



## Comparative Analysis Of The Antiseptic Properties Of Some Disinfectants On Bacteria And Fungi Of Public Health Importance Isolated From Barbing Clippers

### Abstract

The assessment of disinfectants and cleaning agents commonly used by barbers during barbering operations has always been crucial with reference to public health importance. This study focused on the evaluation of the antiseptic properties of commonly used disinfectants in public barbering salon with the aim of ascertaining their suitability for barbering operations. The study revealed *Malassezia* and *Trichophyton* species as consistent fungi species while *Staphylococcus*, *Streptococcus* and *Bacillus* species were common bacteria consistently isolated from barbering clippers before and after the use of disinfectant (Jik, IZAL, Dettol, Kerosene and Fuel). *Malassezia* and *Trichophyton* occurred respectively in 70.8% and 58.3% of samples, while *Staphylococcus*, *Streptococcus* and *Bacillus* species occurred in 91.67%, 75% and 83.3% of samples respectively. Of all the used disinfectants, hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) showed more antiseptic properties on all isolates with a zone of inhibition of 12mm (*Malassezia*), 14mm (*Trichophyton*), 42mm (*Staphylococcus*), 40mm (*Streptococcus*) and 30mm (*Bacillus*) while Fuel and kerosene were least in antiseptic properties and showed zero zone of inhibition for all the isolates. The result therefore showed that Hydrogen peroxide is suitable for barbering operations and could be an alternative to high level disinfection.

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### Key Words:

Barbing salon, Disinfectant, Hydrogen Peroxide, High level disinfection.

### Introduction

From 2002 till date, there has been an increase in the establishment of barbing industry, the majority of which is controlled by people with little or no training/knowledge on infection controlled practices. Although the barbing industry is known for its aesthetic activity research however shows the possibility of it making its patrons feel sick by acquisition of contagious diseases. (Kondo, *et al.*, 2006). All individuals (male and female) have approximately 300,000 hairs on their scalp with a growth rate of approximately half an inch per month (Elewski, 2000). Therefore, they are expected to visit a barber's shop at least once a month for a haircut. The use of barbing clipper for barbering operation is a substitute for the traditional use of razor blade and other sharp objects following advancement in science, technology and civilization (Mackenzie, *et al.*, 1986). There are several communicable diseases of the scalp that are of concern in barbering and this is because of the re-use of barbing clippers without appropriate disinfection or sterilization. In Nigeria for example, some barbers are known for using Kerosene, diesel, fuel and other cleaning agents for the sterilization of their electric clippers. A number of

infections such as ringworm, dandruff and other impetigo-like lesion caused by bacteria have been reported to be infections associated with barbering operations. Causative organisms are usually present in non-living cornified layers of the skin and its appendages (Kligman *et al.*, 1983). However, the establishment of a mycotic infection during barbering operation usually depends on the size of the inoculum and on the resistance of the host but the severity of the infection seems to depend mostly on the immunologic status of the host (Mackenzie *et al.*, 1986).

Disinfection which is the removal or distraction of pathogenic microorganisms that may cause infection from surfaces such as the blade of a barbing clipper is usually carried out by the use of disinfectants (Boyce, 2000). These disinfectants cause distraction either by coagulating the protein of the bacteria, by destroying its cell membrane or by the removal of a sulphohydric group from the organisms. The procedures for disinfection have been reviewed during recent years to ensure effectiveness against microorganisms, the revised procedure has been labeled as High Level Disinfectant (HLD) which at present is the only one recommended in this guideline but is rarely applied in the barbering industry (Boyce, 2000).

Despite the possible risk associated with barbering operations, their activity is still under little or no scrutiny as a means of spreading infectious diseases. Hence, this work is aimed at investigating the most suitable disinfectant for barbering operation and to make necessary recommendations based on the findings.

### Materials And Method

Barbing salons located within 3 different areas/zones in Benin City, Edo state, Nigeria were selected for the purpose of this work.

### Collection Of Samples

Samples were taken from the sharp blade of the barber's electric clipper before and after a haircut between May and August 2007. The name of the disinfectant used by the barbers was noted and the swab stick brought to the laboratory under sterile/aseptic condition for microbiological analysis.

### Chemicals And Reagents

All reagents, chemicals and disinfectants used in this work are products of different companies.

The methylated spirit used is a product of Nomagbon Pharmacy in Benin City.

The Jik and Dettol used is a product of Reckitt Benkiser Nigeria Limited, Ogun state, Nigeria.

The fuel and Kerosene were gotten from Oando filling station Ikpoba-hill Benin City.

### Microbiological Examination Of Sample

#### Isolation Of Bacteria And Fungi

Bacteria were isolated using Nutrient Agar medium containing 250mg of Nystatin (an antifungal) to prevent the growth of fungi on the media. The antifungal (Nystatin) was added after autoclaving the media. The same procedure was repeated for the isolation of fungi using Notman Agar containing 250mg of chloramphenicol incubated at room temperature, for 5 – 7 days.

Further sub-culturing on Nutrient Agar and Potato Dextrose Agar was carried out to isolate pure colonies which were stored on a slant at 4°C for further studies.

#### Identification Of Microbial Isolate

Bacteria isolates were purified by sub-culturing and by the use of selective media. Using morphological, cultural and biochemical characteristics, pure isolates of bacteria were identified to their genus level using Bergey's manual

of determinative Bacteriology, 1997 while the fungi isolates were identified using the procedure described by De-hoop in Atlas of clinical fungi, 1991 as a guide.

### Sensitivity Test

Sterile filter papers were use to construct different sensitivity disk after which it was autoclaved at 161°C for 1 hour to make it completely sterile.

The sensitivity disk were soaked in 20ml of 7 different disinfectants for 30mins so as to absorb the disinfectant, after which it was inserted on the media containing different isolate and incubated for 24 hrs at 37°C and the zone of inhibition measured in millimeters.

### Results And Discussions

In this study, *Staphylococcus*, *Streptococcus* and *Bacillus* species were predominant bacteria isolated from almost all the samples collected, while *Trichophyton* and *Malassezia* species were fungi isolated. *Staphylococcus*, *Streptococcus* and *Bacillus* sp. were isolated from 91.67%, 75% and 83.3% of samples respectively while *Trichophyton* and *Malassezia* were isolated from 58.3% and 70.8% of samples respectively. Most of these organisms are sometimes referred to be part of the normal microbiota of the scalp (Kondo *et al.* 2006, Pomeranz, 1999 and Gorbach *et al.* 1997) since the scalp is always left exposed and they do sometimes cause infection when the scalp is nicked during barbering operation.

The sensitivity test reveals that hydrogen peroxide is the most effective disinfectant with a zone of inhibition of 42mm, 40mm and 30mm for *Staphylococcus*, *Streptococcus* and *Bacillus* sp. respectively while some cleaning agents such as kerosene and fuel which is commonly used by barbers within Benin City had no antiseptic effect on any of the microbial isolate.

Similarly, hydrogen peroxide had more antiseptic properties on all fungi isolates compared to other disinfectants and cleaning agent.

The figures below represent the antiseptic properties of the different disinfectants and cleaning agents on the microbial isolate.

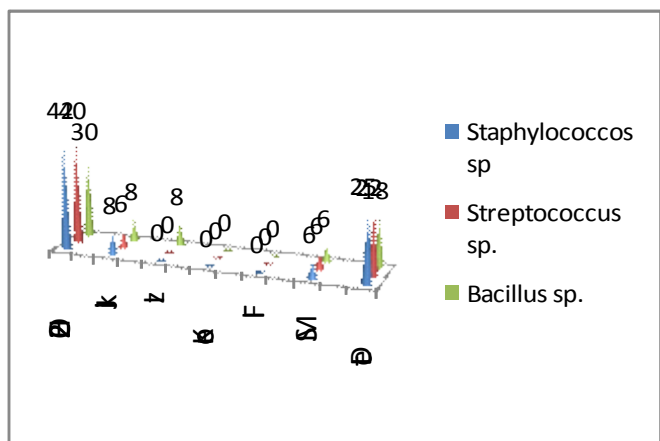


Fig. 1: Antiseptic properties of disinfectants and cleaning agents on Bacteria isolates.

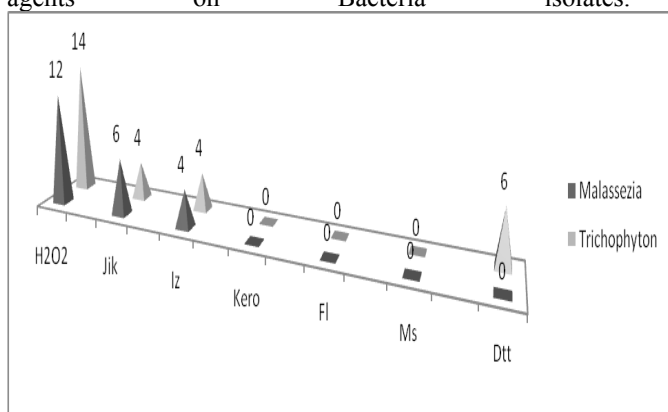


Fig. 2: Antiseptic properties of disinfectants and cleaning agents on Fungi isolates.

H2O2 = Hydrogen peroxide

Jik = Jik (Sodium hypochlorite)

Iz = Izal

Kero = Kerosene

Fl = Fuel

Ms = Methylated spirit

Dett. = Dettol

*Trichophyton* is a known causative agent of mycosis. *Malassezia* species is responsible for a number of scalp infection and also causes illness together with other pathogens especially *Staphylococcus* species (Okafor and Agbugbaeruleke 1998).

### Conclusion/Recommendation

The different cleaning agents and disinfectants commonly used by barbers during barbering operations only sometimes reduces the microbial load and not disinfect the barbering clippers. Hence, barbers who cannot afford High Level Disinfection should be encouraged to use hydrogen peroxide as it has been proved to have more antiseptic properties on fungi and bacteria isolates as shown in figure 1 and 2

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