Assiri A., Al-Qattibi S., Bin Nasser A., Gubran A.N.M. Yemeni J Med Sci. 2025; 19(7):38 -49
https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

 Original Article

Knowledge and Practice Regarding HBV, HCV, and HIV Infections Among Hairdressers in Aden, Yemen

Ammar Assiri[1], Sultan Al-Qattibi [1], Ahmed Bin Nasser[1], Ali N.M. Gubran[2]*

[1] *Department of Basic Sciences, Faculty of Medicine and Health Sciences, University of Science and Technology, Aden, Yemen.*
[2] *Department of Health Sciences, Faculty of Medicine and Health Sciences, University of Science and Technology, Aden, Yemen.*

ABSTRACT

Background: HBV, HCV and HIV infections can cause major health problems commonly caused by global mortality and morbidity. The current study is the first regarding the knowledge and practices among hairdressers about HBV, HCV, and HIV infections in Aden, Yemen.
Objective: It aimed to determine knowledge and the practices among men hairdressers regarding HBV, HCV, and HIV infections and to determine the association between scores of knowledge and the practices and demographic, occupational, and other related characteristics of hairdressers in Aden, Yemen.
Methods: A cross-sectional study was conducted on 109 hairdressers, all of them were males. The predesigned questionnaire was used to collect the data from all participants.
Results: The percentages of knowledge among hairdressers regarding infections and transmission of HBV, HCV, and HIV were from 85.3% to 91.7%. About 33.9% and 15.6% of participants never heard about vaccination against HBV and the risk of these viruses on the hairdressers and their clients, respectively. Fifty-three (48.6%), of the hairdressers, were reused razors or blades between different clients and 42 (38.5%.) of them were not receive a vaccine against HBV. There were significant associations between knowledge and education level and the number of customers per day (p=0.004 and p=0.001), respectively. There was also a significant association between practice and level of education, size of salon as well and a borderline significant association was showed between the marital status of hairdressers and practice (p=0.015, 0.001 and 0.06), respectively.
Conclusion: The majority of hairdressers were aware of the risk of HBV, HCV, and HIV infection and transmission routes, the risk of shaving tools as well as vaccination against HBV. A high percentage of hairdressers have reused shaving tools and this needs direct monitoring by regulatory authorities to prevent the spreading of infectious diseases.

Keywords: Hairdressers, Knowledge, Practice, HBV, HCV and HIV, Aden.

**** Corresponding author address:*** *a.alyafei@aden.ust.edu, Abuyafa201@yahoo.com*

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

INTRODUCTION

Hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) are blood-borne viruses where HBV and HCV can cause serious liver diseases that result in cirrhosis and liver carcinoma, while HIV can cause acquired immunodeficiency syndrome (AIDS) (1). These infections are major health problems commonly caused by global mortality and morbidity (2-4). Globally, it is estimated that 296 million, 50 million, and 39.9 million people are infected with HBV, HCV, and HIV, respectively (5-7).

The routes of transmission of these viruses are similar, including sexual intercourse; exposure to blood and body fluids of infected people; and from pregnant women to their newborns with HBV, HCV, and HIV, respectively (8-10). They are transmitted via exposure to sharp items such as needles, syringes and shaving tools that are contaminated with blood and other body fluids (11,12). The hairdressers can play a potential role in the transmission of these blood-borne infections to the hairdressers or their clients (13). Intra-familial transmission of HBV and HCV also occurred (14-16). HBV, HCV, and HIV can be transmitted during hairdresser procedures due to reusable sharp shaving tools such as blades and razors that are contaminated with blood and body fluids from previous infected clients (17, 18). The transmission may occur through minor skin-piercing during shaving practice with the sharing of reusable contaminated tools such as scissors and razors (19, 20).

Poor awareness, knowledge, attitude, and practice (KAP) among hairdressers increase the risk of blood-borne infections (21). Despite the adequate knowledge among the majority of hairdressers about the risk and transmission of bloodborne viral infections and their transmission, they do not strictly follow the preventive measures (12). The age, levels of education, and income affect the KAP among hairdressers (17).

In Yemen, one of the most important factors in the spreading of bloodborne viruses is overcrowding in hairdresser salons. This commonly occurs during special and religious celebrations such as Eid Al-Fitr and Eid Al-Adha because the hairdressers may not have enough time for sterilization procedures, in addition to the inadequacy or lack of shaving tools and towels to cover the large number of clients, thereby reusing most of these items. Therefore, this study aimed to determine knowledge and the practices among men hairdressers regarding HBV, HCV, and HIV infections and to determine the association between scores of knowledge and the practices and demographic, occupational, and other related characteristics of hairdressers in Aden, Yemen.

METHODOLOGY

The calculated sample size was 278 as per the following equation:

$$n= Z^2p\ (1-p)/\ E^2$$

Among 217 hairdressers available in the city, only 109 of them were accepted to participate in this cross-sectional study that was conducted in different Salons in Aden-Yemen. All of them were males. The predesigned questionnaire was used to collect the data from all participants. It contained socio-demographic data such as sex, age, marital status, education level, and other questions about the years of experience as a hairdresser, number of hairdressers for each hairdressing saloon, number of customers per day, and size of the saloon. All participants were also asked a number of questions about their knowledge and practice regarding HBV, HCV, and HIV infections (17).

Twenty questions (nine for knowledge and twelve for practice) had three possible answers yes, no, and do not know (the latter option was deleted during the analysis of data because all participants did not use this option while answering all questions). The knowledge and practice were scored as good, intermediate, and poor. Good knowledge refers to correct answers to > 6 questions, intermediate knowledge ranges 4–6 questions, while poor knowledge < 4 questions. The practice was stratified into good practice >8 correctly answered questions, intermediate ranged scores from 6-8 questions, and poor <6 questions. The inclusion criteria were all male hairdressers who were working in Salons in different districts in Aden-Yemen whereas the exclusion criteria were other non-hairdressers such as clients, managers, and municipal workers as well as females who were working in beauty salons.

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Statistical Analysis

Analysis of the data was performed by using the Statistical Package for the Social Sciences (SPSS) (Version 21). The percentages were used to express the qualitative data. In addition, differences between the two variables were calculated by the chi-square (χ^2) test where the p-value (<0.05) was statistically significant.

Ethics Approval and Consent Form

Ethical approval: The ethical approval of this study was obtained from the Ethics Committee of the College of Medicine and Health Science at the University of Science and Technology; MEC No. (MEC /AD090). It was based on the standards of the Helsinki Declaration. The written consent form was obtained from each hairdresser before performing any procedure.

RESULTS

Of a total of 109 male hairdressers, the majority were singles (71.6%); had primary and secondary school education (68.8%); were workers with less than 10 years of experience (70.6%); had 3 hairdressers per salon (50.5%); had more than 12 customers per day (53.2%); and had salons with a small size of less than 30 m^2 (69.7%) (Table 1). Regarding the knowledge about HBV and HCV and HIV, 89.0%, 89.9%, and 91.7% knew that HBV and HCV can cause liver diseases and HIV causes AIDS, respectively. Among hairdressers, 85.3%, 86.2%, and 88.1% knew that HBV, HCV, and HIV are blood-borne viruses and they can be transmitted via exposure to contaminated blood, respectively.

About 90.8% of participants knew that razors and scissors could be potential sources of infections by these viruses. Thirty-seven (33.9%) of workers have never heard about vaccination against HBV as a preventive tool for HB infection, and 17 (15.6%) of them have no idea about the risk of these viruses to the hairdressers and their clients (Table 2).

As regards the practice, 4 (4.6%) did not wash their hands between different clients. 80 (73.4%) reused the towels between customers, 53 (48.6%) reused razors or blades, and 16 (14.7%) had no disposable gloves. 13 (11.9%) do not wear gloves after an accidental cut. 3 (2.8%) do not use antiseptic after an accidental cut, 1 (0.9%) do not disinfect reusable instruments adequately, 6(5.5%) do not perform daily disinfection of hair brushes, and 42(38.5%) were not receive vaccine against HBV (table3). There were significant associations between knowledge and education level and number of customers per day (p=0.004 and p=0.001), respectively. There was also a significant association between practice and level of education, size of salon (m2) as well and a borderline significant association was showed between the marital status of hairdressers and practice (p=0.015, 0.001 and 0.06), respectively (Tables 4 and 5).

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Table (1): Demographic, occupational and other related characteristics of men hairdressers in Aden-Yemen

Items	Frequency (n=109)	Percentages %	Items	Frequency (n=109)	Percentages %
Age (years)			Workers for each hairdressing saloon		
<20	24	22.0	1	3	2.8
20-24	32	29.4	2	13	11.9
25-29	27	24.8	3	55	50.5
>29	26	23.9	More	38	34.9
Marital status			Customers per day		
Single	78	71.6	<10	22	20.2
Married	31	28.4	10-12	26	26.6
Education level			>12	58	53.2
Illustrate	22	20.2	Size of salon (m2)		
Primary school	37	33.9	<30	76	69.7
Secondary school	38	34.9	30-40	13	11.9
University	12	11.0	41-50	9	8.3
Work experience (years)			>50	11	10.1
<10 years	77	70.6			
10–20 years	29	26.6			
>20 years	3	2.8			

Table (2): Knowledge of hairdressers regarding the risk of HBV, HCV, and HIV infections in Aden- Yemen

Items	Frequency (n=109)	Percentage %
Are you aware of the diseases caused by HBV?		
Yes	97	89.0
No.	12	11.0
Are you aware of the diseases caused by HCV?		
Yes	98	89.9
No.	11	10.1
Are you aware of the diseases caused by HIV?		
Yes	100	91.7
No	9	8.3
Are you aware that HBV can be transmitted through blood?		
Yes	93	85.3
No.	16	14.7
Are you aware that HCV can be transmitted through blood?		
Yes	94	86.2
No	15	13.8
Are you aware that HIV can be transmitted through blood?		
Yes	96	88.1

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Table (3): Practice of hairdressers regarding prevention of HBV, HCV, and HIV infections in Aden- Yemen

Items	Frequency (n=109)	Percentage %
Do you wash your hands between different clients?		
Yes	104	95.4
No.	5	4.6
Do you reuse towels between clients?		
Yes	80	73.4
No.	29	26.6
Do you reuse razors or blades?		
Yes	53	48.6
No	56	51.4
Do you use disposable gloves during shaving and hairdressing procedures?		
Yes	93	85.3
No.	16	14.7
If yes, Do you change gloves between different clients?		
Yes	87	79.8
No.	6	5.5
Do you wear gloves after an accidental cut on a client?		
Yes	96	88.1
No	13	11.9
Do you use antiseptic after an accidental cut on a client?		
Yes	106	97.2
No	3	2.8
Do you disinfect your reusable instruments adequately?		
Yes	108	99.1
No	1	0.9
Do you sterilize your instruments between clients?		
Yes	105	96.3
No	4	3.7
Do you perform daily disinfection of your hair brushes?		
Yes	103	94.5
No	6	5.5
Are you vaccinated against hepatitis B?		
Yes	67	61.5
No	42	38.5

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Table (4): Association between demographic, occupational, and other related characteristics of hairdressers and knowledge score in Aden-Yemen

Items	Practice score						P
	Good		Intermediate		Poor		
	No.	%	No.	%	No.	%	
Age (years)							
<20 **(n=24)**	20	83.3	3	12.5	1	4.2	0.261
20-24 **(n=32)**	21	65.6	10	31.2	1	3.1	
25-29 **(n=27)**	15	55.6	10	37.0	2	7.4	
>29 **(n=26)**	18	69.2	8	30.8	0	0.0	
Marital status							
Single **(n=78)**	57	73.1	19	24.4	2	2.6	0.06
Married **(n=31)**	17	54.8	12	38.7	2	6/5	
Education level							
Illustrate **(n=22)**	17	77.3	3	13.6	2	9.1	0.015
Primary school **(n=37)**	27	73.0	10	27.0	0	0.0	
Secondary school **(n=38)**	22	57.9	16	42.1	0	0.0	
University **(n=12)**	8	66.7	2	16.7	2	16.7	
Work experience (years)							
<10 years **(n=77)**	53	68.8	21	27.3	3	3.9	0.578
10–20 years **(n=29)**	18	62.1	10	34.5	1	3.4	
>20 years **(n=3)**	3	100.0	0	0.0	0	0.0	
Workers for each hairdressing saloon							
1 **(n=3)**	3	100.0	0	0.0	0	0.0	0.226
2 (n=13)	10	76.9	3	23.1	0	0.0	
3 **(n=55)**	32	58.2	21	38.2	2	3.6	
>3 **(n=38)**	29	76.3	7	18.4	2	5.3	

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Customers per day							
<10 **(n=22)**	15	68.2	5	22.7	2	9.1	0.356
10-12 **(n=29)**	22	75.9	6	20.7	1	3.4	
>12 **(n=58)**	37	63.8	20	34.5	1	1.7	
Size of salon (m2)							
<30 **(n=76)**	47	61.8	29	38.2	0	0.0	0.001
30-40 **(n=13)**	10	76.9	1	7.7	2	15.4	
41-50 **(n=9)**	8	88.9	0	0.0	1	11.1	
>50 **(n=11)**	9	81.8	1	9.1	1	9.1	

Table (5): Association between demographic, occupational, and other related characteristics of hairdressers and practices score in Aden-Yemen

Items	**Practice score**						**P**
	Good		**Intermediate**		**Poor**		
	No.	**%**	**No.**	**%**	**No.**	**%**	
Age (years)							
<20 **(n=24)**	20	83.3	3	12.5	1	4.2	0.261
20-24 **(n=32)**	21	65.6	10	31.2	1	3.1	
25-29 **(n=27)**	15	55.6	10	37.0	2	7.4	
>29 **(n=26)**	18	69.2	8	30.8	0	0.0	
Marital status							
Single **(n=78)**	57	73.1	19	24.4	2	2.6	0.06
Married **(n=31)**	17	54.8	12	38.7	2	6/5	
Education level							
Illustrate **(n=22)**	17	77.3	3	13.6	2	9.1	0.015
Primary school **(n=37)**	27	73.0	10	27.0	0	0.0	
Secondary school **(n=38)**	22	57.9	16	42.1	0	0.0	
University (n=12)	8	66.7	2	16.7	2	16.7	

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Work experience (years)							
<10 years **(n=77)**	53	68.8	21	27.3	3	3.9	0.578
10–20 years **(n=29)**	18	62.1	10	34.5	1	3.4	
>20 years **(n=3)**	3	100.0	0	0.0	0	0.0	
Workers for each hairdressing saloon							
1 **(n=3)**	3	100.0	0	0.0	0	0.0	0.226
2 **(n=13)**	10	76.9	3	23.1	0	0.0	
3 **(n=55)**	32	58.2	21	38.2	2	3.6	
>3 **(n=38)**	29	76.3	7	18.4	2	5.3	
Customers per day							
<10 **(n=22)**	15	68.2	5	22.7	2	9.1	0.356
10-12 **(n=29)**	22	75.9	6	20.7	1	3.4	
>12 **(n=58)**	37	63.8	20	34.5	1	1.7	
Size of salon (m2)							
<30 **(n=76)**	47	61.8	29	38.2	0	0.0	0.001
30-40 **(n=13)**	10	76.9	1	7.7	2	15.4	
41-50 **(n=9)**	8	88.9	0	0.0	1	11.1	
>50 **(n=11)**	9	81.8	1	9.1	1	9.1	

DISCUSSION

This is the first study regarding the knowledge and practices among hairdressers about HBV, HCV, and HIV infections in Aden, Yemen. Our results about knowledge regarding infections caused by HIV, HBV, and HCV were higher than those reported by Amodio et al., who revealed that 86.7%, 64.8%, and 60% were aware of HIV, HBV, and HCV, respectively (17). Research from Bangladesh determined that 81.61% and 100% knew HBV and HIV, respectively (22). A study conducted in Tanzania showed that 63% of hairdressers knew about HBV infection (23). Quarm et al. showed that 47.9% were aware of the cause of AIDS (24). A report from Egypt found that 86% of barbers had heard about HBV and HCV (25).

Regarding the knowledge about transmission of HBV, HCV, and HIV via blood in the current study, about 85.3%, 86.2%, and 88.1% knew that these viruses were blood-borne, respectively. Methab et al. stated that 30.8% knew about blood route transmission of HIV (26). A study carried out in South Italy noticed that 93.3% of hairdressers were aware of blood as a vehicle of blood-borne viruses (17). Kilonzo et al. found that 32.5% of hairdressing workers knew about the blood route for transmission of HBV (23). Mahbub showed that 80.0% and 100% of workers had awareness about the transmission of HBV and HIV via transfusion of contaminated blood, respectively (22). Shalaby et al. noticed that 92.5% of workers were aware of the blood transmission of HBV and HCV (25). A study performed in Pakistan

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

found that 30.8% of hairdressers knew about blood transmission of HBV and HIV by sharing razors (26). In the present data, 90.8% of workers knew that razors and scissors could be potential sources of infections by blood-borne viruses. This is slightly similar to that reported by Amodio and colleagues (17). A study performed in Bangladesh detected that 79% and 99% of workers knew that sharing razors can transmit HBV and HIV infections, respectively (22). Methab et al. found that 25.6% of hairdressers knew about the risk of sharing razors in the transmissions of HBV and HIV (26). Sedhai detected that 96.7% of hairdressers knew about the potential risk of razors regarding blood borne viruses (27). Another study showed that the percentage of knowledge among hairdressers about the risk of sharing shaving sharp tools in the transmissions of HBV was 33.3% (23).

According to the vaccination against HBV in our study, 66.1% of hairdressers knew the vaccine as a preventive measure against HBV. Different studies showed different results, such as 72.4% in Italy (17), 40.66% in Egypt (25), and 71.6% in Pakistan (26). In the current data, the knowledge about the risk of HBV, HCV, and HIV among those hairdressers and their clients was 84.4%. Two studies from Ghana and Italy noticed that 72.7% and 55.2% of workers knew the real risk for HIV in clients (17). The variations in knowledge among hairdressers regarding HBV, HCV, and HIV in different studies were attributed to socioeconomic status, age, level of education, work experience, and daily workload.

As regards the practice in the present study, 4 (4.66%) were not washing their hands between different clients. Different studies showed higher results than ours (17, 24). Those hairdressers who were reusing the towels between customers were 80 (73.44%). Two pieces of pieces of research from Italy and Egypt showed lower percentages than our data (17).

According to reused razors or blades in the current result, 53 (48.66%) of hairdressers have reused the razors. This is in line with that reported in Egypt (25). Amodio et al. showed that 18.1% of workers d ors/blades (17). The hairdressers, as well as the general population, should be educated by a health education program on routes of transmission and routes of prevention and control of blood borne (28).

In this survey, 16 (14.7%), 6 (5.55.5%), and 13 (11.99%) had no use of disposable gloves, did not wear gloves after an accidental cut on a customer, and did not change gloves between different clients, respectively. Higher percentages were found in a study conducted among Italian hairdressers (17).

Regarding the sterilization of reusable instruments in this report, only 1 (0.99%) of hairdressers did not sterilizes the reusable adequately before day work, 4 (3.77%) did not sterilize instruments between clients, and 6 (5.55%) did not apply daily disinfection for hair brushes. Higher percentages were stated by Amodio et al. (17).

Our data demonstrated that 42 (38.55%) of hairdressers not received the HBV vaccine. Amodio et al. reported a slightly similar result (17). Meanwhile, lower than our results were revealed in Pakistan, Tanzania, and Nigeria, where the percentages of hairdressers who had received a vaccine against HBV were 2.0%, 3.3%, and 4.6% (23, 26, 29). There are several factors contributing to the poor practice among hairdressers, including crowding (increasing the number of clients), poor awareness, socioeconomic status, and lack of monitoring by regulatory authorities and control over obtaining licenses for working as hairdressers and opening hairdressing salons.

As regards the knowledge score among hairdressers, there was a significant association between education level and good knowledge (p=0.004). This agreed with that reported in Iran and Italy (17, 20). A significant association was also noticed between knowledge score and the number of customers per day (p=0.001). Amodio et al. and Usman et al. stated opposite results (17, 29). Related to the practice score in the present data, there were significant associations between practice and level of education and size of salon (m^2), as well as a borderline significant association between marital status of hairdressers and practice (p=0.015, 0.001, and 0.06), respectively. Significant associations were reported in Italy and Nigeria between the level of education of hairdressers and practice (p=<0.01 and 0.000001) (17, 29).

The limitations of our study were the small sample size, the female beauty salons were not enrolled in the study, all the male hairdressers were also not involved due to duty work, and the location of those salons was due to a lack of a list from the local

government that contained all salons in different areas in Aden.

CONCLUSION

The majority of hairdressers were aware of the risk of HBV, HCV, and HIV infection and transmission routes and the risk of shaving tools, as well as vaccination against HBV. There were significant associations between a score of knowledge and education level and the number of customers per day. The associations were significant between practice and level of education and size of salon, as well as a borderline significant association between the marital status of hairdressers and their practice. A high percentage of hairdressers have reused shaving tools, and this needs direct monitoring by regulatory authorities to prevent the spreading of infectious diseases.

Acknowledgments

The authors of this study wish to thank all those hairdressers who accepted to participate in our study. They would also like to express their gratitude to the students' team who collected the data for the research.

Conflict of interest

The authors declare that no conflict of interest.

REFERENCES

[1] S. Riedel, S. A. Morse, T. A. Mietzner, and S. Miller, *Microbiologia Médica de Jawetz, Melnick & Adelberg*, 28th ed., McGraw Hill Brasil, Jan. 2022.

[2] M. Bhat, P. Ghali, M. Deschenes, and P. Wong, "Hepatitis B and the infected health care worker: public safety at what cost?" *Canadian Journal of Gastroenterology and Hepatology*, vol. 26, no. 5, pp. 257–260, 2012.

[3] N. Mahboobi, S. R. Porter, P. Karayiannis, and S. M. Alavian, "Dental treatment as a risk factor for hepatitis B and C viral infection: a review of the recent literature," *Journal of Gastrointestinal and Liver Diseases*, vol. 22, no. 1, pp. 79–86, 2013.

[4] N. Mohamed, N. Saddki, A. Yusoff, and A. M. Jelani, "Association among oral symptoms, oral health-related quality of life, and health-related quality of life in a sample of adults living with HIV/AIDS in Malaysia," *BMC Oral Health*, vol. 17, p. 1, Dec. 2017.

[5] World Health Organization, "Hepatitis B," [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b. [Accessed: Aug. 18, 2022].

[6] World Health Organization, "Hepatitis C," [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/hepatitis-c. [Accessed: Apr. 9, 2024].

[7] World Health Organization, "HIV. Global situation and trends," [Online]. Available: https://www.who.int/data/gho/data/themes/hiv-aids. [Accessed: Jul. 22, 2024].

[8] P. Chin-Hong et al., *Levinson's Review of Medical Microbiology and Immunology: A Guide to Clinical Infectious Diseases*, McGraw Hill, 2024.

[9] Al-Abd N, Al-Ayashi W, Bamagha O, Al-faha AO, Al-yafei BS, Abdullah AF, Qasem AA, Raweh RA, Al-bakri AA, Albanna ZE, Thabet RA. Prevalence and Knowledge, Attitude, and Practices of Hepatitis B Virus Among Dental Students at the University of Science and Technology, Aden, Yemen. Yemeni Journal for Medical Sciences. 2025 May 6;19(5).

[10] Bin-Hameed E, Macinon A, Hirsi A, AL-gowaihi A, Alkharraz A, Bares M, Mogheeth MB, Barakat M, Bakran R, Alkharraz S. Seroprevalence and Risk Factors of Hepatitis B and C Viruses among Hemodialysis Patients in Mukalla City, Hadhramout, Yemen. Yemeni Journal for Medical Sciences. 2025 Jan 25;19(2).

[11] Alssamei FA, Elagib AA, Al-Sonboli NA, Alkumaim FA, Alsayaad NS, Aldobibi AT.

Evaluation of Immune Response to Hepatitis B Vaccine among Malnourished Children in Yemen. Yemeni Journal for Medical Sciences. 2015 Jan 1;9(1).

[12] I. K. Habibullah et al., "To assess the knowledge, attitude, and practices of barbers regarding HIV and HCV transmission in the Peshawar region," *Pakistan Journal of Medical & Health Sciences*, vol. 16, no. 6, p. 1065, Sep. 2022.

[13] B. Ataei, K. Shirani, S. M. Alavian, and M. Ataie, "Evaluation of knowledge and practice of hairdressers in women's beauty salons in Isfahan about hepatitis B, hepatitis C, and AIDS in 2010 and 2011," *Hepatitis Monthly*, vol. 13, no. 3, p. 6215, Mar. 2013.

[14] A. N. M. Gubran et al., "Intra-household transmission of hepatitis B virus in Rasd, Abyan-Yemen," *Libyan Journal of Medical and Applied Sciences*, Nov. 2023, pp. 50–58.

[15] A. N. M. Gubran et al., "Intra-familial transmission of hepatitis B virus in Aden-Yemen," *Electronic Journal of University of Aden for Basic and Applied Sciences*, vol. 5, no. 2, pp. 210–216, Jun. 2024.

[16] A. N. M. Gubran et al., "Clustering of hepatitis C infection among family members in Aden, Yemen," *Egyptian Liver Journal*, vol. 14, no. 1, p. 85, Nov. 2024.

[17] E. Amodio et al., "Knowledge, attitudes and risk of HIV, HBV and HCV infections in hairdressers of Palermo city (South Italy)," *European Journal of Public Health*, vol. 20, no. 4, pp. 433–437, Aug. 2010.

[18] F. Biadgelegn et al., "Potential risk of HIV transmission in barbering practice in Ethiopia: from public health and microbiological perspectives," *BMC Public Health*, vol. 12, p. 1, Dec. 2012.

[19] A. B. Wakjira, "Assessment on knowledge, attitude and practice with regard to the transmission and prevention of HIV/AIDS among barbers and beauty salon workers in Hossana Town, South Ethiopia," *J. Clin. Diagn. Res.*, vol. 5, pp. 2376–0311, 2017.

[20] N. Shekari, H. Khodadadi, A. R. Sayadi, and M. Asadpour, "Survey of knowledge and attitude of female hairdressers in Rafsanjan regarding the prevention of blood-borne diseases and its relationship with demographic characteristics," *Journal of Zabol Medical School*, Sep. 2021.

[21] G. Khan, T. A. Rizvi, I. Blair, and T. E. Adrian, "Risk of blood-borne infections in barber shops," *Journal of Infection and Public Health*, vol. 3, no. 2, pp. 88–89, May 2010.

[22] A. Mahbub, "Knowledge and attitude and practices of salon workers regarding the transmission of HIV and HBV in Bangladesh," M.S. thesis, East West Univ., 2016.

[23] S. Kilonzo, H. Jaka, and S. Mapunda, "Knowledge and risk assessment of hepatitis B infection among barbers and beauty salon workers in Mwanza, Tanzania," *International Journal of Translational Medical Research and Public Health*, Mar. 2024.

[24] M. D. Quarm, J. Mthembu, K. Zuma, and E. E. Tarkang, "Knowledge, attitudes and prevention practices regarding HIV/AIDS among barbers in Ho municipality, Ghana," *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, vol. 18, no. 1, pp. 42–51, Oct. 2021.

[25] S. Shalaby et al., "Hepatitis B and C viral infection: prevalence, knowledge, attitude and practice among barbers and clients in Gharbia governorate, Egypt," *Eastern Mediterranean Health Journal*, vol. 16, no. 1, 2010.

[26] S. Methab et al., "Knowledge and practices regarding hepatitis B and HIV-AIDS among beauty salon workers and hairdressers in

https://doi.org/10.20428/yjms.v19i7.3078
https://journals.ust.edu/index.php/yjms

Karachi, Pakistan," *ASR Chiang Mai University Journal of Social Sciences and Humanities*, vol. 10, no. 1, pp. 1–21, Jun. 2023.

[27] G. P. Sedhai, "Knowledge and practices of hairdressers about occupational safety and health in Kaski District," *Interdisciplinary Journal of Management and Social Sciences*, vol. 6, no. 1, pp. 122–135, Feb. 2025.

[28] A. N. M. Gubran et al., "Hepatitis B virus infection among hemodialysis patients in Aden-Yemen," *Yemeni Journal for Medical Sciences*, vol. 18, no. 1, pp. 1–8, Nov. 2024.

[29] N. O. Usman et al., "Knowledge, attitude and practice of preventive measures for hepatitis B and C infection among barbers in SabonGari Local Government Area," *International Journal of Medicine and Health Development*, vol. 23, no. 2, pp. 295–299, Jul. 2018.