THE RELATIVE EFFICACY OF STERILIZATION TECHNIQUES ON BARBING CLIPPERS IN SELECTED LOCAL GOVERNMENT AREAS OF OSUN STATE.

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ABSTRACT

The study was designed to assess the efficacy of sterilization techniques used on barbing clippers used for barbering operation. There is a growing concern that hair cutting practice may be a contributing factor to contagious skin and scalp diseases. Two barbing salons each from Ilesha and Esa-Oke townships were used for the study. Three sterilization techniques –use of Flame, Kerosene and Methylated Spirit were examined. The study revealed the presence of Bacillus species, Micrococcus species and Staphylococcus species as bacterial consistent and the presence of Fusarium oxysporum, Fusarium compaticum, Aspergillus tamari and Aspergillus flavus as fungi isolates. It also observed that kerosene reduced the microbial load better than the application of flame by proper stability of flame on barbers' clippers while the application of methylated spirit has the highest microbial load. Recommendations were made on how to enhance sterilization techniques in barbing operations.

INTRODUCTION

There are some concerns that hair-cutting sessions may be a contributing factor to HIV transmission in Africa and other developing countries.. In Africa, barber shaving is probably one of a number of nonsexual cultural practice that may expose individuals to blood and blood-borne pathogen through the use of sharp instruments repeatedly for different customers without intervening disinfection and sterilization and unaware of the concept of transmission of infectious agents. For instance, the prevalence of salon or roadside barber shaving has been reported to be as high as 34% - 49% in countries such as Ethiopia, Pakistan and Bangladesh. The practices are done in the barbershop, however, are largely underestimated and unaddressed as one of the routes of blood-borne disease transmission. . In Nigeria, barbing salons are ubiquitous, you can find them at every nook and cranny of places. It is one of the places where there is frequent use of some blades often without proper sterilization and the clients' face and skull skin can be scratched and may be cut by sharp equipment during shaving of their hair. Barbering tools e.g. clippers, blade, hair brush; comb etc. can be made infected by various dimensions of uncleanliness. Infections such as itching, alopecia (hair loss), dandruff, folliculitis, HIV transmission and other blood pathogen are therefore transferred from one person to another via

barbering equipment, due to wounds or cut in infected areas. The transmittable disease mentioned are due to the little or no training or experience on the proper handling of this tool by barbers. This makes them carriers of very contagious diseases . These communicable diseases of the scalp are of concern in barbering because of the re-use of barbing clippers without appropriate disinfection or sterilization . Therefore proper sterilization of such instruments such as clippers blade, comb, and brushes etc. is therefore important to prevent transmission of microorganism and also to inactivate them. There is a growing concern that barbering procedure could create opportunities for HIV as well as other blood borne and skin disease transmission. In areas where such infections are common assessing knowledge, attitude, and practice of barbers and to evaluate the efficacy of proper sterilization and/or disinfection techniques have a paramount importance for proper intervention .Sterilization which has been known, as a process that destroys or eliminates all forms of microbial life, by physical or chemical methods, involving the application of dry heat, liquid chemicals, and sterilization agent. Consistent sterilization practices require a comprehensive program that ensures competence and proper method of cleaning, wrapping of instruments by the operator and monitoring the entire process. Cleaning/disinfecting reduces the bio burden and removes foreign materials that interfere with sterilization process by acting as a barrier to the sterilizing agent.

Disinfection is the removal or distraction of pathogenic microorganisms that may cause infection from surfaces such as blades of barbering clippers is usually carried out by the use of disinfectants. These disinfectants cause destruction either by coagulating the protein of the bacteria by destroying the cell membrane or by the removal of the sulphohydric group from the organisms. Sterilization in between shavings using sharp equipment will kill potential infectious agents and will prevent disease transmission among clients.

In Osun State, Nigeria sharing equipment during shaving of hair in barber's shop is commonly practised. Despite the possible risk associated with barbering operations, their activity is still under less scrutiny as a means of spreading infectious diseases. There is a low level of awareness about barber's haircut practices and the disinfectants they use in Esa-Oke and Ilesa in Osun State. Therefore, this study was conducted to evaluate the microbiological efficacy of sterilization techniques used in barbers shops in the selected areas of the State. In Nigeria, some barbers are known to use kerosene, heat, methylated spirit, sterilizing unit, UV rays, fuel and so on, as cleaning agents for the sterilization of their electric clippers. Three sterilization techniques that were examined in the study were application of heat, application of methylated spirit, application of kerosene

The objective of this research work is to:
determine the relative efficacy of sterilization techniques on barbing clippers
determine the safest barbing sterilization technique in the selected area
determine benefits of sterilization on end users

Isolate and identify the microorganisms associated with improper sterilization techniques in the study area.
To make recommendations based on the findings.

Material and Methodology.

Sample selection

The barbing salons used as collection point are located within two areas in Esa-oke township and Ilesha, Osun state Nigeria. The samples were selected based on the following conditions that they used electric clippers, they were patronized by a diverse population, use one or more of sterilization techniques tested.

Collection of material

The names of the disinfectants used by the barbers were noted and recorded. The barbers' clippers were swabbed using sterile swab sticks before and after sterilization. The swab sticks containing the samples were labelled accordingly. The specimen samples were stored in sterile specimen bottles and brought to the laboratory under the aseptic condition for microbiological analysis.

Procedure

Media used include Nutrient Agar, Nutrient Broth, Potato Dextrose Agar which were prepared according to the manufacturer's direction. The culture media for isolation, stocking, and some biochemical characterization of bacteria isolates were Nutrient Agar, Potato Dextrose Agar (PDA), Triple Salt Agar, Nutrient Broth. The isolation was done using the pour plate technique and pure cultures of the isolates were obtained with repeated subculturing. The cultures were incubated at 35^0 C for the bacterial cells and 27^0 C for the fungal cells.
The identification of the bacterial and fungal isolates was carried out using the laboratory procedures described by Fawole and Osho (2002).

Results and Discussion

The bacterial isolates recovered from the study were three different species of *Bacillus,* three species of *Staphylococcus* and one *Micrococcus* species. Their occurrences indicate their presence in a particular sample, were spread out in Table 1

Table 1: Occurrence of the Bacterial Isolates from the Samples Collected

Organisms	A			B			C			D		
Methods	K	F	S	K	F	S	S	F	K	S	F	K
Micrococcus species	-	-	-	-	-	-	+	+	-	+	-	-
Bacillus species I	-	-	-	-	-	-	-	+	-	-	+	-
Staphylococcus species I	-	-	-	-	-	-	-	+	-	-	+	-
Bacillus species I	+	+	+	+	+	+	+	+	+	+	+	+
Staphylococcus species II	-	-	-	-	-	-	+	-	+	+	-	-
Staphylococcus species III	+	-	-	+	-	-	+	+	-	+	+	-

Keys: A = Collected sample from Esa-oke (before sterilization); B = Collected sample from Esa-oke (after sterilization); C = Collected sample from Ilesa (before sterilization); D = Collected sample from Ilesa (after sterilization); K = kerosene, F = flame, S = spirit, "+" = presence of microbes, "-" = absence of microbes

Micrococcus species form was present in spirit and flame methods before sterilization and was present in the spirit method form after sterilization. The *Micrococcus* species was absent in collected samples from Esa-Oke both with before and after sterilization but was not found with the flame and kerosene methods of sterilization from collected samples from Ilesa.

The first *Bacillus* species form was absent in samples obtained from the selected area in Esa-Oke for all three sterilization techniques used both before and after sterilization. These species were present in flame sterilization techniques used on collected samples from Ilesa both before and after sterilization but not found in spirit and kerosene sterilization techniques both before and after sterilization from collected samples from Ilesa.

The first *Staphylococcus* species form was absent in samples obtained from Esa-Oke both before and after sterilization for all the three techniques used. This species was absent in spirit and kerosene sterilization techniques from collected samples from Ilesa. This species was present in flame technique both before and after sterilization from collected samples from Ilesa.

The second *Bacillus* species was present in the samples obtained from the selected area in Esa-Oke and Ilesa for the three sterilization techniques both before and after sterilization.

The second *Staphylococcus* species was absent in the samples obtained from the selected area in Esa-Oke both before and after sterilization. This species was also present in spirit before and after sterilization, present in kerosene before sterilization and absent after sterilization. This species was absent in flame techniques before and after sterilization.

The third *Staphylococcus* species was present in flame sterilization techniques both before and after sterilization from the samples obtained in Esa-Oke. In Esa-Oke, this species was absent in flame and spirit sterilization techniques used in Esa-Oke. In Ilesa, this species was present both in flame and spirit sterilization techniques used but absent in kerosene sterilization techniques for collected samples from Ilesa.

Table 2 MORPHOLOGICAL AND BIOCHEMICAL CHARACTERISTICS OF THE BACTERIALISOLATES

	Morphological characteristics of the isolates	Gram txn	catalase	Coagulase	Spore staining	Starch hydrolysis	Sugar Fermentation					Probable organism
							sucrose	lactose	glucose	H_2S production	Gas production	
O	Circular,raised,entire,opaque,yellow	-ve cocci	+ ve	-ve	-ve	-ve	+ve	+ve	-ve	+ve	-ve	*Micrococcus sp*
B	Circular,raised,entire,opaque,cream	+ve rod	+ ve	-ve	+ve	-ve	+ve	+ve	-ve	-ve	+ve	*Bacillus sp*
S	Circular Convex Entire Opaque Cream	+ve cocci	+ ve	+ve	-ve	-ve	+ve	+ve	-ve	-ve	+ve	*Staphylococcus sp*
J	Circular, Raised Entire Opaque Cream	+ve cocci	+ ve	-ve	+ve	-ve	+ve	+ve	-ve	+ve	+ve	*Bacillus sp*
R	Circular, Raised Entire Opaque White	+ve rod	+ ve	+ve	-ve	-ve	+ve	+ve	+ve	+ve	+ve	*Staphylococcus sp*
Q	Irregular, Flat,Rhizoid,Transparent Cream	+ve cocci	+ ve	-ve	-ve	-ve	+ve	+ve	-ve	+ve	-ve	*Staphylococcus sp*

Keys: "+" = present; "-" = absent; +ve = positive; -ve = negative

TABLE 3: CHARACTERISTICS AND IDENTIFICATION OF FUNGAL ISOLATES

Isolates	A	B	C	D
Observe	Whitish cream	Cream	Cream	Whitish cream
Texture	Floccose	Granular	Granular	Fluccose
Growth	Abundant	Abundant	Abundant	Abundant
Hyphae	Septate	Septate	Septate	Septate
Spore type	Microconidia	Conidia	Conidia	Macroconidia
Spore texture	Smooth	Rough	Rough	Rough
Spore shape	Oval	Oval	Globose	Round
Spore colour	Hyaline	Yellow	Yellow	Golden yellow
Special features	Stipe is long and hyaline	Hyaline stipe, radiating head, long, verrucose, dome-shaped vesicle	Long rough stipe, long metulae, partly globose head	Abundant in chains
Microorganism	*Fusarium oxysporum*	*Aspergillus flavus*	*Aspergillus tamarii*	*Fusarium compactum*

TABLE 4: OCCURRENCE TABLE FOR THE FUNGAL ISOLATES

Isolates	Esa-Oke						Ilesa					
Sterilizing agents	Kerosene		Flame		Spirit		Spirit		Flame		kerosene	
Isolates	B	A	B	A	B	A	B	A	B	A	B	A
Fusarium oxysporum	+	-	+	+	-	-	-	-	-	-	-	-
Aspergillus flavus	-	-	+	-	+	-	-	-	-	-	-	-
Aspergillus tamarii	-	-	-	-	-	-	-	-	+	-	-	-
Fusarium compaticum	-	-	-	-	-	-	-	-	+	+	-	-

Keys: B =before sterilization, A =after sterilization, + = presence of the microbes, - = absence of the microbes

Fusarium oxysporum was absent in samples obtained from Ilesa both before and after sterilization. This species was present in flame sterilization before and after sterilization but absent in kerosene and spirit application before and after sterilization. *Aspergillus flavus* was absent in samples obtained from Ilesa both before and after sterilization. This species was present in flame and spirit samples before sterilization but absent in kerosene both before and after sterilization and also absent in flame and spirit sterilization after sterilization. *Aspergillus tamari* in sample G was absent in samples obtained in Esa-Oke for the three sterilization techniques both before and after sterilization.

This species was present in flame sterilization technique before sterilization but absent after sterilization technique from samples obtained from the selected area in Ilesa. This species was absent in kerosene and spirit sterilization techniques used both before and after sterilization. *Fusarium compaticum* present in sample H was absent throughout in samples obtained from the selected area in Esa-Oke both before and after sterilization for the three sterilization techniques used. This species was absent in spirit and kerosene sterilization techniques used in the selected area in Ilesa both before and after sterilization. This species was present before and after sterilization in the flame technique used in Ilesa both before and after sterilization.

The presence of microbial growth on cultures with methylated spirit sterilization led to the curiosity of culturing with methylated spirit. The culture plate containing methylated spirit still allowed the growth of microorganisms. This disapproves the disinfecting properties of methylated spirit toward the sterilization of barbing clippers, thus making the application of kerosene on barbing clippers more acceptable. This is followed by the application of direct heat on the barbing clippers, if stable heat can be applied to the clippers and not just a casual application it will also make the application of heat more efficient compared to the application of methylated spirit.

The wellbeing of man is more important to the community development as it influences the growth and development of all physical and internal organs. The socio-demographic characteristics of barbers did not significantly influence the knowledge, attitude, and practices of barbers of the selected area in Esa-Oke and Ilesa. There was inappropriate haircut practices in the barbershop that could be due to lack of practical knowledge about sterilization and potency of disinfectants. Although the principle of universal protection methods considers that all blood and body fluids are potentially infectious. However, barbers are still professionals in the community which was owned, cared and financed by the community especially the rural and urban areas and majority of them do not have any perception of unhealthy working practices in haircutting, unlike other countries where activities of barbers are regulated through a comprehensive training, licensing and monitoring programs

CONCLUSION

In this study, the presence of *Bacillus species, Micrococcus species,* and *Staphylococcus species* were recorded as bacterial isolates and the presence of *Fusarium compaticum, Fusarium oxysporum, Aspergillus tamari, Aspergillus flavus* as fungal isolates in the blade of the clippers that were used in shaving hair which is harmful to the normal growth of the hair was observed. This could be avoided by the proper sterilization of barbering tools such as clippers, combs, brushes etc. having personal barbering tools also reduces the spread of diseases contracted from barbers shop. Personal hygiene, safety precaution measure by barbers are very important for shaving, trimming and cutting of hairs.

It could be concluded that the proper application of kerosene to barbering clippers helps in decreasing microbial growth and the transfer of contaminants or diseases from one

person to another. The use of flame has less effect in sterilizing barbing clippers due to inappropriate knowledge of the usage by barbers but it could be made effective by stabilizing the heat to be applied to the clippers blade for 2-3minutes before using it for shaving. Methylated spirit is the least effective in three sterilization techniques observed, this may be due to the improper handling or unhygienic method of production.

The different cleaning agents and disinfectants commonly used by barbers during barbing operations only sometimes reduces the microbial load and not disinfect the barbing clippers. Hence governmental policy should be laid down for barbers regarding proper training before going into the barbing industry as an entrepreneur. Moreover the use of personal clippers or barbing tools by client helps reduce the transfer of diseases from one customer to the other via barbing tools. The application of kerosene to the clippers blade as it has been proved to have more antiseptic properties on fungi and bacteria isolates to reduce the risk of contamination by the client and the application of stable heat should be used by barbers as a source of sterilization.

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