



ORIGINAL ARTICLE HEPATITIS B

Knowledge and Risk Assessment of Hepatitis B Infection among Barbers and Beauty Salon Workers in Mwanza, Tanzania

Semvua Kilonzo, PhD¹, Hyasinta Jaka, PhD¹, Sylvanus Mapunda, MD²

¹Department of Internal Medicine, Catholic University of Health and Allied Sciences, ²Department of Internal Medicine, Bugando Medical Center, Mwanza, Tanzania.



***Corresponding author:**

Semvua Kilonzo, PhD,
Department of Internal
Medicine, Catholic University
of Health and Allied Sciences,
Mwanza, Tanzania.
Tel: +255712830256

sekipcb@yahoo.com

Received: 05 December 2023

Accepted: 16 January 2024

Published: 18th March 2024

DOI

10.25259/IJTMRPH_476

Quick Response Code:



ABSTRACT

Background and Objective: Community-acquired hepatitis B virus (HBV) infection is increasing in developing countries. In Tanzania, there is an exponential increase in barbershops and beauty salons, which are potential sites of transmission of HBV. Occupational exposure rates and HBV vaccination rates among salon workers are unknown; their level of knowledge about infection prevention and control (IPC) is also unknown. This study aimed to evaluate the risk of infection and the knowledge of barbers and beauty salon workers about HBV transmission and prevention.

Methods: A cross-sectional study was conducted using a convenience sample of 200 barbers and beauty salon workers from 13 barber shops and 13 beauty salons in the urban district of Mwanza, Tanzania. Data were collected using a self-administered questionnaire, entered into EpiData version 3.1, and analyzed with Stata version 13. Categorical variables were expressed as frequencies, and association levels were compared using Fisher's exact test.

Results: Fifty-four percent of the study participants were female, and the mean age was 25 (21.0–29.5) years. A total of 126 (63%) participants were aware of the existence of HBV infection, of which only 22% had general good knowledge of HBV transmission and prevention. Both HBV awareness ($P < 0.001$) and good knowledge of its transmission and prevention ($P = 0.03$) were positively associated with higher levels of education. Seventy-three (36.5%) participants reported a history of occupational injuries. Merely 27.8% of participants were familiar with the correct methods of decontamination beauty tools, and only 14.3% understood the correct procedures for post-exposure wound care. Vaccination coverage was low with only (2%) of barbers and beauty salon workers having received vaccines.

Conclusion and Global Health Implications: The frequent occupational injuries and inadequate vaccination among barbers and beauty salon workers amplify their risk of HBV infection. They also lack basic knowledge about HBV transmission and prevention, placing the clients they serve at high risk for infection. We recommend that training on HBV Infection Prevention and Control (IPC) should focus on this specific group, and the implementation of these measures should be closely monitored in barbershops and beauty salons. Moreover, this vulnerable group should be considered for a global vaccination program.

Keywords: Knowledge, Occupational, Exposure, Hepatitis B, Salon, Barbers, Tanzania

INTRODUCTION

Hepatitis B virus (HBV) infection has become a major public health problem. Approximately 300 million people worldwide are chronically infected with HBV.^[1] Africa has one of the highest

This is an open-access article distributed under the terms of the Creative Commons Attribution License CC BY-NC-SA 4.0, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2024 The Authors. Published by Global Health and Education Projects, Inc., USA.

HBV burdens in the world, and sub-Saharan Africa is currently classified as a high-prevalence area, accounting for one-quarter of HBV burdens worldwide.^[1] The prevalence of HBV in the general population of Tanzania is estimated at 6.2%.^[2] HBV transmission occurs through contact with contaminated blood and other body fluids in clinical and non-clinical settings. Recent studies have shown that the transmission rate of HBV infection in the healthcare setting is generally declining due to increased adherence to modified infection prevention and control (IPC) protocols.^[3] On the contrary, HBV transmission outside the healthcare system is high, and approximately 50% of all people infected with HBV have no known risk factors in developing countries.^[4-7]

The rising popularity of barbershops and beauty salons in developing countries has contributed significantly to the horizontal transmission of the HBV virus.^[8,9] Infections can be spread from one customer to another through sharing contaminated beauty treatment tools. These include tools that are used for shaving, tattooing, body piercing, and manicure. Moreover, infections may also spread to the service providers through mechanical occupational injuries such as needle sticks and cuts.^[8,10] Significant amounts of infectious HBV deoxyribonucleic acid have been detected in shaving clippers and nail scissors^[11,12] and people who shave in barbershops were found to be more than twice as susceptible to acute HBV infection as to the general population.^[13] A large surveillance study in Italy reported that beauty treatment in barbershops and salons was attributed to 15% of acute HBV cases.^[14] Furthermore, mechanical occupational injuries have been identified as another important risk factor for HBV infection in these settings, especially among service providers.^[10] These injuries often occur without proper treatment and follow-up care. Studies have shown that up to 50% of hairdressers have experienced needle sticks or cuts with inadequate post-exposure care.^[5,7] These injuries have been attributed to HBV seropositivity in barbers, which is higher than in the general population.^[15] This places a major responsibility on barbers and beauty care workers to break the vicious cycle of transmission of HBV infection. In Tanzania, the government has worked hard to make sure that the preventive and control measures against HBV infections among barbers, and beauty salon workers and other vulnerable populations like illicit intravenous drugs users are in place to ensure reduction in transmission of the infections. These are highlighted clearly in the national strategic plan for control of hepatitis B and C. They include but are not limited to vaccination, raising knowledge and awareness of prevention, diagnosis, and treatment of HBV. Other strategic objectives that have been put into action are to strengthen the health facility's ability and patient's accessibility to diagnostic and treatment services.^[16] Despite all these efforts, knowledge of HBV among barbers and beauty salon workers is still limited, and this raises their vulnerability to acquiring HBV infections.

Thus, it becomes critical for barbers and beauty salon workers to have a detailed understanding of HBV transmission and preventive methods to halt this transmission.^[17-19] To the best of our knowledge, information about the risk of infection for beauty salon workers and barbers and their knowledge and prevalence is scarce in Tanzania. Hence, this study is designed to assess the knowledge and awareness of barbers and beauty salon workers regarding HBV transmission, prevention methods, and associated infection risk.

METHODS

Study Design

This was a descriptive cross-sectional study conducted between October, 2020 and February, 2021 among barbers and beauty salon workers in Mwanza city, northwestern Tanzania.

Study Setting

This study was conducted in the Mwanza Region. The region is located on the spectacular southern shores of Lake Victoria, north-west of Tanzania. It covers an area of 1337 square km. Of this, 71.55 km² (28%) is covered by water, and the remaining 184.9 km² (72%) is a dry land. Approximately 86.8 km² is urbanized while the remaining areas consist of forested land, valleys, and cultivated plains, grassy, and undulating rocky hills.^[20]

This region is made up of seven administrative districts. These districts include Ilemela, Nyamagana, Kwimba, Ukerewe, Magu, Sengerema, and Misungwi, with a total population of 3,696,872 people as of the 2022 national census.^[20,21]

The study took place in Nyamagana district in 13 administrative wards, namely, Buhongwa, Butimba, Igogo, Igoma, Isamilo, Mahina, Mbugani, Mirongo, Mkolani, Mkuyuni, Nyamagana, Pamba, and Kishiri. The health sector of Mwanza is well-built, with a total of more than 6 hospitals, 35 health centers, and 231 dispensaries. These provide a wide range of HBV prevention and treatment services in the region and other neighboring regions of the lake zone.^[20] The main economic activities carried out by the Mwanza region's population are businesses including barbershops and beauty salons, agricultural production, livestock keeping, and, to a significant extent, fishing.^[20] There has been a significant rise in the number of barbershops and beauty salons in Mwanza, but there is a lack of specific data indicating the precise quantity of these establishments.

Sample Size Estimation

The sample size was estimated using the equation:

$$n = Z^2PQ/d^2$$

Where, $Z = 1.96$ (95% confidence interval), $P = 0.11$ (11% prevalence in subjects with sufficient knowledge in previous studies)^[22] $Q = 1 - P$ and $d =$ margin of error, that is 0.05.

Therefore, the estimated minimum sample size was $n = 150$. However, the study team was able to approach 200 participants from 13 wards.

Sampling Procedure

A total of 26 barbershops and beauty salons were selected; one barbershop and one beauty salon were chosen from each region. We invited all barbers and beauty salon workers from the selected facilities to participate in the study. The purpose of the study was explained to them, and consent form was signed accordingly.

Data Collection Tool

Data were collected using a structured self-administered questionnaire that was designed by authors guided by the study objectives. The questionnaire was originally designed in English and later translated into Swahili by an experienced language interpreter, who was not part of the research team. It was later pretested in a similar population in a nearby Ilemela district to ensure clarity and a good flow of questions. Two trained research assistants helped with the questionnaire administration during data collection and ensured the clarity and correctness of the questionnaire. We asked participants to read through all the questions initially, ensuring comprehension. Subsequently, all misunderstandings pertaining to the questions were clarified by the research assistant. We verified that all participants could read and write in Swahili language. The questionnaire consisted of five sections; Section 1 consisted of four questions on demographic characteristics; Section 2 contained one awareness question; Section 3 consisted of ten knowledge questions; Section 4 had two questions about occupational risk; and Section 5 had two questions about vaccination history.

Knowledge of HBV transmission and prevention was evaluated only among those who reported awareness of HBV infection. We used Bloom's Modified Cutoff Total Knowledge Score scale^[23] to measure participant's knowledge of HBV. Here, a score between 80% and 100% of correct answers is good knowledge, 50%–79% is moderate knowledge, and <50% is poor knowledge. This questionnaire was developed based on the research objective and the previous literature.^[24] Awareness was measured by one question that required a participant to answer whether they had heard about HBV or not.

Statistical Analysis

Data were extracted from the questionnaire. Consequently, the data extracted from the questionnaire was entered using the

Epi data version 3.1 and analyzed with Stata version 13 (Stata Corp LP, College station, TX). The continuous variables were summarized using mean with standard deviation or median with interquartile range depending on the distribution; whereas, the categorical variables were summarized using frequencies and proportions. For the identification of associated predictors, bivariate logistic regression was first done for each independent variable, variables with P -values lower than 0.05 were considered statistically significant. Fisher's exact test set at $P < 0.05$ was used to test for the significance of association in categorical variables.

Ethical Review

Ethical approval to conduct and publish results of the study was obtained from the Joint Ethics Committee of the Catholic University of Health and Allied Sciences/Bugando Medical Center with ethical clearance number 1666/2020. Permission was granted by the medical officer in charge of the city of Mwanza. Written informed consent was obtained from each participant after requesting and explaining the purpose of the study. The client's information was only processed by the investigator and identifiers such as names were not included in the final analysis to maintain confidentiality.

RESULTS

Demographic Characteristics

From October 04, 2020, to February 23, 2021, we recruited a total of 200 barbers and beauty salon workers from 13 barber

Table 1: Characteristics of the study participants (n=200).

Characteristics	Frequency (n)	Percentage (%)
Sex		
Male	92	46.0
Female	108	54.0
Age (years)		
<20	26	13.0
20–30	135	67.5
31–40	32	16.0
>40	7	3.0
Education		
Primary or none	39	19.5
Secondary	126	63.0
College/University	35	17.5
Type of facility		
Barbershop	115	57.5
Beauty salon	85	42.5
n: number of participants		

shops and 13 beauty salons. Of these, 54.0% were female, and the median age was 25 (21.0–29.5) years. Most (63%) of the participants had completed secondary education [Table 1].

Occupational Exposure

Out of the participants, 73 (36.5%) reported experiencing at least one needle stick injury throughout their career. Of these, the majority (53.4%) had five or more such injuries, 4.7% had between two to five injuries, and 21.9% reported one injury.

HBV Vaccination Status

Only four (2.0%) participants reported receiving the HBV vaccine, and all of them had only one dose.

Awareness of HBV Infection

A total of 126 participants (63.0%) were aware of the existence of HBV infection, and 37.0% of them had never heard of HBV.

Knowledge of HBV Infection

Overall, 22.2% of the participants who were aware of HBV infection were classified as having good knowledge about HBV infection transmission and prevention. Alternatively, 35% had moderate knowledge, and 42.9% had poor knowledge.

Only 33.3% of the participants were aware that HBV could be transmitted by sharing beauty treatment tools, and only a minority (26.3%) knew that it could be transmitted through trauma caused by sharp, contaminated objects. Proper decontamination (disinfection/sterilization) methods and appropriate post-exposure wound care were known to 27.8% and 14.3%, respectively. The entire set of post-exposure measures was unfamiliar to all participants [Table 2].

Factors Associated with HBV Awareness and Knowledge

Participants with at least a secondary level of education (referred to as literate) were significantly more likely to be aware of (90.8% vs. 9.5%) and have good knowledge about HBV infection (100% vs. 0%, $P = 0.03$), compared to those without such education (referred to as illiterate) [Table 3].

DISCUSSION

This study was conducted to assess the knowledge and risks of barbers and beauty salon workers about HBV infection. Despite a moderate level of awareness, participants are poorly informed about HBV transmission and prevention and are at high risk of infection.

At 63%, the level of HBV infection awareness in our study is significantly higher than the previously reported 13% in

Table 2: Knowledge of the barbers and beauty salon workers about HBV transmission and prevention ($n=126$).

	Knowledge item	Correctly responded	
		Frequency	Percentage
1.	HBV	73	57.9
2.	HBV can be transmitted through contact with body fluids.	60	47.6
3.	HBV can be transmitted from a mother to her unborn child.	37	29.4
4.	HBV can be transmitted by sharing instruments for shaving, tattooing, body piercing, or other cosmetics.	42	33.3
5.	Injury with a contaminated sharp object is a risk factor for HBV infection	33	26.2
6.	HBV can be transmitted through blood transfusions	41	32.5
7.	HBV infection is a preventable disease	70	55.6
8.	HBV vaccines are available for prevention	61	48.4
9.	Decontamination methods of beauty treatment tools	35*	27.8
10.	Post-exposure wound care procedure	18*	14.3

*Frequency of participants who stated the correct methods, HBV: Hepatitis B virus, n: number of participants.

Nigeria and 1% in Morocco.^[5,25] An ongoing global strategy campaign to raise awareness of viral hepatitis, which was officially launched in 2010^[26] and was fully adopted in Tanzania in 2018,^[26] may have facilitated with this variation. As such, the previous studies reported pre-campaign awareness data, and the general awareness level appears to have improved over the years, according to the most recent data.^[27]

The significant knowledge gaps we identified, especially among illiterate people, are similar to those reported in other studies from developing countries. In Ethiopia, only 11% of barbers were found to have good knowledge of HBV transmission and prevention.^[22] An experimental study in Egypt revealed a low baseline level (22%) of knowledge of barbers about HBV infection, which increased to 80.7% after the implementation of health educational guidelines.^[28] Low knowledge that we detected especially in critical parameters such as sharing and proper decontamination of beauty tools put clients receiving services at these facilities at increased risk of HBV infection.

Furthermore, barbers and beauty salon workers in our study face continuous exposure to HBV, primarily due to

Table 3: Association between the characteristics studied with awareness and good knowledge for hepatitis B infection.

Characteristic	Aware of hepatitis B (n=200)			Good knowledge (n=126)		
	Yes (n=126)	No (n=74)	P-value*	Yes (n=28)	No (n=98)	P-value*
Sex						
Male	67 (53.2)	33 (44.6)	0.24	16 (57.1)	51 (52.1)	0.67
Female	59 (46.8)	41 (55.4)		12 (42.9)	47 (47.9)	
Age (years)						
<20	12 (9.52)	14 (18.9)	0.56	3 (10.7)	9 (9.2)	0.72
20–30	89 (70.6)	46 (62.2)	0.22	19 (67.9)	70 (71.4)	0.81
31–40	20 (15.8)	12 (16.2)	0.95	5 (17.9)	15 (15.3)	0.77
>40	5 (3.9)	2 (2.7)	0.64	1 (3.5)	4 (4.1)	1.00
Education						
Primary or below	12 (9.5)	27 (36.5)	<0.001	0	12 (12.2)	0.03
Secondary or above	114 (90.8)	47 (63.5)		28 (100)	86 (87.8)	
Type of facility						
Barbershop	19 (61.3)	96(56.8)	0.43	19 (67.9)	41 (41.8)	0.53
Beauty salon	11 (36.7)	74 (43.8)		13 (46.2)	48 (48.9)	
Vaccinated for HBV	4 (3.2)	0	0.12	3 (10.7)	1 (1.0)	0.02
History of prick	45 (35.7)	28 (37.8)	0.76	17 (60.7)	28 (28.6)	0.003
Prick>5 times	22 (17.5)	17 (22.9)	0.36	6 (21.4)	16 (16.3)	0.57

*Association levels were compared using Fisher's exact test, HBV: Hepatitis B virus, n: number of participants.

the frequent mechanical injuries they sustain, such as cuts, and needle sticks, which increase their risk of contracting the HBV infection. Similar to other studies, mechanical injuries are common among this group. Almost 50% of barbers and hairdressers reported having such incidents in Turkey^[28] and more than 55% in Nigeria. Moreover, these injuries were correlated with seropositivity of HBV.^[15] Thirty-seven participants in this study reported a mechanical injury, of which more than 50% had multiple incidents, which increases the risk of HBV infection. A slight variation in our findings may be explained by reporting bias as the information is from self-reporting. Some of the individuals might either choose not to report some information or could not recall some past injuries. All in all, this risk could have been minimized by vaccination against HBV and following the appropriate post-exposure measures recommended to reduce the chance of HBV transmission. Additionally, cleaning the affected site with water and soap or antiseptic and then attending the medical facility for a thorough serological evaluation, vaccination, and HBV immunoglobulin could have mitigated the risk.^[29] However, none of the study participants were familiar with this complete set of procedures and none of them reported having taken three doses of the HBV vaccine according to standard recommendations.^[30] Furthermore, only 2.5% participants were partially vaccinated. The low vaccination

status is the same as reported in Nigeria, where only one out of 199 barbers and hairdressers was found to have been vaccinated against HBV.^[31]

As far as we understand, our study is the first to explore the risks of HBV infection and gaps in related knowledge among barbers and beauty salon workers in Tanzania. These findings complement locally generated evidence to support national HBV control efforts in the country.

CONCLUSION AND IMPLICATIONS FOR TRANSLATIONS

Our study unequivocally shows that due to frequent occupational injuries and inadequate vaccination, barbers and beauty salon workers face an elevated risk of HBV infection. Furthermore, most participants, particularly those without formal training, have a significant lack of knowledge about HBV transmission and prevention, putting clients they serve at high risk of infection.

We propose comprehensive training in HBV transmission and prevention for this group, and we recommend regular oversight of IPC guidelines adherence across all barbershops and beauty establishments to reduce their risk of HBV acquisition and transmission to other customers. Furthermore, the effectiveness of alternative education

forums, such as social media in reaching illiterate populations should be investigated. Given their high susceptibility to HBV infection, we recommend prioritizing barbers and beauty care workers in the global HBV vaccination programs.

Key Messages

- Majority of barbers and salon workers did not have adequate knowledge of HBV infection transmission and prevention.
- Barbers, beauty salon workers, and the clients they serve are at increased risk of HBV infection.

Acknowledgments

The authors are grateful to all participants for their support. They would also like to thank the city Medical Officer of Mwanza city for her involvement and permission to conduct this study.

COMPLIANCE WITH ETHICAL STANDARDS

Conflicts of Interest

The authors declare no competing interests.

Financial Disclosure

Nothing to declare.

Funding/Support

There was no funding for this study.

Ethics Approval

Ethical approval to conduct and publish results of the study was obtained from the Joint Ethics Committee of the Catholic University of Health and Allied Sciences /Bugando Medical Center with ethical clearance number 1666/2020.

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent.

Use of Artificial Intelligence (AI)-Assisted Technology for Manuscript Preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

Disclaimer

None.

REFERENCES

1. World Health Organization (WHO). Global Hepatitis Report, 2017. Geneva: World Health Organization; 2017. [Accessed 2023 Nov 29]. Available from: <https://www.who.int/publications-detailredirect/9789241565455>
2. Kilonzo SB, Gunda DW, Mpondo BC, Bakshi FA, Jaka H. Hepatitis B virus infection in Tanzania: Current status and challenges. *Hindawi J Trop Med*. 2018 Jan 30;2018:4239646.
3. Hayashi T, Hutin YJ, Bulterys M, Altaf A, Allegranzi B. Injection practices in 2011–2015: A review using data from the demographic and health surveys (DHS). *BMC Heal Serv Res*. 2019 Aug 27;19(1):600.
4. Zheng XQ, Li X, Liu J, Shi L, Wang HZ, Tian KG, *et al.* Horizontal transmission might be a common route of hepatitis B virus exposure in highly endemic areas. *J Med Virol*. 2022 Oct;94(10):4983–92.
5. Olusola BA, Gometi EA, Ogunsemowo O, Olaleye DO, Odaibo GN. High rate of hepatitis B virus infection among hairdressers in Ibadan, Nigeria. *J Immunoass Immunochem*. 2017;38(3):322–32.
6. Alharbi NM, Alhashim HM. Beauty salons are key potential sources of disease spread. *Infect Drug Resist*. 2021 Mar 25;14:1247–53.
7. Alavian SM, Taheri S. A global perspective on the intrafamilial transmission of hepatitis B virus infection. *Int J Travel Med Glob Health*. 2013;1:9–13.
8. Yang J, Hall K, Nuriddin A, Woolard D, Yang J, Hall K, *et al.* Risk for hepatitis B and C virus transmission in nail salons and barbershops and state regulatory requirements to prevent such transmission in the United States. *J Public Heal Manag Pract*. 2014 Nov-Dec;20(6):E20–30.
9. Bashir HH, Kamani L, Usman M, Kishwar K. Awareness and safe practices of hepatitis-B and C prevention and transmission among workers of women beauty salons. *Pak J Med Sci*. 2022 Nov-Dec;38(8):2156–62.
10. Shure W, Desta K, Diriba R, Egzabaxier AG, Benti G. Magnitude of hepatitis B virus among barbers in Addis Ababa, Ethiopia. *Austin Hepatol*. 2018;3:1008.
11. Spengane Z, Korsman S, Mkentane K, Davids LM, Zemanay W, Africa M, *et al.* Blood and virus detection on barber clippers. *South Afr Med J*. 2018 Mar 28;108(4):278–82.
12. Koroglu M, Demiray T, Ozbek A, Guclu E, Karabay O, Altindis M, *et al.* Nail scissors and fingernails as reservoirs of hepatitis B virus DNA: Role of nail scissors in household transmission of hepatitis B virus. *Am J Infect Control*. 2018 Jul;46(7):793–7.
13. Jimenez AP, El-Din NS, El-Hoseiny M, El-Daly M. Community transmission of hepatitis B virus in Egypt: Results from a case-control study in greater Cairo. *Int J Epidemiol*. 2009 Jun;38(3):757–65.
14. Mariano A, Mele A, Tosti ME, Parlato A, Gallo G, Ragni P, *et al.* Role of beauty treatment in the spread of parenterally transmitted hepatitis viruses in Italy. *J Med Virol*. 2004 Oct;74(2):216–20.
15. Candan F, Alagözülü H, Poyraz Ö, Sümer H. Prevalence of hepatitis B and C virus infection in barbers in the Sivas Region of Turkey. *Occup Med (Lond)*. 2002 Feb;52(1):31–4.
16. The United Republic of Tanzania. National strategic plan for the control of viral hepatitis 2018/19–2022/23. National Bureau of Statistics. 2012; 2022.
17. Mutocheluh M, Kwarteng K. Knowledge and occupational hazards of barbers in the transmission of hepatitis B and C was low in Kumasi, Ghana. *Pan Afr Med J*. 2015 Mar 18;20:260.
18. Ilyas U, Manzoor I, Shahbaz A, Jalil H, Sheikh M, Shafqat Z. Awareness and practice of safety measures related to transmission of hepatitis B and C among barbers and saloon workers of Lahore, Pakistan. *Int J Community Health Med Res*. 2017;3:84–91.
19. Abuanja MJ, Ahemd HM. Evaluation of barbers knowledge, attitude and practice regarding blood transmitted disease (hepatitis B and HIV) in Shendi locality at Shendi town (Sudan). *Adv Res J Multidisciplinary Discov*. 2016;3:15–8.

20. United Republic of Tanzania President's Office. Regional Administration and Local Government. Mwanza City Council Strategy Plan 2016/2017-2020/2021. Mwanza: Mwanza City Council; 2021.
21. The United Republic of Tanzania. Administrative Units Population Distribution Report. Ministry of Finance and Planning National Bureau of Statistics Tanzania, Presidents' Office - Finance and Planning Office of the Chief Government Statistician Zanzibar; 2022.
22. Beyen TK, Tulu KT, Abdo AA, Tulu AS. Barbers' knowledge and practice about occupational biological hazards was low in Gondar Town, North West Ethiopia. *BMC Public Health*. 2012 Nov 1;12:942.
23. Bloom BS. Learning for mastery. Instruction and curriculum. Regional education laboratory for the Carolinas and Virginia, Topical papers and reprints, Number 1; 1968.
24. Jokhio AH, Bhatti TA, Memon S. Knowledge, attitudes and practices of barbers about hepatitis B and C transmission in Hyderabad, Pakistan. *East Mediterr Health J*. 2010 Oct;16(10):1079–84.
25. 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 Dec;17(12):911–9.
26. World Health Organization. Sixty-third World Health Assembly, Resolutions and Decisions. Geneva: World Health Organization; 2010. p. 17–21.
27. Imam H, Tasleem S, Imam T, Irfan HM, Imran M. A study regarding awareness and spread of hepatitis B and C among barbers and beauty parlors working in DG Khan. *J Community Med Health Educ*. 2021;11:4.
28. Hassan MA, Mohamed MA, Ibrahim AM. Effect of health educational guideline for barbers about hepatitis B and C in Port Said City. *Am J Nurs Res*. 2020;8:60–71.
29. Kuhar DT, Henderson DK, Struble KA, Heneine W, Thomas V, Cheever LW, *et al.* Updated US public health service guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis. Atlanta, GA: CDC, Division of Healthcare Quality Promotion; 2018. p. 1–48.
30. Centre for Diseases Control. Hepatitis B vaccination. United States: Centre for Diseases Control; 2023. [Accessed 2023 Nov 29]. Available from: <https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html#note-hepb>.
31. Aina BA, Olutoye OA. Hepatitis B virus infection, knowledge and vaccine uptake among hairdressers in Ikorodu, Lagos State. *Eur J Public Health*. 2020;30:3–5.

How to cite this article: Kilonzo S, Jaka H, Mapunda S. Knowledge and Risk Assessment of Hepatitis B Infection among Barbers and Beauty Salon Workers in Mwanza, Tanzania. *Int J Transl Med Res Public Health*. 2024;8:e002. doi: 10.25259/IJTMRP_476