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HIV, HBV and HCV Knowledge and Practice among Barbers and Women Hairdressers (coiffeurs): A Cross Sectional Study in Khartoum State 2015

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Abstract **Background:** Human immunodeficiency virus HIV, Hepatitis B virus HBV and Hepatitis C HCV are blood borne viruses that infect millions of people worldwide. Barbers and women hairdressers (coiffeurs) may accidently cut their customer exposing themselves and their customers to be infected with the viruses. **Objectives:** To assess the knowledge and practice of barbers and (coiffeurs) regarding HIV, HBV and HCV infections in Khartoum state. **Method:** A cross sectional community based involving 384 barbers and coiffeurs study using proportionate stratified purposive sampling technique was conducted in Khartoum state, Sudan. A questionnaire through interview was used to collect data. **Results:** About half of the participants did not possess the basic knowledge about HBV and only (19%) had it in case of HCV, whereas most of them (83%) possess the basic knowledge about HIV. Only (10%) regularly sterilize/disinfect the instruments between customers and (4.2%) reuse razors on other customer. Significantly, men are better in knowledge but women are better in practice, also Ethiopians were the worst in knowledge and practice. **Conclusion:** knowledge of barbers and coiffeurs was generally poor and their practice may lead to spread of the blood borne disease. Authorities, media and customers should pay more attention to the problem.

Keywords: *barbers, coiffeurs, human immunodeficiency virus, hepatitis B virus, hepatitis c virus, Khartoum*

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1. Introduction

1.1. Background Information

1.1.1. Human Immunodefiecency Virus (HIV)

HIV is a virus causes what is called AIDS. The illness alters the immune system, making people much more vulnerable to infections and diseases. This susceptibility worsens as the syndrome progresses. [1]

Globally, an estimated 35.3 (32.2–38.8) million people were living with HIV in 2012. [2] In Sudan, the prevalence of HIV was 0.2 % in 2014. [3]

HIV can be transmitted in many ways, such as vaginal, oral sex, anal sex, blood transfusion, and contaminated hypodermic needles and sharp objects.

1.1.2. Hepatitis B Virus (HBV)

HBV causes a serious liver infection. For some people, hepatitis B infection becomes chronic, meaning it lasts more than six months. Having chronic hepatitis B increases your risk of developing liver failure, liver cancer or cirrhosis. [4]

The world can be divided into three areas where the prevalence of chronic HBV infection is: high (>8%), intermediate (2-8%), and low (<2%). In Sudan, the prevalence of HBV range from 6.8 – 26%. [5]

Common ways HBV is transmitted include: Sexual contact, sharing of needles, accidental needle and sharp objects sticks and mother to child.

The hepatitis B vaccine is the mainstay of hepatitis B prevention. [4]

1.1.3. Hepatitis C Virus (HCV)

Hepatitis C virus (HCV) causes both acute and chronic infection.

Hepatitis C is found worldwide. The most affected regions are Africa and Central and East Asia. In Sudan, the prevalence of HCV range from 2.2 – 4.8%. [5]

HCV is a blood borne virus. It is most commonly transmitted through: sharing of injection equipment, reuse or inadequate sterilization of medical equipment, especially syringes and needles and sharp objects.

There is no vaccine for HCV, precautions should be considered. [6]

Barbers and coiffeurs use sharp objects like razors, blades and scissors which may accidently cut their costumers and expose themselves and their customers to be infected with HIV, HBV and HCV if the razors and its blades reused and the scissors were not properly sterilized.

The hypothesis of the study is that, Barbers and coiffeurs should have a healthy practice influenced by their knowledge to prevent the transmission of these viruses to themselves or between their customers,

1.2. Statement of the Problem

The hairdressing trade may potentially expose its practitioners and their customers to HIV, HBV and HCV infections. Worldwide data concerning this problem is mainly restricted to well developped countries whilst data in Africa and Middle East is way very poor. In Sudan, the number of the barbers and women hairdressers (coiffeurs) saloons is not very well known, of the known, the most are found in Khartoum where this study was conducted.

In the last few decades, hairdressing has increased in Sudan. So do the prevalence of the blood borne viruses. It may be a contributing factor as there is study conducted in Samsun Turkey [10] found a presence of HBV DNA in (6.6%) used razor-blade. Further studies should be conducted to trace exact cases that had been infected through hairdressing as this study is just to assess the potential risk of transmission of these viruses through the knowledge and practice. There is a study conducted in Khartoum, but it did not cover women hairdressers (coiffeurs) or show if there are differences between nationalities practicing this profession. [7]

1.3. General Objectives

To assess the knowledge and practice of barbers and women hairdressers (coiffeurs) regarding HIV, HBV and HCV infections in Khartoum state.

1.4. Specific Objectives

1. To assess the knowledge of barbers and women hairdressers (coiffeurs) about:
   a. HIV, HBV and HCV basic knowledge, modes of transmission, prevention and the source of informations.
   b. HIV, HBV and HCV as an occupational risks.
   c. Razors and scissors as a potential source of transmitting the infections.
   d. HBV vaccination.
2. To define the status of HBV vaccination.
3. To assess the practices concerned with the transmission of the blood borne viruses.
4. To determine the associations between gender, nationalities and educational level the above objectives.

2. Research Methodology

2.1. Study Design

Cross sectional descriptive community based study.

2.2. Study Area

Khartoum is the capital of Sudan and is located where the Blue and White Niles merge to form the Nile. The huge, spread-out city is actually made out of three distinct cities (Khartoum, Khartoum North or Bahri, and Omdurman) which are divided by the Nile and its two arms. The Blue Nile flows between Khartoum and Bahri, the White Nile between Khartoum and Omdurman, and the merged Nile between Bahri and Omdurman. The confluence of the Blue and White Nile, known as Al-Mogran, lies just north of the bridge between Khartoum and Omdurman.

About 5 millions live in Khartoum state in 2014. [19] The state is divided geographically into seven localities as follows: (Khartoum and Jabal Awlea) in Khartoum city, (Omdurman, Ombadda and Karari) in Omdurman city and (Bahri and ShargAlniel) in Bahri city.

2.3. Study Population

The actual population of the study is the barbers and women hairdressers (coiffeurs) in Khartoum state.

2.3.1. Inclusion Criteria

All barbers and women hairdressers (coiffeurs) who were permanently working in specific shops.

2.3.2. Exclusion Criteria

1- Barbers and women hairdressers (coiffeurs) who were working temporarily.

2-Roadside barbers.

2.4. Sampling

Assuming prevalence of 50% of subjects having an inadequate knowledge and practice:

- Sample size: calculated by formula

$$n = \frac{z^2 pq}{d^2}$$

Z = 1.96(95 %CI)
p = prevalence (0.5)
q = 1-p (0.5)
d = margin of error (0.05)
Sample size = 384 barbers and coiffeurs.

Sampling type: proportionate stratified with purposive sampling in each stratum, where the strata are of two levels: barbers and coiffeurs as two strata and then localities of Khartoum state as seven strata.

Selected sample from barbers

$$= \frac{number\ of\ barbers}{total\ of\ barbers\ and\ coifeurs} * \text{sample size}$$

= 250 barber shops

Selected sample from coiffeurs

$$= \frac{number\ of\ coiffeurs}{total\ of\ barbers\ and\ coifeurs} * \text{sample size}$$

= 124 coiffeurs shops

Selected sample from stratum

$$= \frac{number\ in\ locality}{total} * \text{sample size}$$

The results are in (supplemental Table 1)

2.5. Data Collection

A self structured pretested questionnaire with 0.78 reliability alpha factor on cronbach's test was given - through interview- to the participants.

2.6. Variables of the Study

Socio-demographic information (age, sex, marital status and educational level) and occupational characteristics (experience, customers per day, saloon size, and worker for each) as independent variables. Knowledge about the blood borne viruses and hygienic practices (multiple questions) as dependent variables.

2.7. Analysis

Statistical analysis was done using SPSS software version 22 to calculate frequencies, student t-test, chi square and one way ANOVA tests. P value was taken at a significant level of < 0.05. And Microsoft Office Excel 2007 in some graphs.

2.8. Ethical Consideration

Approval was taken from community medicine department board and all the participants were given a written informed consent and they had all rights to accept or refuse.

3. Results

Total of 384 barbers and women hairdressers (coiffures) who accepted to participate to the study socio-demographic characteristics are shown in (Table 1). The majority of respondent were males 250 (65%), Age between 26 to 33 years comprised 194 (50.5%), whereas 171 (44.5%) of the participant were educated to the secondary level. Ethiopians constituted one third of the participant 129 (33.6%), 225 (58%) of the participant were singles and 172 (48.8%) had 5-10 years of experience.

Table 1. Socio-demographic and occupational characteristics of the participants

Socio-demographic characteristics		Count	N %
Age	<18	10	2.6%
	18 - 25	119	31.0%
	26 - 33	194	50.5%
	≥34	56	14.6%
	Non response	5	1.3%
Sex	Male	250	65.1%
	Female	134	34.9%
Nationality	Sudanese	223	58.1%
	Ethiopian	129	33.6%
	Egyptian	12	3.1%
	Turkish	19	4.9%
	Other	1	0.3%
Marital status	Single	225	58.6%
	Married	136	35.4%
	Divorcee	3	0.8%
	Non-response	20	5.2%
Education level	Illiterate	22	5.7%
	Basic education	139	36.2%
	Secondary education	171	44.5%
	University or institute	52	13.5%
Work experience	<5	174	45.3%
	5 - 10	172	44.8%
	11 - 15	27	7.0%
	≥16	8	2.1%
	Non response	3	0.8%
Salon size (m^2)	Small (≤14)	18	4.7%
	Medium (15-34)	302	78.6%
	Large (≥35)	64	16.7%
Customers per day	≤10	176	45.8%
	11 - 20	206	53.6%
	≥ 21	2	0.5%

Subjects who had the basic knowledge about HBV as a disease of liver were 188 (48.96%), 84 (44.7%) of them knew that blood constitutes a major mode of transmission.

99 (25.8%) of the participants had knowledge about HBV vaccine existence, whereas the vaccinated ones are only 18 (4.68%). Only (19%) of barbers and coiffeurs had heard about HCV as a disease of the liver that can cause jaundice. Basic knowledge about HIV as a causative agent of acquired immunodeficiency syndrome AIDS is 316 (82%), of those who had the basic knowledge 194 (61.4%) knew that blood is a mode of transmission whereas 307 (97.2%) of them knew about sex as mode of transmission. Mass media constitutes the major source of from which subjects got the knowledge. Only 118 (30.7%) of subjects knew that razors and scissors constitute a source of infection by HIV, HBV and HCV. Participants' responses about HIV, HBV and HCV as occupational risk are shown in (Figure 1).

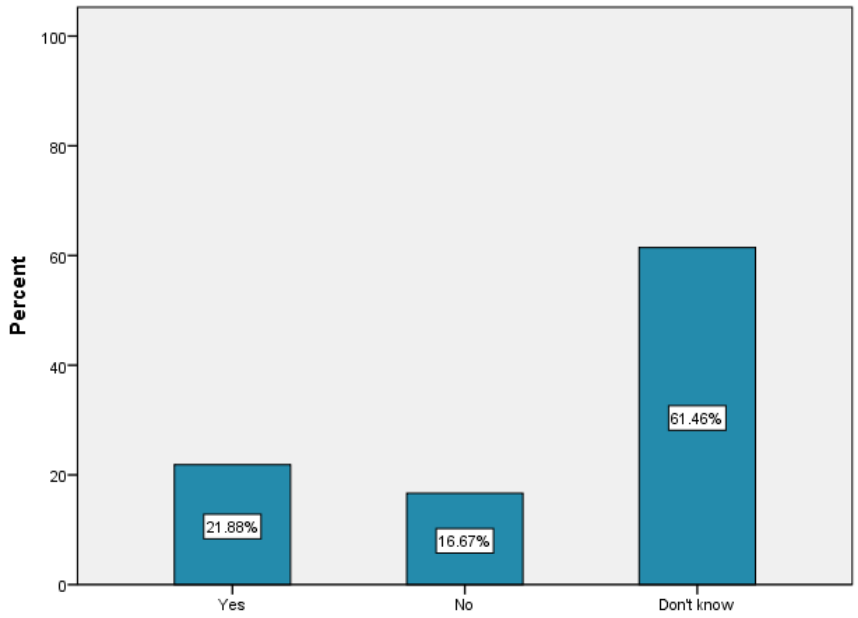

Figure 1. Knowledge of barbers and coiffeurs in Khartoum state about HIV, HBV and HCV as occupational risk (n=384)

The knowledge scores were determined in a 0-9 scale, and respective knowledge edge levels ranked as follows: Optimum (score 8-9), good (score 6-7), intermediate (score 4-5), poor (score 2-3) and extremely poor (score 0-1), the results were compared to the socio-demographic and occupational characteristics and tested by Independent-samples Student's t-test and ANOVA in (Table 2).

Table 2. Socio-demographic and occupational characteristics of barbers and coiffeurs in Khartoum state related to knowledge scores

Socio-demographic characteristics		Mean score (SD)	P-value
Age	<18	1.1 (2.2)	0.000*
	18 - 25	2.5 (2.1)	
	26 - 33	4.1 (2.4)	
	≥34	5.1 (2.2)	
	Non-response	5.2 (2.2)	
Sex	Male	3.9 (2.5)	0.032*
	Female	3.3 (2.3)	
Nationality	Sudanese	4.4 (2.1)	0.000*
	Ethiopian	1.9 (2.0)	
	Egyptian	5.3 (1.2)	
	Turkish	6.6 (2.1)	
Marital status	Single	3.0 (2.4)	0.000*
	Married	4.7 (2.3)	
	Divorcee	3.3 (1.5)	
	Non-response	5.1 (2.0)	
Education level	Illiterate	0.4 (0.8)	0.000*
	Basic education	2.3 (1.9)	
	Secondary education	4.4 (2.0)	
	University or institute	6.5 (1.7)	
Work experience	<5	3.1 (2.4)	0.000*
	5 - 10	3.9 (2.5)	
	11 - 15	5.0 (1.9)	
	≥16	6.3 (1.6)	
	Non-response	6.0 (1.0)	
Salon size (m^2)	Small (≤14)	3.7 (3.0)	0.149
	Medium (15-34)	3.8 (2.4)	
	Large (≥35)	3.1 (2.4)	
Customers per day	≤10	3.5 (2.4)	0.412
	11 - 20	3.8 (2.5)	
	≥ 21	5.0 (1.4)	
Worker per salon	1	4.7 (2.1)	
	2	4.2 (2.5)	
	3	3.3 (2.5)	0.087
	≥4	3.6 (2.4)	
	Non-response	3.3 (2.1)	

*Statistically significant on ANOVA test.

The overall mean score of knowledge is 3.7 which is considered poor (just below intermediate).

Only 70 (18.2%) of the participants wash their hands between customers regularly (supplemental Figure 1).

368 (95.8%) of the participant were not reusing the razors. Just 23 (6%) of the subjects wear of gloves after inadvertent cut on their customers. 212 (55.2%) of the participants wash the wound after inadvertent cut on customer with water. Only 36 (10.2%) of the participant were disinfecting/sterilizing instruments between customers (supplemental Figure 2).

21 (53.8%) of the participants who were sterilizing/disinfecting the instruments between customers were females, 23 (59%) of them were Sudanese and non 0 (0%) of them were illiterate (supplemental Table 2).

Autoclave, sanitizers and flame were methods used by barbers and coiffures for sterilization/disinfection of instruments and they are shown in percentages in Figure 2.

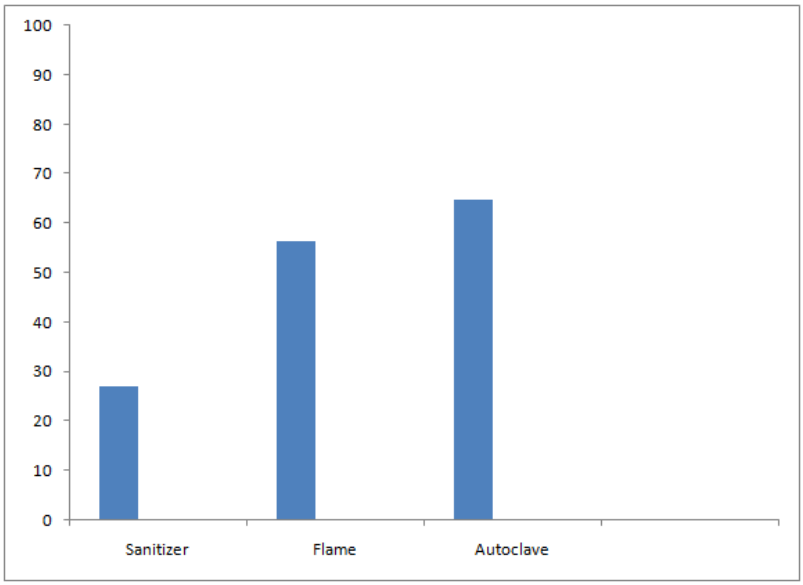

Figure 2. Sterilization/disinfection methods and its corresponding percentages of barbers and coiffures in Khartoum state who use it (n=144)

The practice score was determined in a 0-6 scale and then ranked as follows: Adequate (score 5-6), intermediate (score 3-4), and inadequate (score 0-2) practice levels. The results were compared to the socio-demographic and occupational characteristics and tested by Independent-samples Student's t-test and ANOVA in (Table 3).

Table 3. Socio-demographic and occupational characteristics of barbers and coiffeurs in Khartoum state related to practice scores

Socio-demographic characteristics		Mean score (SD)	P-value
Age	<18	1.2 (1.2)	0.000*
	18 - 25	2.0 (0.9)	
	26 - 33	2.3 (1.0)	
	≥34	2.4 (1.1)	
	Non-response	3.0 (1.9)	
Sex	Male	2.0 (1.0)	0.000**
	Female	2.5 (1.1)	
Nationality	Sudanese	2.3 (1.1)	0.000*
	Ethiopian	1.7 (0.8)	
	Egyptian	2.3 (0.6)	
	Turkish	3.1 (1.2)	
Marital status	Single	2.0 (1.0)	0.000*
	Married	2.4 (1.1)	
	Divorcee	2.7 (2.1)	
	Non-response	2.8 (1.4)	
Education level	Illiterate	1.2 (0.7)	0.000*
	Basic education	1.8 (0.8)	
	Secondary education	2.5 (0.9)	
	University or institute	3.3 (1.2)	
Work experience	<5	2.2 (1.0)	0.001*
	5 - 10	2.1 (1.1)	
	11 - 15	2.0 (0.8)	
	≥16	3.0 (1.3)	
	Non-response	4.3 (1.5)	
Customers per day	≤10	2.1 (1.0)	0.549
	11 - 20	2.2 (1.1)	
	≥ 21	2.5 (0.7)	
Worker per salon	1	2.4 (0.9)	0.012*
	2	2.1 (1.0)	
	3	2.0 (1.0)	
	≥4	2.4 (1.1)	
	Non-response	3.1 (1.4)	

*Statistically significant on ANOVA test
**Statistically significant on t-test.

The overall mean score of practice is 2.2 which is considered inadequate.

4. Discussion

The results of this study show a severe lack of knowledge and inadequate practice concerning HIV, HBV and HCV infections among authority licensed barbers and coiffeurs in Khartoum. This may be attributed to the fact that most of them are not well educated as they tend to dropout of schools or college trying to fulfill their socioeconomic needs. In comparison to a study made in Palermo, south italy [8], as a well developed country where the knowledge was good nevertheless there were unsafe practices that may lead to infections by the blood borne viruses. Another study conducted in Isfahan, Iran [12], as a semi developed country where the knowledge was intermediate about HBV, HCV and HIV in women's beauty salons. And although this study concluded generally similar results to a former study conducted in Khartoum [7], Sudan, some major differences between the two studies exist, such as the fact that the former study targeted unlicensed roadside barbers and was restricted to only male participants.

In Sudan as in many oriental and Islamic countries, there is no gender intermixing regarding beauty centers, so barbers and their customers are exclusively males and women hairdressers (coiffeurs) have exclusively female customers. The number of barber shops is twice that of coiffeur shops, this is attributed to the fact that men tend to have frequent regular visits to barbers relative to women who visit coiffeurs mainly in social occasions.

Most of the participants were young 26 -33 (50.5%) unmarried (58.6%), and most of them stated that they were not going to spend more than ten years in this profession, this is similar to a study made in Ibdgan [16], Nigeria where the young barbers 20-29 years old constituted (46,7%). Illiterates in our study were (5.7%), most of them (86.4%) are Ethiopians given that the literacy rate in Ethiopia is (49.1%) [20]. The majority of barbers and coiffeurs in our study had a range of customers between 11–20 (53.6%) per day which is similar to study conducted in Karachi, Pakistan [11].

About half of the barbers and coiffeurs in our study had basic knowledge about HBV as a disease of liver and this was also similar to the Karachi, Pakistan study in which just (53%) of the barbers had any knowledge about hepatitis at all. Pakistan has a prevalence of (2.5%) and (4.8%) for HBV and HCV respectively [21], and Sudan has a prevalence of (6.8-26%) and (2.2-4.8%) for HBV and HCV respectively [5].

Despite that the knowledge of the barbers and coiffeurs in our study about the possibility of transmission of HBV by razors and scissors was found to be (30.5%), vaccination rate against HBV among them was just (4.7%) in contrary to the study of Khartoum [7] where it was only (1%), this may be attributed to inclusion of roadside barbers in that study. Knowledge about transmission routes of HBV carries a lot of claims, one of them is the respiratory route responded by (43%) of those who claimed possessing the basic knowledge. Mass media (TV, Radio and even social networks) may be responsible for this incomplete information as it comprise the source from which (88%) got the knowledge.

Only (19%) of respondents had the basic knowledge about HCV as a liver disease, but (91.6%) of the Egyptians barbers poses this knowledge given that the prevalence of HCV in Egypt is (14.7%) [22] making it one of the highest countries in HCV prevalence.

Basic knowledge about HIV as a causative agent of acquired immune-deficiency syndrome is very good (83%) as media and religious shows shed a lot of lights when it comes to sexual relationships given that (97.2%) of those who possessed the knowledge responded with sex as mode of transmission and (61.4%) responded with blood. Significantly, male barbers and well educated participant had a better knowledge about HIV whereas Ethiopians had the worst. Given that UNAIDS estimated the prevalence rate of HIV among adults between 15-49 years in Ethiopia [23] to be (1.2%), make that association an important issue to be considered.

The overall knowledge level of barbers and coiffeurs is found to be poor. There is a significant association between nationality and this knowledge score, Ethiopians had the worst. Level of education and work experience also significantly correlate to the knowledge, the higher the educational level and years of experience, the higher the score.

Barbers and coiffeurs may accidently cut their customers, these cut do not need to be very large to transmit the blood borne disease. In a study done in Samsun, Turkey [10], The presence of HBV DNA was found in (6.6%) used razor-blade samples by the detection of a specific positive band with agarose gel electrophoresis. In another study in Sivas region, Turkey [9], the prevalence of HBV and HCV was found to be higher in barbers than in a control group.

There are a lot of unsafe practices that may potentially expose the barbers and coiffeurs themselves as well as their customers to the blood borne diseases. One of these practices is razors and blades reuse. In Sudan barbers use non disposable straight razors with changeable blades whereas coiffeurs use blades directly. This practice of reusing blades was found in (4.7%), two thirds of them were coiffeurs, and of course the straight razors are almost always reused by barbers. This practice may not just transmit blood borne viruses but also bacterial and fungal infections could be transmitted. In northern California [24], shaving the legs with a razor was a risk factor for an outbreak of Mycobacterium fortuitumfurunculosis.

Regular hand washing between customers was found among only (18%) of the participants, more than two thirds of them were coiffeurs. This association may be attributed to the fact that coiffeurs tend to do more than shaving like using dyes and other liquid beauty materials.

Among the unsafe practices, not using antiseptic and not wearing gloves after inadvertent cut on a customer was found in (68%) and (94%) of the participants respectively.

Regular sterilization and disinfection of the instrument including non disposable straight razors was found only in (10%). Many of the participants just wash the instrument at the end of the day or at the end of the week.

Most of the barbers possess autoclaves but a lot of them are just using it for storage purposes.

Most of the barbers and coiffeurs (78%) in this study did not consider HIV, HBV and HCV as a real risk for themselves and for their clients. This may explain their inadequate practice and poor knowledge status.

Khartoum health authorities claims that they issue health cards and permission paper for opening barber and

coiffeur shops only if there are autoclaves, water source and general clean environment. However, these instructions are not applied as a lot of barbers do not possess autoclaves and many of the barbers and coiffeurs themselves do not possess the health cards and work in officially certified shops.

5. Conclusion

- The knowledge of the barbers and coiffeurs about HBV was found to be poor.
- The knowledge about HCV was found to be extremely poor.
- The knowledge about HIV was found to be good.
- Practices of the barbers and coiffeurs were inadequate and may lead to spread of the infection between customers.
- Barbers had a better knowledge but coiffeurs had a better practice.
- Ethiopians had the worst knowledge and practice among the other nationalities.
- The higher the level of education, the better the knowledge and practice.

6. Recommendations

- Barbers and coiffeurs should be enrolled in an obligatory educational and training course before getting licensed.
- Local health authorities should implement the guidelines and any violation should be taken seriously.
- Disposable straight razor should be provided and made obligatory as in some regional countries.
- Mass media should shed more light on HBV and HCV as they are more prevalent in Sudan than HIV.
- Customers should have their own instruments and take the procedure seriously.
- Immigration office should pay more attention about illegal Ethiopian barbers and coiffeurs and visa requirement for this job.

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