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Bashir Mohamed Ali
maganmagan181@gmail.com
Daynile General Hospital
Hassan Mohamed Isack
Daynile General Hospital
Abdullahi Abdirisak Ahmed
Daynile General Hospital
SayidAli Hassan Nur
Daynile General Hospital
Hafsa Ali Hassan
Daynile General Hospital
Roma Abdulkadir Mayow
Daynile General Hospital

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Authors

Bashir Mohamed Ali*[1,2](Email: maganmagan181@gmail.com; ORCID: 0009-0009-1365-0030)

Hassan Mohamed Isack[1,2](Email: hassanisakmoh@gmail.com; ORCID: 0009-0006-2066-0120)

Abdullahi Abdirisak Ahmed[1,2] (Email: indhayare767@gmail.com; ORCID:0009-0006-7986-3184)

Dr SayidAli Hassan Nur[1] (Email: Drcaraale2023@gmail.com; ORCID: 0009-0001-0637-923X)

Dr Hafsa Ali Hassan[1] (Email: Xilkasali8@gmail.com; ORCID: 0009-0001-7996-7681)

Roma Abdulkadir Mayow [1,2] (Email: roomocabduqaadir43@gmail.com; ORCID: 0009-0001-6566-863X)

***Corresponding Author**

Bashir Mohamed Ali

maganmagan181@gmail.com

Affiliations

1. Center for Health Research and Innovation, Daynile General Hospital, Mogadishu, Somalia.
2. Faculty of Health Sciences and Tropical Medicine, Somali National University, Mogadishu, Somalia

Abstract

Background:

Male barbers may contribute to hepatitis B virus (HBV) transmission through occupational exposure to blood and contaminated instruments. However, evidence on HBV prevention

practices among barbers in Somalia is limited. This study assessed the level of HBV prevention practices and factors associated with these practices among male barbers in selected districts of Mogadishu, Somalia.

Methods:

A community-based cross-sectional study was conducted among male barbers working in registered and non-registered barbershops in Daynile, Hodan, Howl-Wadag, and Yaqshid districts of Mogadishu from 1 to 29 July 2026. A total of 768 eligible male barbers constituted the sampling frame, from which 384 participants were selected using systematic random sampling. Data were collected using a structured, interviewer-administered questionnaire assessing sociodemographic characteristics, occupational factors, HBV-related knowledge and attitudes, and prevention practices. Prevention practices were classified as safe when participants correctly answered more than 50% of 12 practice questions. Bivariable and multivariable logistic regression analyses were performed to identify factors associated with safe prevention practices.

Results:

Among the 384 participating barbers, 249 (64.84%) demonstrated unsafe HBV prevention practices, while 135 (35.16%) demonstrated safe practices. After adjustment, educational level, working hours, work experience, monthly income, and knowledge level were significantly associated with prevention practices. Barbers with no formal education had lower odds of safe practices than those with formal education (AOR = 0.26, 95% CI: 0.12–0.55). Those working ≥8 hours per day had lower odds of safe practices than those working <8 hours (AOR = 0.20, 95% CI: 0.09–0.45). Barbers with ≥5 years of experience also had lower odds of safe practices (AOR = 0.32, 95% CI: 0.12–0.82). In contrast, those earning ≥100 USD per month had substantially higher odds of safe practices (AOR = 23.48, 95% CI: 9.40–58.64). Inadequate HBV knowledge was associated with lower odds of safe practices (AOR = 0.18, 95% CI: 0.06–0.56). Age and attitude were not significantly associated with prevention practices in the multivariable model.

Conclusion:

Unsafe HBV prevention practices were common among male barbers in selected districts of Mogadishu. The findings indicate important gaps in routine infection prevention and suggest that educational, occupational, and economic conditions influence the implementation of safer

practices. Targeted practical infection-control training, periodic refresher education, improved access to affordable prevention materials, and strengthened HBV screening and vaccination services should be considered to reduce occupational and community risks of HBV transmission among barbers in Mogadishu.

Keywords:

Hepatitis B virus; HBV prevention; barbers; infection prevention; occupational exposure; knowledge; Mogadishu; Somalia

Background

Hepatitis B virus (HBV) infection is a viral disease of the liver that constitutes a major public health problem worldwide[1,2]. It is a leading cause of chronic liver disease, often remaining asymptomatic while carriers unknowingly spread the infection to susceptible individuals[3]. Current reports indicate that approximately 296 million people are living with chronic HBV infection globally[4]. This epidemic results in an estimated 1.1 million deaths each year, primarily due to life-threatening complications such as liver cirrhosis and hepatocellular carcinoma[5,6]. These conditions represent the severe final stages of untreated chronic infection[5]. In response, the World Health Assembly has established elimination goals for 2030, aiming for a 90% reduction in new cases and a 65% reduction in mortality[7]. Crucially, HBV is considered a vaccine-preventable disease, with available vaccines offering 90–95% protective efficiency when administered correctly[8].

The burden of HBV is notably high in the WHO African Region, which accounts for one of the highest prevalence rates of chronic infection globally[9]. Within this regional context, Somalia is considered an area of high endemicity, with a general population prevalence estimated to exceed 8%[1]. The country faces significant challenges in diagnosis and treatment, largely due to a healthcare system still recovering from decades of civil war and humanitarian crises[9]. These challenges are often associated with limited surveillance systems, low screening rates, and inconsistent vaccination coverage[9]. Local Somali studies have documented HBsAg prevalence

rates of 9.7% among blood donors in Mogadishu, 11.5% among hospital patients, and up to 13.3% among pregnant women[3,9,10]. High-risk groups, such as medical students in Bosaso, have also shown alarmingly low full vaccination rates of only 2.8%[11]. Furthermore, persistent health system fragilities and vaccine stockouts contribute to a large cohort of adults who remain susceptible to infection[9].

The barbering profession has been associated with an increased risk of bloodborne pathogen transmission, particularly in low- and middle-income countries[12]. Sharp instruments routinely used in barbershops, such as razors, blades, and clippers, may increase the risk of infection if they become contaminated with blood during shaving or hair-cutting services[12]. HBV transmission may occur through the reuse of blades or the inadequate sterilization and decontamination of grooming tools between clients[13]. Furthermore, negligent practices such as the careless handling of sharps and poor waste disposal methods have been associated with serious occupational health risks for both the barbers and their customers[12]. In many African settings, traditional shaving is a common cultural practice that may expose individuals to HBV in informal work environments with limited regulatory oversight[12]. Consequently, limited regulation of barbering practices in these settings makes barbers a vital population for study regarding occupational health and safety[12].

Evidence suggests that having good knowledge about the virus does not automatically translate into the consistent application of safe practices in the workplace[2]. Adhering to standard infection prevention measures is critical for interrupting the transmission of HBV in barbershops[12]. Essential practices include consistent hand hygiene before and after serving clients and the use of personal protective equipment (PPE) such as gloves[12]. The use of disposable, single-use blades for each client is a primary strategy for preventing percutaneous exposure to the virus[2]. Additionally, the rigorous sterilization and disinfection of non-disposable instruments using ultraviolet (UV) sterilizers or effective chemical disinfectants is necessary to eliminate microorganisms[13]. Safe waste management, including the proper disposal of used sharps, further mitigates the risk of accidental needle-stick or blade injuries[2]. Additionally, HBV vaccination remains the most effective long-term preventive measure for protecting barbers, who face frequent occupational exposure to blood and body fluids[11].

Synthesis of previous evidence from East African and similar regional studies indicates that several factors are significantly associated with HBV prevention practices among barbers[13]. Educational attainment and formal professional training are common predictors, with higher levels often linked to safer practices and improved knowledge[13]. Knowledge and attitudes toward biological hazards also play a crucial role; barbers with adequate knowledge and positive attitudes are considered more likely to comply with safety protocols[12]. Work experience has been strongly associated with improved practice scores, as cumulative exposure and peer learning may facilitate better understanding[2]. Economic factors, such as monthly income and job security, can also influence a barber's ability to invest in safe equipment and vaccines[3]. Furthermore, the availability of functional sterilization equipment, such as UV sterilizers, is a key determinant of safe practices in the workplace[12]. Moreover, vaccination status itself is often correlated with higher levels of awareness and adherence to general infection prevention measures[7].

Despite the high prevalence of HBV in Somalia, there is a notable lack of evidence regarding the specific prevention practices of male barbers in the country. Most existing Somali studies have focused on healthcare workers, blood donors, or pregnant women, leaving a significant gap in data concerning informal service sectors[1,3,10]. While some research has assessed HBV prevalence or general knowledge in other populations, there are no published studies that comprehensively evaluate the actual prevention practices and their associated factors among barbers in Mogadishu. This missing local evidence is critical, as findings from other countries cannot be fully generalized to the unique Somali socio-cultural and economic context. Without specific data on this high-risk occupational group, it is difficult for health authorities to develop targeted occupational health policies and interventions. Therefore, addressing this gap is essential for informing national strategies aimed at reducing community transmission and achieving HBV elimination goals.

Therefore, this study aimed to assess the level of hepatitis B virus prevention practices and identify the associated socio-demographic, behavioral, and occupational factors among male barbers in the selected districts in Mogadishu, Somalia. By generating local evidence, this research seeks to guide the development of targeted health education and occupational safety interventions for this population.

Methods

Study Design, Area, and period

A community-based cross-sectional study was conducted among male barbers working in barbershops in the selected districts in Mogadishu, Somalia. Mogadishu, the capital city of Somalia, is the country's largest urban center and comprises several districts with a high concentration of barbershops providing hair-cutting and shaving services. Male barbers in these establishments are routinely exposed to sharp instruments and potential occupational contact with blood and body fluids, placing them at increased risk of hepatitis B virus (HBV) infection. The study targeted male barbers actively working in registered and non-registered barbershops during the study period. Data were collected from 1st July 2026 to 29th July 2026 using an interviewer-administered structured questionnaire adapted from previously published study[13]. A cross-sectional study design was employed because it enabled the assessment of HBV prevention practices and the associated socio-demographic, occupational, and behavioral factors among male barbers at a single point in time.

Study Population and Eligibility Criteria

The source population comprised all male barbers working in registered and non-registered barbershops across the four selected districts of Mogadishu, Somalia: Daynile, Hodan, Howl-Wadag, and Yaqshid. A total of 711 barbershops were identified, from which 768 eligible male barbers constituted the sampling frame. Eligible barbers were those who were actively engaged in barbering services during the study period. Participants were selected using a systematic random sampling technique, and 384 male barbers who provided informed consent were included in the study.

Sample Size Determination and Sampling Procedure

The sample size was determined using the single population proportion formula, assuming a 50% proportion of adequate HBV prevention practices, a 95% confidence level, and a 5% margin of error, yielding a required sample size of 384 male barbers. A total of 711 barbershops were identified across the four selected districts of Mogadishu: Daynile, Hodan, Howl Wadag, and Yaqshid. From these barbershops, 768 eligible male barbers were identified and constituted the

sampling frame. Where more than one eligible barber worked in a barbershop, all eligible barbers were included in the sampling frame.

The required sample was selected using systematic random sampling. The sampling interval was calculated by dividing the total number of eligible barbers by the required sample size:

$$K = \frac{768}{384} = 2$$

A random starting point was selected from the first two eligible barbers, after which every second eligible barber was selected until the required sample of 384 barbers was reached. The formula was as follows:

$$n = \frac{Z^2 \times p(1-p)}{(e)^2} \quad n = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} \quad n = \frac{3.8416 \times 0.25}{0.0025} \quad n = 384$$

Where:

n: is the required sample size,

Z: is the standard normal value corresponding to a 95% confidence level (1.96),

P: is the assumed proportion of adequate HBV prevention practices (0.50),

E: is the margin of error (0.05).

Data Collection Instrument and Techniques

Data were collected using a structured, interviewer-administered questionnaire adapted from previously published study on hepatitis B virus (HBV) prevention practices and occupational infection prevention among barbers[13]. The questionnaire comprised sections on sociodemographic characteristics (age, educational level, monthly income, and work experience), occupational characteristics (working hours, availability of sterilization equipment, and HBV vaccination status), and knowledge and attitudes toward HBV infection and its prevention. It also included items assessing HBV prevention practices, such as hand hygiene, use of personal protective equipment, use of disposable blades, sterilization and disinfection of instruments, safe disposal of used sharps, and other infection prevention measures routinely practiced in barbershops.

Data Quality Control

We emphasized quality control throughout the data collection process to ensure the reliability and consistency of the findings. The questionnaire was initially developed in English, translated into Somali for field use, and then back-translated into English by independent language experts to verify the consistency and accuracy of the meaning.

Ten trained data collectors and three supervisors with prior experience in health surveys were recruited. They were provided with 4 days of intensive training before the commencement of data collection. The training focused on the study objectives, a detailed review of the questionnaire, interviewing techniques, ethical considerations, confidentiality of information, informed consent procedures, and the roles and responsibilities of both data collectors and supervisors.

During data collection, close supervision was conducted by the principal investigator to ensure adherence to the study procedures and address any emerging issues. Completed questionnaires were reviewed daily for completeness and consistency prior to data entry.

In addition, a pretest was conducted on 10% of the sample size among male barbers working in barbershops outside the selected study districts. Based on the pretest findings, necessary modifications were made to improve the clarity of the questions, eliminate ambiguities, and refine the flow and structure of the questionnaire before the actual data collection.

Data Processing and Statistical Analysis

Data were checked for completeness and consistency before being coded and entered into Stata version 14 for analysis. Data cleaning was performed using Microsoft Excel to identify and correct data entry errors and inconsistencies. Descriptive statistics, including frequencies and percentages, were used to summarize participants' characteristics and the distribution of study variables. The findings are presented using tables and figures where appropriate.

To identify factors associated with hepatitis B virus (HBV) prevention practices, both bivariable and multivariable logistic regression analyses were performed. Initially, each independent variable was entered into a bivariable logistic regression model to assess its association with the outcome variable. Variables with a p-value <0.50 in the bivariable analysis, together with

variables considered biologically or epidemiologically relevant based on previous literature, were entered into the multivariable logistic regression model to minimize residual confounding. The strength of association was expressed using crude odds ratios (COR) and adjusted odds ratios (AOR) with corresponding 95% confidence intervals (CI). Statistical significance was declared at $p < 0.05$.

The goodness-of-fit of the final logistic regression model was assessed using the Hosmer–Lemeshow goodness-of-fit test. The model demonstrated a good fit to the data (Hosmer–Lemeshow $\chi^2 = 7.47$, df = 8, $p = 0.4871$), indicating that the predicted probabilities were consistent with the observed outcomes. Multicollinearity was assessed using the Variance Inflation Factor (VIF), and no evidence of multicollinearity was observed (VIF range: 1.40–4.44; mean VIF = 2.34).

Inclusion and exclusion criteria

All male barbers aged 18 years or older who were actively providing barbering services in registered or non-registered barbershops in the selected districts of Mogadishu during the data collection period were eligible for inclusion in the study.

Barbers who did not meet the eligibility criteria, were unable to provide reliable information, or had incomplete information were excluded from the study.

Operational definitions

Hepatitis B virus (HBV) prevention practice:
Routine infection-prevention behaviors used by barbers to reduce HBV transmission during barbering services.

Safe HBV prevention practice:
Barbers who correctly answered more than 50% of the 12 practice questions, corresponding to 7–12 correct responses, were classified as having safe HBV prevention practices.

Unsafe HBV prevention practice:
A total practice score of 50% or less of the 12 practice questions, corresponding to 0–6 correct responses, was classified as unsafe HBV prevention practice.

Adequate knowledge:

Participants who correctly answered more than 50% of the 12 knowledge questions, equivalent to 7–12 correct responses, were considered to have adequate knowledge.

Inadequate knowledge:

Participants with 50% or fewer correct responses among the 12 knowledge questions, equivalent to 0–6 correct responses, were considered to have inadequate knowledge.

Favorable attitude:

Participants whose responses to the 9 attitude questions exceeded 50% of the maximum possible attitude score were classified as having a favorable attitude.

Unfavorable attitude:

Participants whose responses to the 9 attitude questions were 50% or less of the maximum possible attitude score were classified as having an unfavorable attitude.

Formal education:

Participants who reported having received formal schooling.

No formal education:

Participants who reported having no formal schooling.

Working hours:

The number of hours a barber reported working per day, categorized as <8 hours and ≥8 hours.

Work experience:

The total number of years the participant had worked as a barber, categorized as <5 years and ≥5 years.

Monthly income:

The participant's self-reported average monthly income from barbering work, categorized as <100 USD and ≥100 USD.

Barbershop:

A workplace where barbering services, including hair cutting, shaving, and related grooming procedures, are provided to clients.

Results

Sociodemographic Characteristics of Participants

A total of 384 male barbers participated in the study. Regarding age distribution, the largest proportion of participants were aged 30–39 years (149, 38.80%), followed by those aged 20–29 years (141, 36.72%). Participants aged 18–19 years accounted for 67 (17.45%), while those aged ≥40 years represented the smallest proportion (27, 7.03%). Regarding marital status, the majority of participants were married (233, 60.68%), followed by single participants (84, 21.88%), divorced participants (58, 15.10%), and widowed participants (9, 2.34%).

In terms of educational level, 154 (40.10%) participants were unable to read and write, while 93 (24.22%) were able to read and write without formal education. Participants with primary, secondary, and degree-level education accounted for 44 (11.46%), 49 (12.76%), and 44 (11.46%), respectively. More than half of the participants reported working ≥8 hours per day (224, 58.33%), while 160 (41.67%) worked less than 8 hours daily.

Regarding work experience, 198 (51.56%) participants had 5–10 years of experience, followed by those with less than 5 years (145, 37.76%), whereas 41 (10.68%) had more than 10 years of experience. Concerning monthly income, 233 (60.68%) participants reported earning <100 USD per month, 119 (30.99%) earned 100–300 USD, and 32 (8.33%) earned >300 USD. (Table 1).

Table 1: Sociodemographic characteristics of the barbers in the selected districts in Mogadishu, Somalia

Variables	Categories	N (%)
Age in years	18-19	67(17.45)
	20–29	141(36.72)
	30–39	149(38.80)
	≥40	27(7.03)

Marital status	Single	84(21.88)
	Married	233(60.68)
	Divorced	58(15.10)
	Widowed	9(2.34)
Educational level	Unable to read and write	154(40.10)
	Able to read and write	93(24.22)
	Primary	44(11.46)
	Secondary	49(12.76)
	Degree	44(11.46)
Working hours	<8 hours	160(41.67)
	≥8 hours	224(58.33)
Experience in years	<5	145(37.76)
	5–10	198(51.56)
	>10	41(10.68)
Income in USD	<100	233(60.68)
	100-300	119(30.99)
	>300	32(8.33)

Note: USD= United Nations Dollars

Knowledge of Hepatitis B Virus Among Barbers

This table presents the participants' knowledge of hepatitis B virus (HBV). More than half of the participants correctly identified HBV as a viral disease (232, 60.42%) and recognized that it is transmitted through blood and body fluids (226, 58.85%). Similarly, 204 (53.13%) participants knew that HBV could be transmitted through contaminated blades, while 232 (60.42%) correctly identified sexual contact as a mode of transmission.

Regarding disease characteristics, 215 (55.99%) participants recognized that HBV primarily affects the liver, 207 (53.91%) identified jaundice as a common symptom, 230 (59.90%) were aware that HBV can lead to liver cancer, 218 (56.77%) knew that the infection can be transmitted from mother to child during pregnancy, and 217 (56.51%) recognized that HBV may result in lifelong infection.

Concerning prevention and diagnosis, 230 (59.90%) participants were aware that laboratory tests are available for HBV diagnosis, an equal proportion recognized that an effective vaccine exists, and 214 (55.73%) knew that HBV infection is preventable. Based on the overall knowledge assessment, 192 (50.00%) participants had adequate knowledge, whereas the remaining 192 (50.00%) demonstrated inadequate knowledge. (Table 2).

Table 2: Knowledge of barbers about hepatitis B virus in the selected districts in Mogadishu, Somalia

Variables	Categories	N (%)
Is hepatitis B a viral disease?	Yes	232(60.42)
	No	152(39.58)
Is hepatitis B transmitted through blood and body fluids?	Yes	226(58.85)
	No	158(41.15)
Can HBV be transmitted through contaminated blades?	Yes	204(53.13)
	No	180(46.88)
Can HBV be transmitted through sexual contact?	Yes	232(60.42)
	No	152(39.58)
Is jaundice one of the common symptoms of HBV?	Yes	207(53.91)
	No	177(46.09)
Does HBV primarily affect the liver?	Yes	215(55.99)
	No	169(44.01)
Can HBV lead to liver cancer?	Yes	230(59.90)
	No	154(40.10)
Can HBV be transmitted from mother to child during pregnancy?	Yes	218(56.77)
	No	166(43.23)
Can HBV cause lifelong infection?	Yes	217(56.51)
	No	167(43.49)
Is there a laboratory test for HBV?	Yes	230(59.90)
	No	154(40.10)

Is there a vaccine against HBV?	Yes	230(59.90)
	No	154(40.10)
HBV infection can be prevented?	Yes	214(55.73)
	No	170(44.27)
Knowledge level	Adequate knowledge	192(50.00)
	Inadequate knowledge	192(50.00)

Note: HBV= hepatitis B virus.

Barbers' attitude Toward Hepatitis B Virus Prevention

According to the participants' attitudes toward HBV infection prevention. Overall, positive attitudes were observed across most attitude items. Approximately two-thirds of the participants agreed or strongly agreed that they would undergo HBV testing (250, 65.10%), that a new blade should be used for each customer (241, 62.76%), and that they would receive HBV vaccination (241, 62.77%). Similarly, 237 (61.72%) participants agreed or strongly agreed that avoiding cuts can prevent HBV infection, while 231 (60.16%) considered the use of antiseptics in barbershops necessary.

Regarding preventive measures, 228 (59.38%) participants agreed or strongly agreed that personal protective equipment (PPE) should be used during shaving. Positive attitudes were also observed toward vaccination of family members (225, 58.60%), avoiding intravenous drug use (230, 59.90%), and avoiding extramarital sexual relationships as measures to prevent HBV infection (225, 58.60%). Based on the overall attitude assessment, 197 (51.30%) participants demonstrated a favorable attitude, whereas 187 (48.70%) had an unfavorable attitude. (Table 3).

Table 3: Attitude of barbers on HBV infection prevention practices in the selected districts in Mogadishu, Somalia

Variables	**Scale**	**N (%)**
Do you agree to be personally tested for HBV infection?	Agree	167(43.49)
	Strongly agree	83(21.61)

	Disagree	46(11.98)
	Strongly disagree	88(22.92)
Do you agree that a new blade should be used for each customer?	Agree	160(41.67)
	Strongly agree	81(21.09)
	Disagree	65(16.93)
	Strongly disagree	78(20.31)
Do you agree to receive HBV vaccination?	Agree	156(40.63)
	Strongly agree	85(22.14)
	Disagree	66(17.19)
	Strongly disagree	77(20.05)
Do you agree that avoiding cuts can help prevent HBV infection?	Agree	159(41.41)
	Strongly agree	78(20.31)
	Disagree	71(18.49)
	Strongly disagree	76(19.79)
Do you agree that antiseptic use is necessary in barbershops?	Agree	163(42.45)
	Strongly agree	68(17.71)
	Disagree	81(21.09)
	Strongly disagree	72(18.75)
Do you believe using PPE is essential during shaving?	Agree	165(42.97)
	Strongly agree	63(16.41)
	Disagree	71(18.49)
	Strongly disagree	85(22.14)
Do you agree that vaccination of family members is necessary?	Agree	160(41.67)
	Strongly agree	65(16.93)
	Disagree	75(19.53)
	Strongly disagree	84(21.88)
Do you agree that avoiding intravenous drug use helps prevent HBV infection?	Agree	158(41.15)
	Strongly agree	72(18.75)
	Disagree	67(17.45)

	Strongly disagree	87(22.66)
Do you agree that avoiding extramarital sexual intercourse helps prevent HBV infection?	Agree	156(40.63)
	Strongly agree	69(17.97)
	Disagree	63(16.41)
	Strongly disagree	96(25.00)
Attitude level	Favorable	197(51.30)
	Unfavorable	187(48.70)

Note: HBV= hepatitis B virus; PPE= personal protective equipment

In terms of the prevention practices of barbers toward HBV infection. Less than half of the participants reported washing their hands before attending each client (166, 43.23%), using gloves during service provision (141, 36.72%), disinfecting or sterilizing instruments between customers (155, 40.36%), wearing an apron during shaving (155, 40.36%), or managing cuts with antiseptics (147, 38.28%). In contrast, more than half of the participants reported changing blades after each client (210, 54.69%) and properly disposing of used blades through burial or burning (214, 55.73%).

Despite these positive practices, 264 (68.75%) participants reported reusing towels without sterilization, while 233 (60.68%) had never been screened for HBV infection and 227 (59.11%) had never received HBV vaccination. Additionally, 238 (61.98%) participants did not change combs between clients. Overall, 135 (35.16%) participants demonstrated safe prevention practices, whereas 249 (64.84%) exhibited unsafe prevention practices toward HBV infection. (Table 4).

Table 4: Barbers' prevention practices toward HBV infection in the selected districts in Mogadishu, Somalia

Variables	**Categories**	**N (%)**
Do you wash your hands before serving each client?	Yes	166(43.23)
	No	218(56.77)
Do you use gloves for each client?	Yes	141(36.72)
	No	243(63.28)

Do you change blades after each client?	Yes	210(54.69)
	No	174(45.31)
Do you reuse towels without sterilization between clients?	Yes	264(68.75)
	No	120(31.25)
Do you disinfect or sterilize instruments between clients?	Yes	155(40.36)
	No	229(59.64)
Do you use a razor for shaving?	Yes	150(39.06)
	No	234(60.94)
Do you change or disinfect combs between clients?	Yes	146(38.02)
	No	238(61.98)
Do you wear an apron during shaving?	Yes	155(40.36)
	No	229(59.64)
Have you ever undergone screening for HBV infection?	Yes	151(39.32)
	No	233(60.68)
Have you ever been vaccinated against HBV infection?	Yes	157(40.89)
	No	227(59.11)
Do you properly dispose of used blades (e.g., by burial or burning)?	Yes	214(55.73)
	No	170(44.27)
Do you treat cuts with antiseptics?	Yes	147(38.28)
	No	237(61.72)
Practice level	Safe	135(35.16)
	Unsafe	249(64.84)

Note: HBV= hepatitis B virus.

The overall level of hepatitis B virus (HBV) prevention practices among the participating barbers. Nearly two-thirds of the participants (249, 64.84%) demonstrated unsafe prevention practices, whereas only 135 (35.16%) exhibited safe prevention practices. These findings indicate that unsafe HBV prevention practices were common among male barbers in the selected districts in Mogadishu, highlighting the need for targeted infection prevention training, improved access to protective equipment, and increased HBV vaccination coverage. (Figure 1).

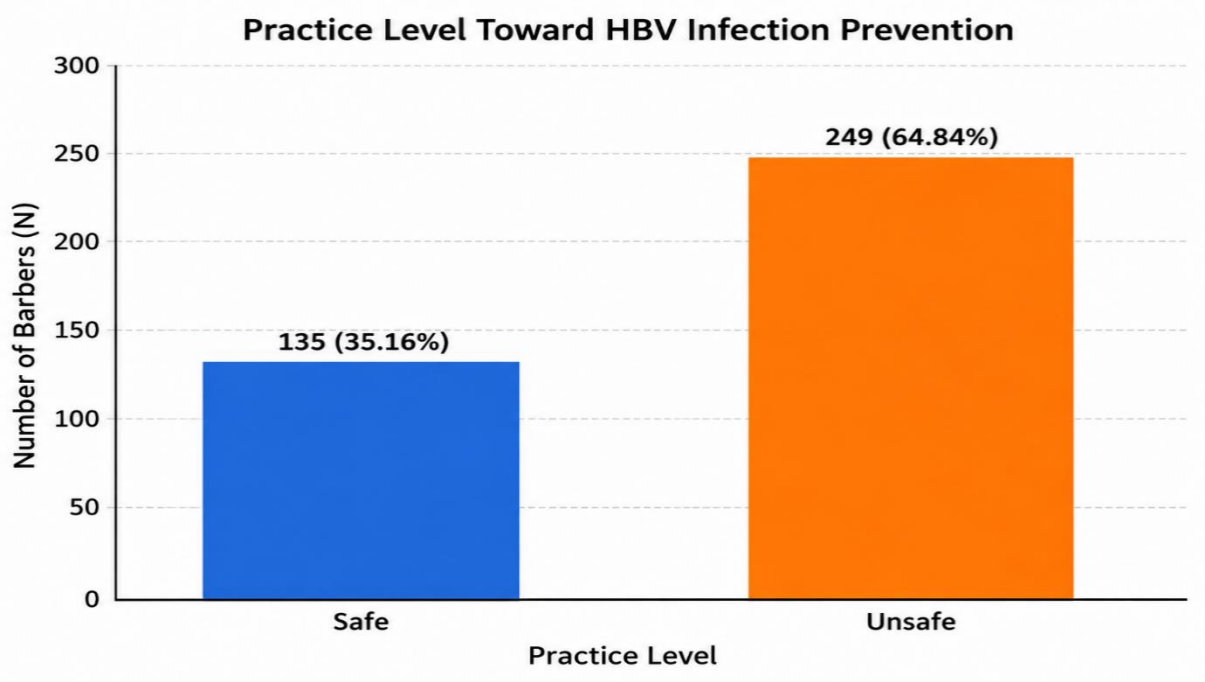


Figure1: Overall HBV prevention practice level among male barbers in the selected districts in Mogadishu, Somalia.

Factors Associated with HBV Prevention Practices

These results of the bivariable and multivariable logistic regression analyses of factors associated with HBV prevention practices among male barbers. In the bivariable analysis, educational level, working hours, work experience, monthly income, knowledge level, and attitude level were significantly associated with prevention practices.

After adjustment for potential confounders, educational level, working hours, work experience, monthly income, and knowledge level remained significantly associated with HBV prevention practices. Barbers with no formal education had 74% lower odds of demonstrating safe prevention practices than those with formal education (AOR = 0.26, 95% CI: 0.12–0.55). Similarly, those working ≥8 hours per day had 80% lower odds of safe practices compared with those working fewer than 8 hours (AOR = 0.20, 95% CI: 0.09–0.45). Barbers with ≥5 years of work experience had 68% lower odds of safe prevention practices than those with less experience (AOR = 0.32, 95% CI: 0.12–0.82). In contrast, barbers with a monthly income of ≥100 USD had substantially higher odds of safe prevention practices than those earning <100 USD (AOR = 23.48, 95% CI: 9.40–58.64). Furthermore, participants with inadequate knowledge

had 82% lower odds of safe prevention practices compared with those with adequate knowledge (AOR = 0.18, 95% CI: 0.06–0.56). Age and attitude level were not significantly associated with prevention practices in the multivariable analysis. (Table 5).

Table 5. Bivariable and multivariable logistic regression analysis of factors associated with hepatitis B virus prevention practices among male barbers in the selected districts in Mogadishu, Somalia.

Variables	Categories	Prevention practice level		COR (95%CI)	AOR (95%CI)
		Safe n (%)	Unsafe n (%)		
Age in years	<20	17	50	Ref	Ref
	≥20	118	199	1.74(0.96,3.16)	0.63(0.23,1.70)
Educational level	No formal education	32	215	0.05(0.03,0.08) ***	0.26(0.12,0.55) ***
	Formal education	103	34	Ref	Ref
Working hours	<8 hours	97	63	Ref	Ref
	≥8 hours	38	186	0.13(0.08,0.21) ***	0.20(0.09,0.45) ***
Experience in years	<5	62	83	Ref	Ref
	≥5	73	166	0.50(0.38,0.90) *	0.32(0.12,0.82) *
Income in USD	<100	26	207	Ref	Ref
	≥100	109	42	20.66(12.03,35.50) ***	23.48(9.40,58.64) ***
Knowledge level	Adequate knowledge	118	74	Ref	Ref
	Inadequate knowledge	17	175	0.06(0.03,0.11) ***	0.18(0.06,0.56) **
Attitude level	Favorable	116	81	Ref	Ref
	Unfavorable	19	168	0.08(0.05,0.14) ***	0.49(0.15,1.63)

Note: AOR, adjusted odds ratio; COR, crude odds ratio; CI, confidence interval; Ref, reference category. Statistical significance was considered at $p < 0.05$; $p < 0.01$; $p < 0.001$.

Discussion

This study found that unsafe hepatitis B virus (HBV) prevention practices were common among male barbers in the selected districts of Mogadishu, Somalia. Nearly two-thirds of participants (64.84%) demonstrated unsafe prevention practices, while 35.16% demonstrated safe practices. In the multivariable logistic regression analysis, educational level, working hours, work experience, monthly income, and knowledge level were independently associated with prevention practice, whereas age and attitude were not statistically associated. These findings have important occupational-health implications because barbers routinely handle sharp instruments, including razors and blades, creating opportunities for blood exposure through accidental cuts or other skin injuries.

The overall level of unsafe prevention practice in Mogadishu is comparable with evidence from other settings, although differences in study populations, measurement tools, and definitions of safe practice should be considered. In East Gojjam, Ethiopia, 79.8% of barbers were reported to have unsafe prevention practices, which is higher than the 64.84% observed in the present study[13]. Similarly, a study in Southeast Ethiopia reported good compliance with biological-hazard prevention measures among 47.1% of barbers, compared with 35.16% demonstrating safe HBV prevention practices in Mogadishu[12]. However, the Southeast Ethiopian study assessed broader biological-hazard prevention rather than HBV-specific practices, limiting direct comparison. Evidence from Mombasa County, Kenya, also identified important gaps in barber safety, including inadequate sterilization facilities and failure to replace blades between clients[8]. In contrast, barbers in Herat, Afghanistan, reported high compliance with some specific practices, including blade replacement/disposal and tool disinfection[2]. These differences suggest that prevention practices vary considerably across settings and may reflect differences in training, workplace resources, regulatory environments, and measurement approaches. Nevertheless, the consistent identification of prevention gaps across several countries indicates that barbers represent an important occupational group for HBV prevention interventions.

The high prevalence of unsafe practice in Mogadishu reflected deficiencies across several routine infection-prevention behaviors rather than a single practice. More than half of the barbers reported not washing their hands before serving clients (56.77%), not using protective gloves

(63.28%), not disinfecting grooming instruments (59.64%), or not disinfecting or changing combs (61.98%). Towel hygiene was also inadequate, with 68.75% reporting reuse of towels without sterilization, while 61.72% did not appropriately treat accidental cuts with antiseptics. In addition, 60.68% had never undergone HBV screening and 59.11% had never received HBV vaccination. These findings show that unsafe practice was multidimensional. Compared with East Gojjam, where handwashing and towel sterilization were also major deficiencies, and Herat, where higher levels of handwashing and tool disinfection were reported, the Mogadishu findings demonstrate substantial variation in specific preventive behaviors[2,13]. Kenyan evidence concerning blade replacement further supports the importance of consistent instrument-related precautions[8]. Together, these gaps indicate the need for practical infection-control measures addressing multiple routine behaviors simultaneously.

Educational level was significantly associated with safe HBV prevention practice. Barbers with no formal education had 74% lower odds of safe practice than those with formal education (AOR=0.26, 95% CI: 0.12–0.55). This finding is consistent with evidence from East Gojjam, Ethiopia, where lower educational attainment was associated with poorer prevention practices among barbers[13]. Limited formal education may affect the ability to understand written infection-prevention guidance, interpret health information, and recognize the importance of appropriate precautions against bloodborne infections. However, this association should not be interpreted as evidence that education itself causes safer practice, particularly given the cross-sectional design. The finding nevertheless suggests that HBV prevention programs for barbers should not rely exclusively on written materials. Practical demonstrations, visual materials, simple language, and locally appropriate training approaches may be more suitable for barbers with limited formal education.

Knowledge level was also significantly associated with prevention practice. Barbers with inadequate knowledge had 82% lower odds of safe prevention practice compared with those with adequate knowledge (AOR=0.18, 95% CI: 0.06–0.56). This finding is consistent with evidence from East Gojjam, where inadequate knowledge was associated with unsafe prevention practices[13]. Adequate knowledge may help barbers recognize HBV transmission routes, understand the risks associated with blood exposure and contaminated instruments, and appreciate the importance of disinfection and other preventive measures. However, knowledge

alone may not be sufficient to ensure consistent behavioral adherence. The present cross-sectional findings cannot establish that improving knowledge will necessarily produce safer practices. Nevertheless, the observed association supports the inclusion of targeted HBV education within barber-focused infection-control programs, particularly education that connects knowledge directly with practical procedures such as instrument disinfection, safe handling of sharp instruments, and management of accidental cuts.

Working hours were significantly associated with safe prevention practice. Barbers working ≥8 hours per day had 80% lower odds of safe practice than those working fewer than 8 hours (AOR=0.20, 95% CI: 0.09–0.45). A similar relationship has been reported in East Gojjam, Ethiopia, although the categorization and direction of the reported outcome should be considered when comparing the findings[13]. Longer working hours may create conditions involving greater workload, time pressure, or reduced opportunity to perform infection-control procedures consistently between clients. However, fatigue and workload intensity were not directly measured in the present study, so these mechanisms remain plausible explanations rather than established causal pathways. The finding nevertheless highlights the importance of considering working conditions when designing infection-prevention interventions for barbers.

Work experience was significantly associated with prevention practice. Barbers with ≥5 years of experience had 68% lower odds of safe practice than those with less than five years of experience (AOR=0.32, 95% CI: 0.12–0.82). This finding differs from the expectation that longer occupational experience necessarily improves preventive behavior. One possible explanation is that established work routines may persist over time, particularly when workers have limited opportunities for refresher training. This interpretation remains speculative because the study did not directly assess previous training or changes in workplace practices over time. Monthly income showed a strong positive association with safe practice: barbers earning ≥100 USD per month had 23.48 times higher odds of safe practice than those earning <100 USD (AOR=23.48, 95% CI: 9.40–58.64). Greater economic resources may facilitate access to disinfectants, disposable blades, protective equipment, and other materials required for infection prevention. However, this association does not establish that income itself causes safer practice, as income may also reflect other unmeasured characteristics of the workplace and barber.

No statistically significant association was observed between age and prevention practice in the multivariable model (AOR=0.63, 95% CI: 0.23–1.70). Similarly, although unfavorable attitude was strongly associated with lower odds of safe practice in the crude analysis (COR=0.08, 95% CI: 0.05–0.14), this association was no longer statistically significant in the multivariable model (AOR=0.49, 95% CI: 0.15–1.63). The attenuation of the attitude association after inclusion of other variables suggests that the crude relationship may have reflected differences in other characteristics. Therefore, the findings do not support treating attitude as a statistically significant correlate of prevention practice in the final model.

Overall, the findings suggest that unsafe HBV prevention practices among male barbers in Mogadishu are associated with a combination of educational, occupational, knowledge-related, and economic factors. The pattern indicates that prevention may require more than general awareness messages. Barbers with limited education or inadequate knowledge may require practical, easily understood infection-control training, while those working long hours or with extensive occupational experience may benefit from periodic refresher training and reinforcement of safe routines. The strong association between income and safe practice also suggests that access to affordable prevention materials should be considered alongside education. Public-health interventions should therefore prioritize practical HBV prevention training, proper instrument disinfection and handling, hand hygiene, safe management of accidental cuts, and appropriate use of disposable materials. Strengthening access to HBV screening and vaccination may also be relevant given the substantial gaps observed in these practices. These measures should be implemented alongside appropriate occupational-health oversight to support sustained adoption of safe practices among barbers in Mogadishu.

Conclusion

Unsafe HBV prevention practices were common among male barbers in the selected districts of Mogadishu, with nearly two-thirds of participants classified as having unsafe practices. Educational level, working hours, work experience, monthly income, and knowledge level were significantly associated with prevention practice in the multivariable analysis, whereas age and attitude were not statistically significant. The findings indicate that inadequate HBV prevention among barbers is not solely a matter of individual awareness but may also be related to educational, occupational, and economic circumstances. Strengthening practical infection-

prevention training, particularly for barbers with limited formal education or inadequate knowledge, alongside improved access to appropriate prevention materials, may help reduce occupational and community risks of HBV transmission. Further studies using longitudinal or intervention designs are warranted to evaluate effective strategies for improving sustained infection-prevention practices among barbers in Somalia.

Recommendations

Based on the findings, several actions are warranted. First, targeted HBV infection-prevention training should be provided to male barbers, with particular emphasis on barbers with limited formal education and inadequate HBV knowledge. Training should prioritize practical demonstrations of hand hygiene, instrument disinfection, safe blade handling and disposal, towel hygiene, and management of accidental cuts rather than relying solely on written information.

Second, local health authorities and relevant municipal bodies should strengthen occupational infection-control standards and monitoring of barbershops, including minimum requirements for instrument decontamination and safe handling of potentially contaminated materials.

Third, interventions should address the economic barriers that may limit access to appropriate prevention materials. Affordable access to disinfectants, disposable blades, gloves, and other essential infection-control supplies could facilitate consistent implementation of recommended practices.

Fourth, periodic refresher training should be considered, particularly for barbers with longer work experience, given the observed association between work experience and prevention practice.

Finally, future research should use observational, longitudinal, or intervention-based designs to determine whether improvements in knowledge, training, availability of prevention materials, and regulatory supervision result in sustained improvements in HBV prevention practices.

Study Limitation

This study has several limitations. First, its cross-sectional design limits the ability to establish temporal or causal relationships between the identified factors and HBV prevention practices. Although educational level, working hours, work experience, income, and knowledge were

statistically associated with prevention practice, these associations should not be interpreted as causal effects.

Second, the study was conducted among male barbers in four selected districts of Mogadishu and therefore may not be generalizable to all barbers in Somalia, particularly those working in other urban or rural settings. The sampling frame included barbers from registered and non-registered barbershops, which improves coverage of the informal sector, but differences between included and unrepresented establishments may remain.

Third, the study relied primarily on an interviewer-administered questionnaire. Self-reported prevention behaviors may therefore be affected by recall bias and social desirability bias, with participants potentially reporting practices that are more consistent with recommended infection-control standards than their actual routine behavior. The questionnaire included practices such as hand hygiene, PPE use, disposable blades, instrument disinfection, and safe sharps disposal.

Fourth, the study assessed prevention practices at a single point in time and did not directly observe barbering procedures. Consequently, reported practices may not perfectly represent actual behavior during routine service delivery.

Finally, although the multivariable model adjusted for measured covariates, residual confounding from unmeasured factors cannot be excluded. Factors such as availability and functionality of sterilization equipment, regulatory supervision, previous infection-control training, and actual availability of disposable materials may influence prevention practices but were not fully captured in the present analysis.

Abbreviations

AOR —Adjusted odds ratio

CI — Confidence interval

COR — Crude odds ratio

HBV — Hepatitis B virus

PPE — Personal protective equipment

USD — United States dollar

UV — Ultraviolet

VIF —Variance inflation factor

WHO —World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance for this study was obtained from the Institutional Review Board of Daynile General Hospital (Ref: DGH:2026/0003, issued June 2026). All study procedures adhered to the Declaration of Helsinki and relevant national guidelines. Informed consent was obtained from all participants before data collection, and confidentiality was ensured by using anonymized data and secure storage. Participants were also fully informed of their right to decline participation or withdraw at any stage without penalty.

consent to participate

Participants provided written informed consent prior to enrolment after receiving comprehensive information about the study objectives, procedures, potential risks, and their right to withdraw without penalty. Confidentiality was maintained using anonymous questionnaires

Consent for publication

Not applicable. No individual-level identifying information is included in this manuscript.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no competing interests.

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Authors' contributions

BMA conceived the study, led the study design, supervised data collection, conducted the data analysis, and drafted the initial manuscript. SHN and HAH provided methodological guidance and critically reviewed the manuscript for intellectual content. HMI, AAA, and RAM contributed

to the questionnaire development, data collection, and cleaning. All authors have read and approved the final manuscript.

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