

Full Length Research Paper

Evaluation of bacterial and fungal contamination in hairdressing and beauty salons

Enemuor SC¹, Ojih MI², Isah S² and Oguntibeju OO^{3*}

¹Department of Microbiology, University of Nigeria, Nsukka Nigeria.

²Department of Microbiology, Kogi State University, P.M.B. 1008, Anyigba, 272002, Kogi State, Nigeria.

³Department of Biomedical Sciences, Faculty of Health and Wellness Sciences, Cape Peninsula University of Technology, Bellville 7535, South Africa.

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A study was conducted to evaluate bacterial and fungal contamination in hairdressing and beauty salons in Anyigba - a university community in Nigeria. Samples were collected from six different salons located around Kogi State University, Anyigba. The samples were collected from combs, brushes, hair stretchers, rollers and hairpins and processed according to standard procedures. The isolates obtained were examined and identified using microscopic examination, colonial morphology and biochemical characteristics. Five bacterial and six fungal species were isolated and identified. The bacterial isolates include *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus* sp, *Enterococcus* species and *Enterobacteria*. The six fungal isolates were as follows *Aspergillus* species, *Penicillium* sp., *Mucor* sp., *Rhizopus* sp., *Trichophyton* sp. and *Cephalosporium* sp. The presence of these potential pathogens is an indication that hairdressing and beauty salons could be contributing to the spread of infection within Anyigba and also to the university community.

Key words: Potential pathogens, hairdressing, beauty salons, health risk.

INTRODUCTION

Hairdressing and beauty salons are classified as personal service establishments and such services may pose potential health concerns to their clients including the risk of infection and sometimes injury (Adeleye and Osidipo, 2004; Barn and Chen, 2011). These health risks vary depending on the nature of the service, the tools and equipment that are used, the health status of the clients and service providers as well as the infection control procedures implemented. While it is known that invasive procedures, such as piercing and tattooing are clearly associated with bacterial, viral and fungal infection risks, even non-invasive procedures such as pedicures can result in infection (Stout et al., 2011). It is believed that any service with the potential to break the skin's surface can be associated with infections and infections can then

be transmitted to and between clients if proper infection control procedures are not implemented. It has been observed that hairdressing operators and their clients are constantly being exposed to bacterial or fungal contamination during their services. Microorganisms are everywhere including skin surfaces and are continually introduced into the environment and could therefore easily spread between clients and operators and transferred by contact with unwashed hands, soiled equipment or contact with blood and other body substances (De Souza and Shibu, 2004).

Infection can occur during hairdressing procedures since items such as razors, scissors, combs, clippers and hairpins can accidentally penetrate the skin. Blood and body fluids do not have to be visible on instruments,

equipment or working surfaces for infection to be transmitted. Infections that can be spread in hairdressing premises include skin infections on the scalp, face and neck such as impetigo and fungal infections such as tinea capitis and ring worm (Brown, 2006; Amodio et al., 2010; Barn and Chen, 2011). Burns can also occur during hairdressing procedures involving hot rollers, tongs and crimpers and when hair is being washed with contaminated water or when stationary or hand-held dryers are improperly used. There are reports of people who have been infected with head lice from direct hair-to-hair contact with someone who has head lice (Ruddy et al., 2001). Unfortunately, there are no established regulations, guidelines and best practices for many of these salons in our environment. Our goal is to protect the health of the public and one important aspect of minimizing health risks is to understand the infection risks of these salons, hence the aim to evaluate the bacterial and fungal contamination in selected salons in a university community.

MATERIALS AND METHODS

A total of 42 samples were randomly collected from six hair and beauty salons in Anyigba, a University community in Nigeria. To determine the types of microorganisms present, comb, brushes, rollers, hairpins and dryers were sampled with a moistened sterile cotton swab. After taking each swab, the swab stick was placed back into the casing to avoid contamination and was labelled appropriately. All the samples collected were transported to the laboratory without delay for culture and treated according to standard method (Adeleye and Osidipo, 2004). A variety of selective and differential microbial media were used for presumptive identification of contaminating microorganisms. A total count of the different colonies isolated on each plate was determined and was significant when bacterial count is $\geq 10^5$. Gram staining, microscopic examination and confirmatory biochemical tests were performed to further identify bacteria and fungi (Adeleye and Osidipo, 2004).

RESULTS AND DISCUSSION

Of the 42 samples obtained from the different salons, only five bacterial and six fungal species were isolated. Table 1 shows the bacterial and fungal species and the number of bacterial and fungal isolates from each salon.

Studies have examined the presence of potential pathogens as well as infection control practices of personal service establishments such as salons so as to better understand and characterized potential hazards in salons. For instance, Sekula et al. (2002) performed an environmental survey of four salons providing personal services in which swab samples collected from randomly selected instruments at each salon were analyzed for the presence of bacteria and fungi and their results showed that all instruments from three of the four salons were contaminated with bacteria and fungi. Due to the presence of these potential pathogens, the authors concluded that current disinfection techniques used at

each salon were inadequate in preventing health risks among clients. It has been observed that sterilization techniques differ between service providers with 38% reporting the use of ultraviolet (UV) light, 18% using glass beads and 1% using ultrasonic cleaners, all of which are not approved methods of sterilization in many jurisdictions (Rideout, 2010).

In our current study, we isolated five bacterial potential pathogenic species and six potential pathogenic fungal species in the different salons. *Staphylococcus aureus* was isolated from all the salons and are among the most important bacteria that cause disease in humans. This bacterium has been shown to cause various pus-forming diseases in humans such as boils, carbuncles, folliculitis, impetigo contagiosa, scalded-skin syndrome. *Staphylococcus epidermidis* which was also isolated from most of all the samples is a normal habitat of the skin but can occasionally cause endocarditis. Isolation of the organisms from the equipment and items used in these salons indicate that the sterilization methods employed by the operators are not effective if at all they sterilize items between clients. *Trichophyton sp.* isolated from some of the samples also indicates that ringworm or dermatophytosis can also be spread via these salons. From these findings, it is clear that hygienic practices in these hairdressing and beauty salons are far below expected standards. This could imply that operators or workers in these salons are almost ignorant or less informed of the risks involved in their work. This situation calls for the agencies in public health sector to awake to their responsibilities in sensitizing and organizing lectures, training workshops and seminars for the operators and workers of hairdressing and beauty salons in our different communities. If the people are informed of the dangers or hazards associated with their profession they would help in improving on their practices and by so doing reduce the spread of these infections.

The information presented here is limited in several ways. For instance the study was restricted to a small university community and the sample size was not significantly large as it did not cover larger population. Also, information gathered does not allow for an assessment of the salons-related burden of disease since it does not provide a complete picture of salon-related infections in the community. Without an accurate estimate of the number of people receiving these services and the number obtaining medical treatments, it is difficult to establish a quantitative notion of risk. Many people may not seek medical attention if an infection occurs especially in instances where incubation periods take weeks or longer. Even if they seek medical attention, they or the treating doctor may not link the infection with salon services. Despite these limitations, this study provide important information on the potential risk associated with salon services in our community and the possibility of salons acting as source of infection among clients and also to the community in general. Further

Table 1. Total number of bacterial and fungal isolates from each hairdressing and beauty salons.

Salon	No. of samples collected	Bacterial isolate		Fungal isolate	
		Organism	No. of samples present	Organism	No. of samples present
A	8	<i>S. aureus</i>	5	<i>Aspergillus</i> sp.	4
		<i>Streptococcus</i> sp.	2	<i>Mucor</i> sp.	3
		<i>Enterococcus</i> sp.	1	<i>Rhizopus</i> sp.	2
B	8	<i>S. aureus</i>	4	<i>Aspergillus</i>	4
		<i>S. epidermidis</i>	1	<i>Penicillium</i> sp.	2
		<i>Streptococcus</i> sp.	2	<i>Mucor</i> sp.	2
C	6	<i>S. aureus</i>	3	<i>Rhizopus</i> sp.	1
		<i>Enterococcus</i> sp.	2	<i>Trichophyton</i> sp.	2
		<i>Enterobacteria</i> sp.	1	<i>Aspergillus niger</i>	1
D	6	<i>Streptococcus</i> sp.	2	<i>Aspergillus</i> sp.	2
		<i>Staphylococcus</i> sp.	2	<i>Cephalosporum</i> sp.	3
		<i>Enterococcus</i> sp.	2	<i>Trichophyton</i> sp.	1
E	6	<i>Staphylococcus</i> sp.	3	<i>Aspergillus niger</i>	2
		<i>Streptococcus</i> sp.	2	<i>Penicillium</i> sp.	3
		<i>S. epidermidis</i>	1	<i>Rhizopus</i> sp.	1
F	8	<i>Staphylococcus</i> sp.	2	<i>Mucor</i> sp.	2
		<i>Enterobacteria</i> sp.	2	<i>Rhizopus</i> sp.	2
		<i>Enterococcus</i> sp.	2	<i>Cephalosporum</i> sp.	1
				<i>Penicillium</i> sp.	1

study is recommended.

RECOMMENDATIONS

Based on the outcome of this study, the following recommendations are suggested: The government at federal, state and local levels should establish regulations, guidelines and best practices for salons operating in the country. There should be specific infection control practices and implementation of the practices and appropriate measures should be put in place to prevent the spread of infections via salons. Unsafe or unhygienic practices may affect the health of both the customer and the operator. Where procedures involve skin penetration, if not managed properly they may transmit bacterial, fungal and viral infections including HIV, Hepatitis B and Hepatitis C. All equipment must be cleaned (washed in hot soapy water) before disinfection or sterilization, to remove organic matter and other residue, which may cause a layer of build up that prevents disinfection or sterilization. Equipment that comes into contact with the skin must be cleaned before re-use whether or not it looks dirty. Equipment should be

thoroughly cleaned at least once a day and immediately after contamination with blood. A fresh disinfection solution should be prepared daily and the container thoroughly cleaned before refilling. Bench top sterilizers are the most effective means of sterilizing equipment. This will go a long way to reduce microbiological and other potential hazards associated with the services of hairdressing and beauty salons in the country.

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