsAg testing in settings where HBV prevalence exceeds 2% [5].

CONCLUSION

The results showed that the prevalence of hepatitis B surface antigen (HBsAg) was higher among barbers compared to butchers. In addition, most HBsAg infections were asymptomatic. These results show the need to target occupational health professionals more through hepatitis B vaccination and continuous periodic screening, along with taking infection control measures in these professions specifically, given their importance in increasing the spread of the disease among other groups. Further studies should be conducted by taking samples from different locations and performing confirmatory molecular tests.

Conflict of Interest: The author declares that there is no conflict of interest related to the publication of this study.

Financial Disclosure: The author received no specific financial support or funding for this study.

Data Availability: All data generated or analyzed during this study are available within the published article.

Authors' Contribution

Sura Mustafa Qasim was responsible for all aspects of the study, including study design, sample collection, laboratory procedures, data analysis, and manuscript preparation and writing. The author also supervised the experimental work and reviewed and approved the final version of the manuscript.

Acknowledgment

I would like to express my sincere gratitude to the University of Tikrit and the College of Dentistry for their continuous support and encouragement throughout this study. I also extend my appreciation to everyone who contributed to and supported the completion of this research.

REFERENCES

- Mamoori YI, Ahmed IA, Mahmood AR, Al-Waysi SA. Full-Length Genome Sequencing and Analysis of Hepatitis B Viruses Isolated from Iraqi Patients. *International Journal of Microbiology*. 2024; 2024:6826495. doi:10.1155/2024/6826495.
- Tarky AM, Akram WA, Al-Naaimi AS, Omer AR. Epidemiology of viral hepatitis B and C in Iraq: a national survey 2005–2006. *Zanco Journal of Medical Sciences*. 2013; 17(1):370–380. doi:10.15218/zjms.2013.0017.
- Abdulqadir MO, Rashid PMA, Hussain AH, Rahman HS, Ezzaddin SA. Genetic characterization of hepatitis B virus genotypes among patients with chronic infection in Sulaimaniyah city, Iraq. *PeerJ*. 2023; 11:e14454. doi:10.7717/peerj.14454.
- Ngoupa JB, Njukeng PA, Akwa EN, Kengne M, Tamoufe U, Ter Goon D, Nwobegahay J. Seroprevalence and associated risk factors for Hepatitis B virus infection among barbers and their clients in two cities in Cameroon. *S Afr J Infect Dis*. 2019; 34(1):154. doi:10.4102/sajid.v34i1.154.
- World Health Organization. Hepatitis B. Fact sheet. Geneva: World Health Organization; 28 July 2026.
- Ataallah TM, Hanan KA, Maysoun KS, Sadoon AA. Prevalence of hepatitis B and C among blood donors attending the National Blood Transfusion Center in Baghdad, Iraq from 2006–2009. *Saudi Medical Journal*. 2011; 32(10):1046–1050. doi:10.15537/1658-3175.5398.
- Rasheed NH, Mohamad HS, Almizori LA, Taha AA. The Prevalence of Hepatitis B and C Viruses among Blood Donors Attending Blood Bank in Duhok, Kurdistan Region, Iraq. *International Journal of Infectious Diseases*. 2016; 4(1):e39008. doi:10.17795/iji-39008.
- Hussein NR, Abozait HJ, Naqid IA, Ibrahim NM, Khalid FK, Musa DH, Saleem ZS. Risk Factors of Hepatitis B Virus Infection in the Kurdistan Region of Iraq: A Cross-Sectional Study. *Mediterranean Journal of Hematology and Infectious Diseases*. 2025; 17(1):e2025018. doi:10.4084/MJHID.2025.018.
- Adoba P, Boadu SK, Agbodzakey H, Somuah D, Ephraim RKD, Odame EA. High prevalence of hepatitis B and poor knowledge on hepatitis B and C viral infections among barbers: a cross-sectional study of the Obuasi municipality, Ghana. *BMC Public Health*. 2015; 15:1041. doi:10.1186/s12889-015-2389-7.
- She SL, Shi LY, Wu YJ, Li ZZ, Zheng CZ, Wu YP, Yu XH. A seroepidemiologic study of hepatitis B virus infection among barbers in Huangshi City, Hubei, China. *Microbiology and Immunology*. 1988; 32(2):229–233. doi:10.1111/j.1348-0421.1988.tb01382.x.
- 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. *Eastern Mediterranean Health Journal*. 2010; 16(1):10–17.
- Jatheesh KS, Anu Reshma V, Shokandha S, Sivakami R, Lakra AB, Joseph RM. Seroprevalence and associated risk factors of hepatitis B virus infection among barbers of South West district of Delhi, India: a cross-sectional study. *International Journal of Community Medicine and Public Health*. 2025; 12(5):2170–2174. doi:10.18203/2394-6040.ijcmph20251371.
- Sood AK, Pathak SM, Khandelwal N. A study of prevalence of occult hepatitis B virus infection, knowledge and preventive practices against hepatitis B virus in barbers serving the armed forces. *J Clin Exp Hepatol*. 2021; 11(6):668–673. doi:10.1016/j.jceh.2021.02.005.
- Jokhio AH, Bhatti TA, Memon MS. Knowledge, attitudes and practices of barbers about hepatitis B and C transmission in Hyderabad, Pakistan. *East Mediterr Health J*. 2010; 16(10):1079–1084. doi:10.26719/2010.16.10.1079.
- Sarkar MAM, Saha M, Hasan MN, Saha BN, Das A. Current status of knowledge, attitudes, and practices of barbers regarding transmission and prevention of hepatitis B and C virus in the north-west part of Bangladesh: a cross-sectional study in 2020. *Public Health in Practice*. 2021; 2:100124. doi:10.1016/j.puhip.2021.100124.
- Tariq H, Kamal MU, Makker J. Hepatitis in slaughterhouse workers. *World Journal of Hepatology*. 2019; 11(1):37–49. doi:10.4254/wjh.v11.i1.37.
- Ola SO, Otegbayo JA, Yakubu A, Odaibo GN, Olaleye DO. Nigerian butchers and hepatitis B virus infection. *Tropical Gastroenterology*. 2008; 29(1):32–34.

- Kareem AM, Mohammed Y, Rogo LD. Seroprevalence of Hepatitis B Virus Surface Antigen among Butchers and Slaughtered Cows in Kano Metropolis, Nigeria. UMYU Journal of Microbiology Research. 2017;2(2):104–109. doi:10.47430/ujmr.1722.016.
- Sharif AAOM, Mohamedsharif AA, Mohammed IBS, Abdalla WM. Serological detection and epidemiological analysis of HBV among butchers in Khartoum State. Scientific Reports. 2026; 16:10897. doi:10.1038/s41598-026-45904-4.
- Gerlich WH, Thomssen R. Outbreak of hepatitis B at a butcher's shop. Dtsch Med Wochenschr. 1982; 107(43):1627–1630. doi:10.1055/s-2008-1070177.