



# EVALUATION OF SANITARY STATUS OF HAIRDRESSING SHOPS AT KHARTOUM STATE, SUDAN, 2021

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## ABSTRACT

*This is a cross-sectional descriptive study was carried in Khartoum state, Sudan from 2015-2021 among hairdresser, Field work to evaluate sanitary status of working environment of hairdressing shops was done from September 2019 to January 2020. A sample of 250 dressing shops in 31 administrative units within the seven localities in Khartoum state were enrolled randomly in the study using cluster sample and PPP (proportionate probability procedure) [1, 2]. The data were collected by a standard check list and analyzed by SPSS software version 25. Important health instructions/requirements checked at work place were; posters on HBV, working/dressing coats, Autoclaves and antiseptics for sterilization, good water and soap for cleaning, gloves, first aid kits and cupboard for keeping instruments, locked baskets/containers for other waste and safety measures for flammable/dangerous substances. It was found that hairdressers were not given posters or guidelines on hepatitis B/blood diseases, and there is short in working tools especially gloves, autoclave, instruments/means for treating injuries, cupboards for keeping tools and safety box/special containers for sharps/dangerous substances. Important health instructions/requirements checked were; there were no posters/leaflets on hepatitis B, shorts in working tools such as coats, autoclaves or sterilization devices, gloves, instruments for first aid, cupboards for keeping coats and instruments, safety boxes and locked containers or baskets for keeping sharps and other wastes and safety measures for dangerous/flammable substances. Important conclusions were; there is short in hepatitis B information for hairdressers, short in working tools/instruments and short in cupboards for storing tools, negligence in using personal protective equipment, short in sterilization devices, short in safety measures for first aid and dangerous substances, the strength point was there was rare supervision by health authority to these premises, Important recommendations were; periodic supervision by health authorities to barbers shops and posters on health instructions and safety to be provided to these shops, and expanding studies on blood diseases to the rest of hairdressers not only in Khartoum state, but also in other Sudanese states*

**KEYWORDS;** Sanitary status, Dressing shops, Khartoum State, Sudan.

## INTRODUCTION

Worldwide, blood-borne viruses (HIV, HBV and HCV) infect millions of people continuously and their spread depends on many factors, including beauty treatments (tattooing, piercing, manicure, pedicure and shaving) with instruments not properly sterilized [3,4]. Therefore, rigorous sterilization procedures are essential to avoid any contamination with blood-borne viruses, particularly by beauty instruments, because HBV is not easily inactivated by drying, simple detergents or alcohol [5].



The implements that are used repeatedly on many customers can, at any time, come into contact with a customer's blood. This could be from a minor nip during a manicure or shave or possibly from a customer's previous sore, scratch or insect bite. If this customer has hepatitis, the residue from even a tiny bit of blood will contaminate the equipment. Without proper disinfection, HBV may remain on a dry surface for seven days. And then if that infected tool is used on another person and nicks him/her, too (or if the instrument merely touches an open sore), the virus may travel into his or her body.

The risk of hepatitis transmission through non-single use instruments; such as nail files, nail brushes, finger bowls, foot basins, buffers, razors, clippers, and scissors during nail salon and barbershop visits cannot be excluded-according to the results of a new report submitted at the American college of gastroenterology's (ACG) 76th annual scientific meeting in Washington, DC. Items such as finger-bowls and foot basins need to be properly disinfected [6].

A study on HCV prevalence in Egypt showed that shaving at local barbers shops was reported to assess viral transmission [4]. Khartoum state health authorities ordered; reusable instruments like scissors and straight razors must be cleaned by soap and water and sterilized by autoclave. However, these instructions are only verbal and there are no written guidelines or leaflets to explain the methods of cleaning, equipment sterilization and disposal of used blades. In case of roadside barbers, they need education by distributing leaflets on hepatitis and HIV as well as encouraging them to use disposable razor and razor-blades for their customers as they lack potable water supply and equipment sterilization [7].

## MATERIALS AND METHODS

**Study design:** It was descriptive cross-sectional study.

**Study Site:** Khartoum State (area of 28,000 km<sup>2</sup> and 5.352 million populations) is located in the middle of Sudan, at the junction of the White Nile and Blue Nile rivers between 15° 10' and 16° 30' N latitude and 31° 35' and 40° 20' E longitudes. It is the capital, political, and commercial centre of the country. The state has semi-desert climate that having 3 seasons; dry season from March up to June with temperature 38°C to 45°C in May and humidity of 20-40%, rainy season; from July to October, with annual rainfall between 150 mm in July to 200 mm in August and temperature 28°-35°C and humidity 40-60%, and winter season from November to February with maximum and minimum temperatures 25°C to 16°C and humidity of 30-40%.

Administratively, the state is divided into seven localities (Khartoum, Omdurman, Bahri or Khartoum North, Ombada, Karary, Sharg Elneel and Jabal Awlia) which include 101 administrative units. There are 14 administrative units in Khartoum Locality, 13 in Omdurman, 16 in Bahri, 12 in karary, 19 in Ombada, 13 in Sharg Elneel and 14 in Jebel Awlia.

### Sample size:

For this population, the following formula was used according to W.G, Cochran [1], and Lwaga SK and Lemeshow S [2] as per cluster sample:

$$n = \frac{Nz^2 pq}{d^2(N-1) + z^2 pq} \text{ df, where:}$$

**n;** the desired sample size, **N;** number of target population (4176 hairdressers in Khartoum state in December 2018, i.e., last year just before data collection).

**Z;** standard normal deviate (set at 1.96) which corresponds to the significant level 95-96%

**P;** prevalence of hepatitis B among hair dressers according to a prior study/survey at Khartoum state or other state/area in Sudan.

**q;** 1-p.

**df;** design factor equal to 1.5

**d;** error allowed = 0.05.

Taking p=0.13 (prevalence of HB according to Mohamed Hassan study in Nyala, 2011[8] and e =0.05 (allowed error).

$$n = \frac{4176 (1.96)^2 \times 0.13 \times 0.87 \times 1.5}{(0.05)^2 (4176 - 1) + (1.96)^2 \times 0.13 \times 0.87} = 250.33 \sim 250$$

**Sample collection;** At the administrative units/localities, a lottery was run to select randomly, from a list, the dressing shops to be enrolled in the study. Also the number of selected shops in each administrative unit would be



according to the proportional of total number of shops at that administrative unit. A checklist of required work instruments was used to gather the data from the shops.

### **SAMPLING PROCEDURE/TECHNIQUE**

The sample is multi-stage cluster random sample. The steps of sampling were; first, five administrative units were selected randomly from each of the seven localities in Khartoum state to represent the study site but 31 administrative units were actually enrolled in the study instead of 35 (using PPS; probability proportional size method). Second, the distribution of the sample among both localities and men and women beauty shops was proportional according to their weights. Third, as the total number of population was 4176 dressers, including 2754 males and 1422 females, and if we divide the pop by the sample size we get an interval of 16.7 and hence  $2754/16.7$  gives 165 barbers' shops and  $1422/16.7$  gives 85 coiffeurs targeted in the study respectively, so we have 250 dressing shops included in the study by mean of randomization, with noting that there is at least one hairdresser working in each shop. The first shop to start with between 1 and 16 (the sample interval) was to be chosen randomly also. Then a lottery was made to select the second and other shops from the list of the shops in the administrative unit [1].

### **DATA ANALYSIS**

Data (check list) was stored in Microsoft Excel and analyzed using SPSS version 25 software. Descriptive analysis was done and the results transferred to numbers and proportions.

### **ETHICAL CONSIDERATIONS**

The basic principles that the study considered included;

The study proposal was approved by ministry of health-Khartoum state that gave a license to conduct the research. The purpose of the study, the procedure to be carried out was clarified before handing the study and health authorities at localities were informed on all steps and results. Participation in the study was completely voluntary after a formal consent. Privacy of participants was protected by ensuring confidentiality. Localities/administrative units were informed about the observational results and recommendations at the end of the study.

### **RESULTS**

Figures 1 and 2 respectively revealed that most (97% and 97.5%) of the dressing shops hadn't copy of health instructions or posters on hepatitis B. Only 13.5% of the shops had working coats for the workers (figure 3) and 29% of the shops had dressing coats for the customers/clients (figure 4). Close to the half (46%) of the shops didn't have autoclaves for sterilizing instruments (figure 5). 75% of the shops had containers for antiseptics (figure 6) and 80% of them had enough antiseptics for equipment sterilization (figure 7). Most (93%) of the shops had a stock of razors for a week (figure 8). 80% of the shops had potable water for hands washing (figure 9), 91% of the shops had a stock of soap for hands cleaning (figure 10), while 62% of the shops hadn't a stock of gloves (figure 11) and 44% of the shops didn't have instruments for first aid (figure 12). 41% of the shops didn't possess cupboards for keeping instruments (figure 13), 79% of them hadn't safety boxes or locked baskets for storing sharp instruments (figure 14) and 65% of the shops didn't have containers for other wastes (figure 15). Almost all the shops were lighted (figure 16), but 92% of them hadn't measures for controlling flammable or dangerous substances (figure 17).

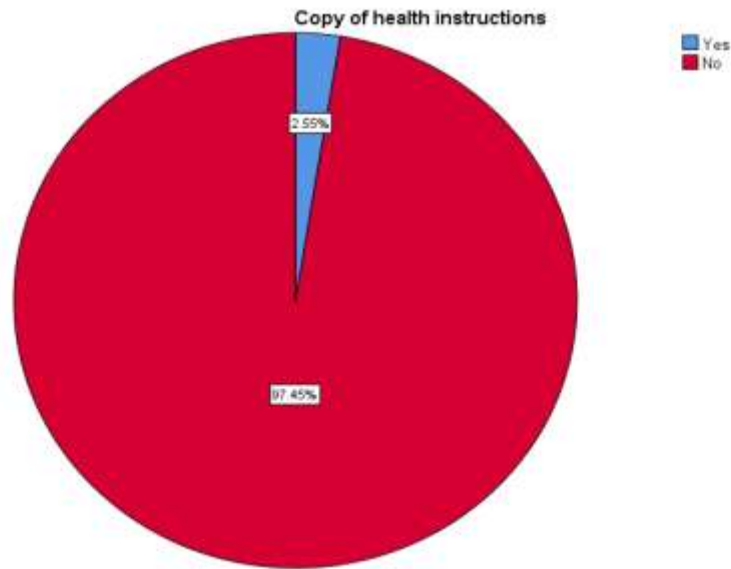


Figure (1); availability of health instructions at work place (n=250).

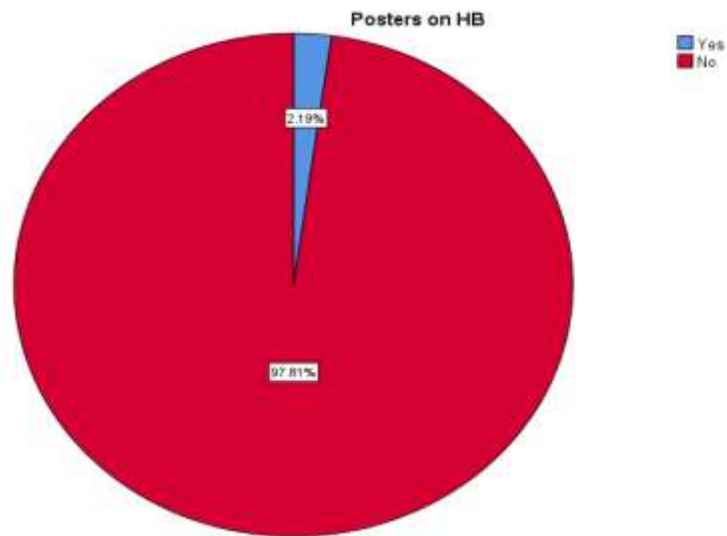


Figure (2); availability of posters on HB at work place (n=250).

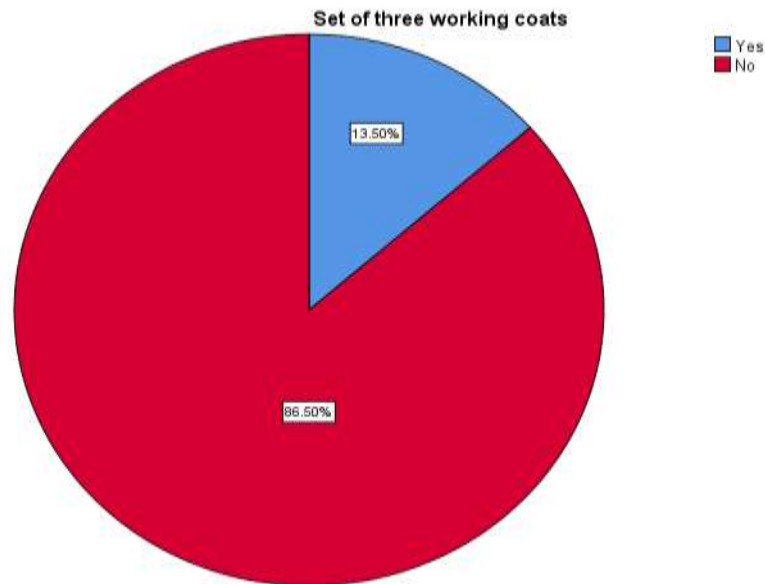


Figure (3); availability of three working coats at work place (n=250).

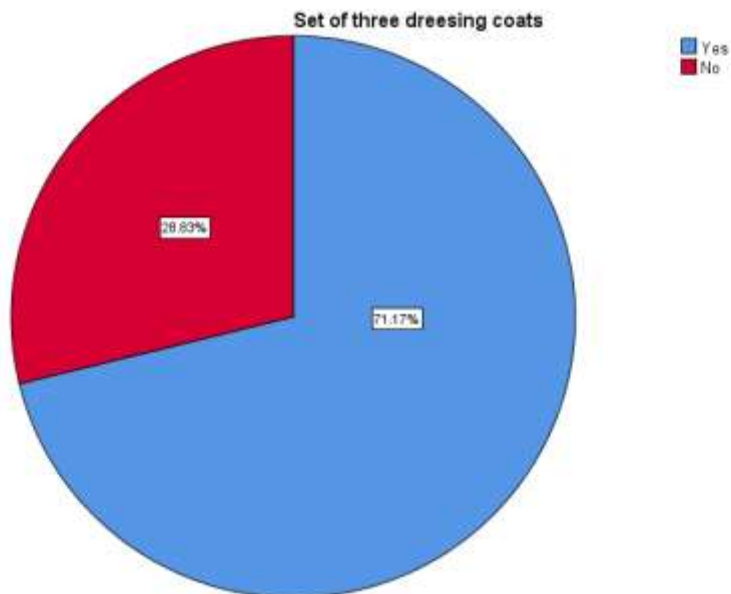


Figure (4); availability of three dressing coats at work place (n=250).

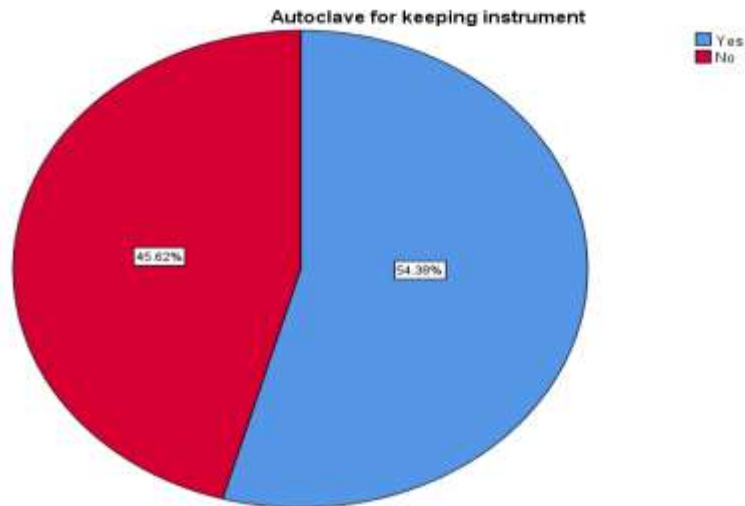


Figure (5); availability of Autoclave for sterilization at work-place (n=250).

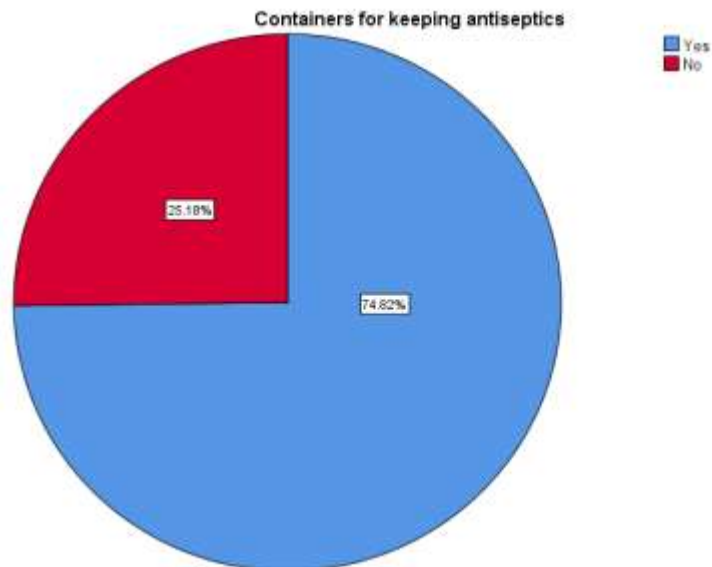


Figure (6); availability of container for antiseptics at work-place (n=250).

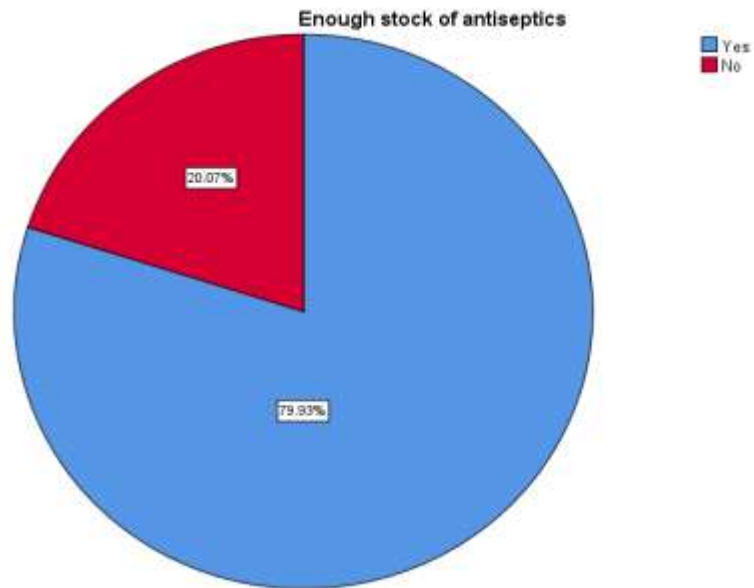


Figure (7); availability of enough antiseptics at work-place (n =250).

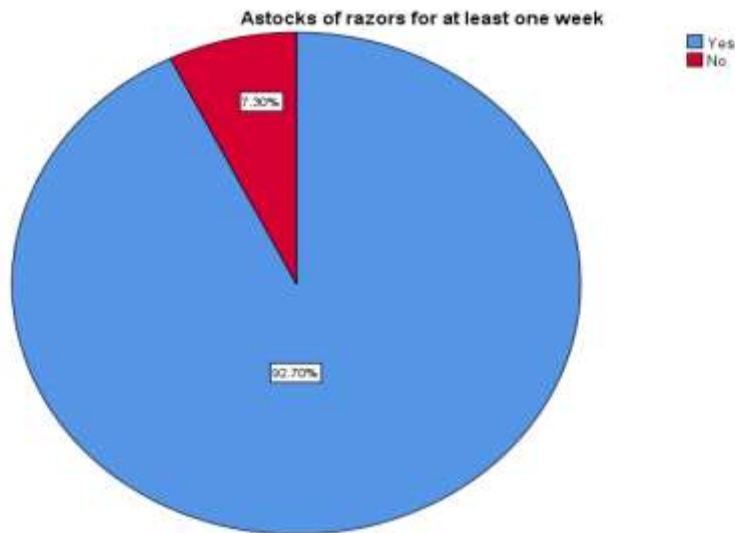


Figure (8); availability of razors for a week at work-place (n=250).

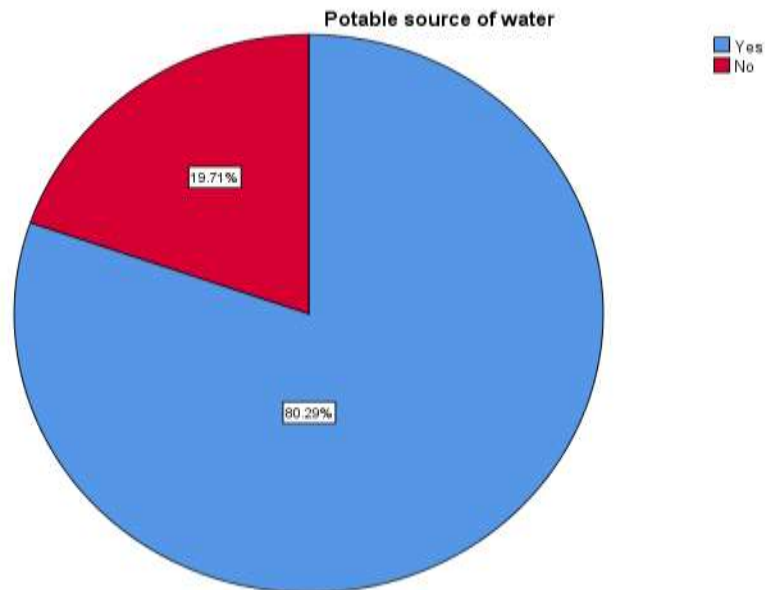


Figure (9); availability of potable water at work-place (n=250).

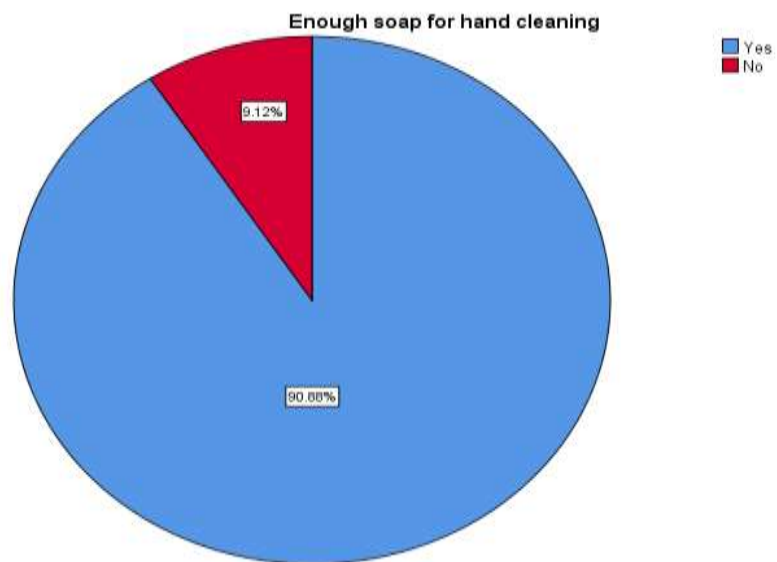


Figure (10); availability of soap for hands cleaning (n=250).



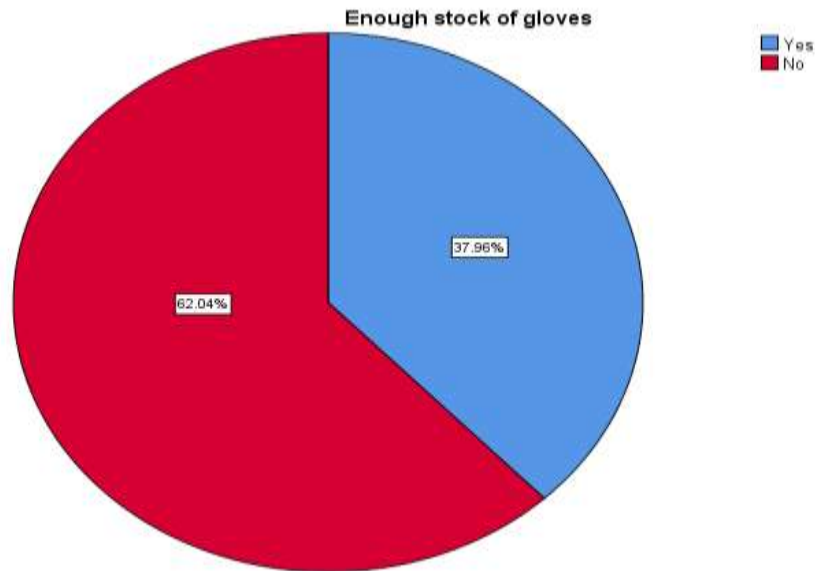


Figure (11); availability of a stock of gloves (n=250).

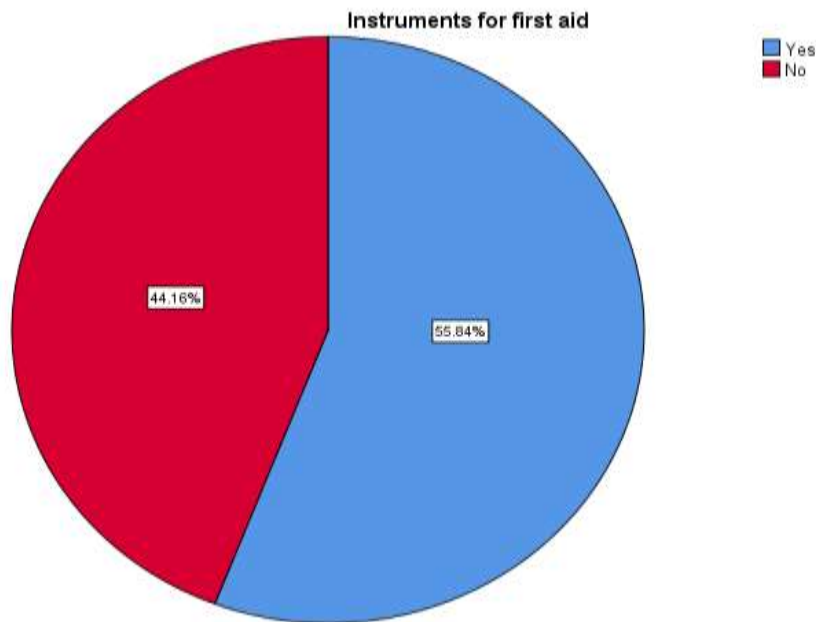


Figure (12); availability of instrument(s) for first aid (n=250).

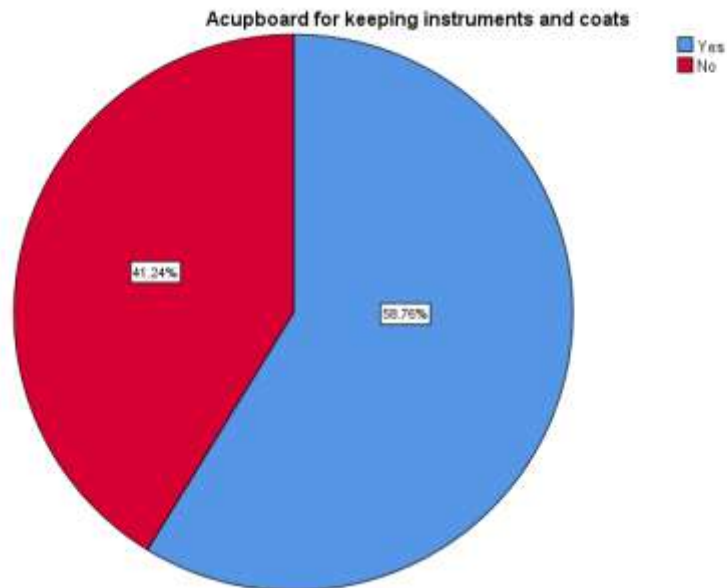


Figure (13); availability of cupboards for keeping instruments/coats (n=250).

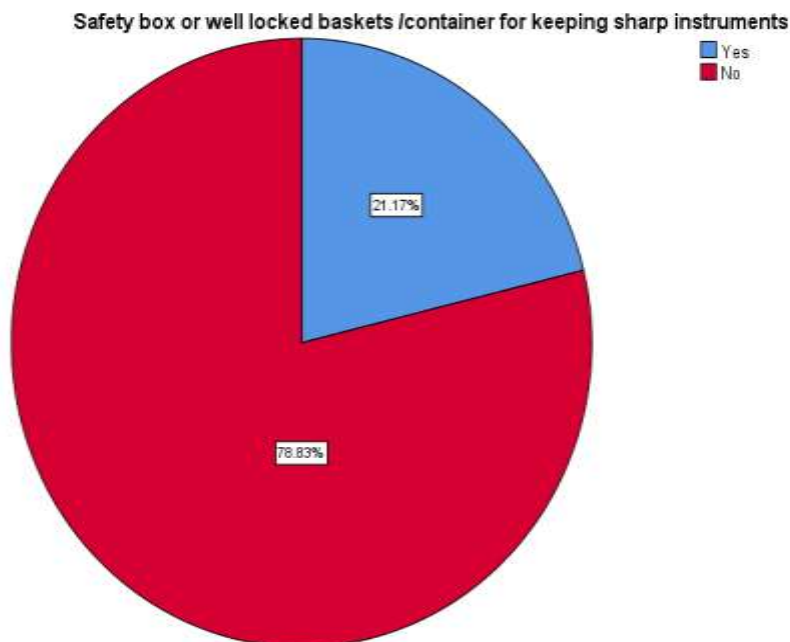


Figure (14); availability of safety box/locked basket for sharp instruments (n=250).

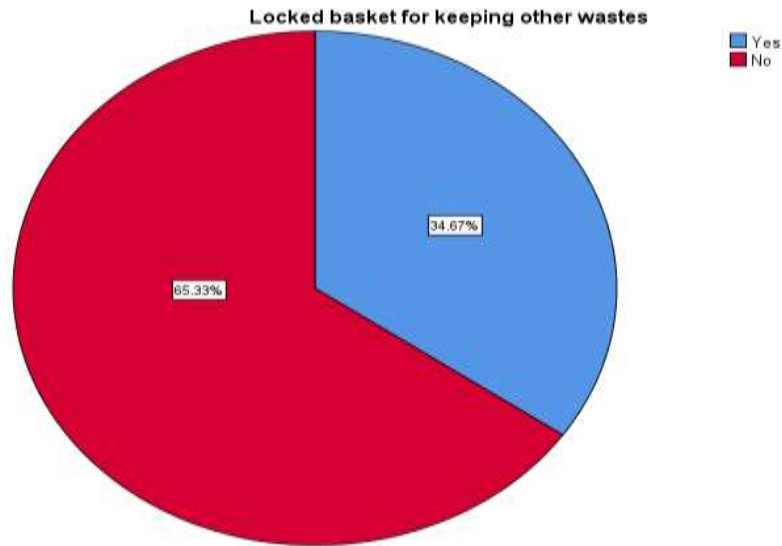


Figure (15); availability of locked basket for other wastes (n=250).

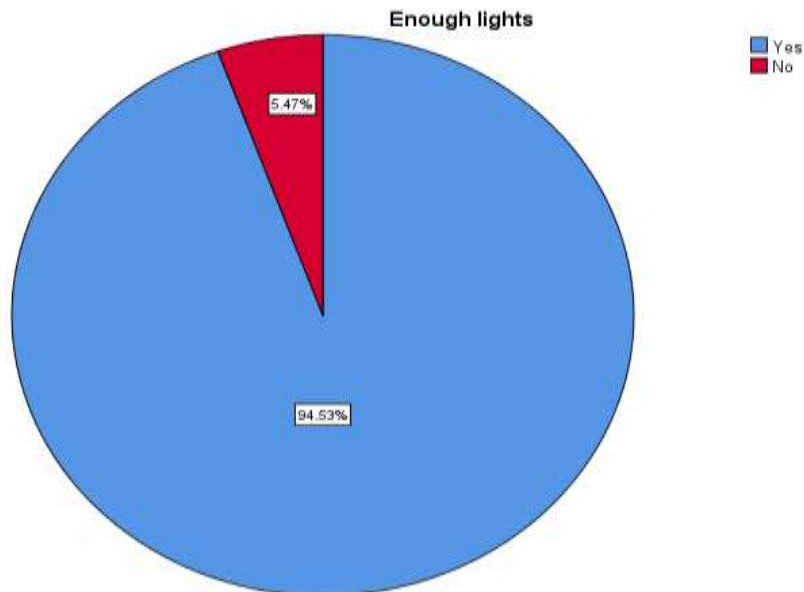


Figure (16); availability of enough light at work place (n=250).

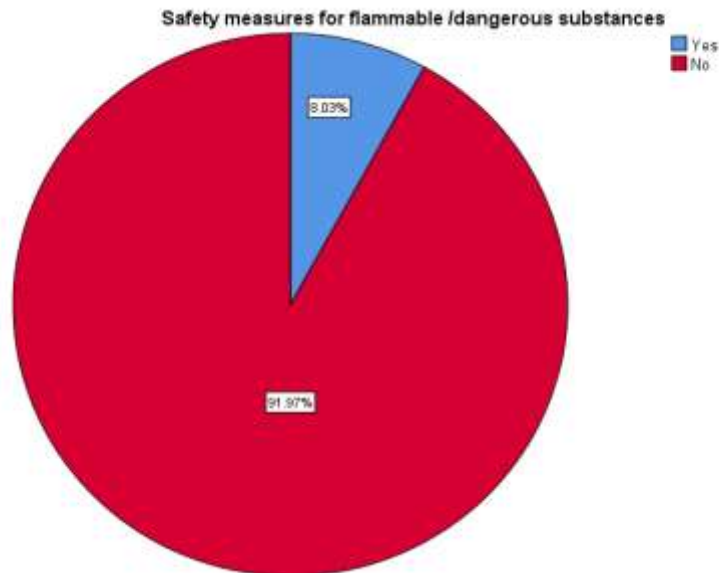


Figure (17); availability of safety measures for flammable/dangerous substances (n=250).

## DISCUSSION

There were no health instructions or posters on hepatitis B/blood diseases in most of the barber's shops (figures 1 and 2). This means that health authorities are neglecting this group, although the majority of them are willing to be educated on blood diseases. It was stated before that some of the reasons of high hepatitis B endemicity in Sudan were; inadequate knowledge on sanitation and sterilization of instruments, inadequate supervision by health authorities and lack of efficient surveillance system to report cases [9, 10]. Some recommendations were proposed in a report at Virginia department of health to eliminate the potential transmission of HBV, HCV and HIV infections as training for nail salon and barbershop workers/technicians, educating them about blood-borne infections and emphasizing principles of good hygiene, antisepsis and disinfection, as well as stringent personal hygiene, storage and inspection requirements [11].

The observation on the shops revealed shorts in the required number of working coats for both barbers and customers (figures 3 and 4) and this reflects the inadequacy of supervision by health authorities to these premises. In addition, the majority of the shops do not have enough stock of gloves (figure 11) and (41%) of the shops do not have cupboards for keeping instruments (figure 13). At work you should use protective barriers or PPEs to prevent blood and other body fluids from contacting your skin, eyes and mouth [12, 14, 15]. These PPEs must be available, in good condition, accessible and in size suitable for different barbers such as; aprons, face shields, gloves, goggles, and gowns [12,15].

Also, a short in autoclaves was found; close to the half of the shops do not possess autoclaves (figure 5) for sterilization although most of the shops (95%) had enough light and source of power (figure 16). Although it's impossible to sterile tools completely, saloons should use autoclaves, and it is recommended that you go only to saloons that use autoclaves for disinfecting instruments and tools [16]. as HBV can remain live (outside the body) for a week or more on table tops, solid surfaces and it is recommended to inspect aprons, the barbers' contaminated hands and powder brush which could contribute to the transmission of HBV and HCV among people who visit barbershops [17].

Fortunately, the majority and sometimes most of the shops were provided with antiseptics, a stock of razors for a week, source of water and enough soap for hands cleaning (figures (6, 7, 8, 9 and 10) . These things are considered the basic needs in any barbers shops, and because of small defects, gloves may not protect the hands completely, and so washing hands before and after wearing gloves can get rid of most germs [14,15]. Antiseptic gels can be used to clean hands if they are not visibly dirty and washing hands with soap and water is to be done if the hands are heavily soiled and also after using antiseptic gels [12].

It was observed also; more than half of the shops had means for first aid and cupboards for instruments, one fifth of them had safety boxes or locked baskets to keep sharp instruments and one third of the shops had locked



baskets for other wastes (figures; 12, 14, 15), and all these equipment are important for premise sanitation and infection control [13]. At work place, a person is recommended to; handle and dispose sharps the right way so as to lower the chance of getting stuck with used needles/sharps. Then he/she has to discard used needles, scalped blades, syringes and other sharps in a sharp disposable container and not be bend, break or recap used needles, and to keep sharps containers as close as he/she uses them [12,15].

Unfortunately, very few barbers stated that they had means to control flammable or dangerous substances (figure 17), which is considered a part of infection control as some substances may break into, injure or burn the skin. In 2001, the Boston public health commission voted to require annual licensing and regular inspections of the city salons and many recommendations were put including tools disinfection and beauty/salon workers have to wear impermeable gloves when handling procedures with the risk of breaking the clients' skin. Although that legislation was primarily enacted to protect the health of salon workers, it also serves to protect from spreading viruses like hepatitis B [15].

Today, the use of single-use materials is becoming widespread in modern salons, so different/new tools should be used for each customer [18]. Tools, such as razor blades, razors and depilation needle tips which can be risky regarding blood-borne infections, should be disposed of in medical waste containers in order to prevent contamination [19].

The important conclusions were; there were shorts in barbering tools which need to be followed by both localities and ministry of health levels to ensure infection control, and emphasizing education and supervision by health authorities. Hence important recommendations were; health education and training for all hairdressers (including road side barbers) on blood diseases, intensive supervision by health authorities to barbers and distributing a manual on health instructions and safety, provision of vaccine for this risky group with suitable cost and extending studies among the rest of hairdressers in other states in Sudan.

## REFERENCES

1. W.G. Cochran, *Determination of Sample Size and Sampling Technique*, 3rd ed.1977.
2. Lwaga SK, and Lemeshow S. *Sample size determination in Health Studies- A practical Manual*, Geneva: World Health Organization; 1991.
3. World Health Organization. *Unsafe injection practices having serious large-scale consequences*. Press Release WHO. 2000, vol. 14 (pg. 1-20).
4. Mariano A, Mele A, Tosti ME, et al. *Role of beauty treatment in the spread of parenterally transmitted hepatitis viruses in Italy*, *J Med Virol*, 2004, vol. 74, (pg: 216-20).
5. Favero MS, Bolyard EA. *Microbiologic considerations. Disinfection and sterilization strategies and the potential for airborne transmission of bloodborne pathogens*, *SurgClin North Am*, 1995, vol. 75 (pg. 1071-89).
6. David A. Johnson, MD, professor of medicine and chief of gastroenterology at eastern Virginia medical school, Norfolk, Virginia, 2012. <https://www.ncbi.nlm.nih.gov/pubmed/25250760>
7. Tajeldin M. Abdallah, Mamoon H. Mohamed and AbdelAzem A. Ali. *Seroprevalence and epidemiological factors of hepatitisB virus infection in Eastern Sudan*. *International Journal of Medicine and Medical Sciences*. 2011.Vol. 3 (7) pp. 239-241.
8. M, Mohamed Ahmed Hassan. *Sero-detection of Human Immunodeficiency, Hepatitis B and C Viruses Among Displaced People Around Nyala-South Darfur, May-Dec, 2011*.
9. Harrison t. *Desk encyclopedia of general virology*. Boston. Boston academic press. 2009, p: 455.
10. <sup>abc</sup> zuckerman aj. *Hepatitis viruses*, in: baron s, et al. *Baron's medical microbiology*. 4th ed, texas: university of texas, medical branch. 1996. <http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=mmed.section.3738>.
11. O'connor, john. "Hepatitis b prevention – the body". *Body health resources corporation*. <http://www.thebody.com/content/art17089.html>. 2008.
12. Chang mh. *Hepatitis b virus infection: semin fetal neonatal med*. 2007, vol. 12 (3): 160–167.
13. (29 CFR Part 1910.1030) *Blood borne Pathogen Standard*. Washington, DC: U.S. Department of Labor, Occupational Safety and Health Administration.2000.
14. CDC (Centers for Disease Control and Prevention). *Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public-Safety Workers A Response to P.L. 100-607 The Health Omnibus Programs Extension Act of 1988*. *MMWR Vol. 38(S-6): 3-37; 1989.63*.
15. CDC (Centers for Disease Control and Prevention). *Recommendations for Prevention of HIV Transmission in Health-Care Settings*. *MMWR Vol. 36(SU02); 1987*.
16. Zahraoui-Mehadji M, Baakrim MZ, Laraqui S, Laraqui O, El Kabouss Y, Verger C, et al. *[Infectious risks associated with blood exposure for traditional barbers and their customers in Morocco]*. *Sante*. 2004, 14(4):211–6.



17. YasirWaheed, SherZaman Safi, WaqasNasirChaudhry, IshtiaqQadri. Awareness and risk factors associated with barbers in transmission of hepatitis B and C from Pakistani population: barber's role in viral transmission. *Asian Biomedicine*. 2010;4(3):435-442
18. Aslan G, Ulukanlıgil M, Seyrek A: Şanlıurfa ilinde HBsAg, Anti-HBs, anti-HCV seroprevalansı (HBsAg, anti-HCV seroprevalence in Şanlıurfa). *Viral Hepatitis J*. 2001, 7 (3): 408-410.
19. Boztaş G, Çilingiroğlu N, Özvarış ŞB, Karaöz A, Karataş F, Kara G, et al. Ankarailinin bir semti'nde bulunankuaförve güzellik salonlarında çalışankişilerinkanyoluyla bulaşan hastalıklar konusunun dabazıgörüüşveuygulamaları. *Hemşirelik Yüksekokulu Dergisi*. 2006; 60-68.