Isolation of Pathogenic Microbes from Beauty Salons in Ranya, Iraq

Patojenik Mikropların Irak, Ranya’daki Güzellik Salonlarından İzolasyonu

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ABSTRACT

Background: Beauty salons can provide a suitable medium for growth of pathogenic microorganisms. This may cause potential health risk to their clients including infection. These health risks vary depending on the nature of the service, the tools and equipment that are used in beauty salons. Skin and eye pathogenicity could be communicated by sharing cosmetics in beauty salons.

Methods: One hundred and twenty moistened cotton swab samples were randomly collected from ten different hair and beauty salons in Ranya city at Sulaymania, Iraq to determine various types of microorganisms present on usable equipment including Sponge, Wax, Lipstick, Eyeliner, Mascara, and foundation. All the collected samples were immediately transported to the laboratory for microbiological examination according to standard method.

Results: Microbiological growth occurred in 67% among all 120 collected samples. Most of growth samples were bacteria. The lower growth were Fungi. Among bacterial growth were Staphylococcus sp (37%), Streptococcus sp (12%), and Enterococcus (5%) consequentially; while other samples were fungi candida albicans (13%).

Conclusion: It was observed that the major cause of contamination of salon tools is repetitive usage of beauty salon tools without considering the hygienic condition. This can cause serious skin infections. Training, supervising and monitoring are required to facilitate the effective methods of sterilization, which prevents from spreading infections caused by pathogens on salon tools and instruments.

Key Words: Beauty salon, contaminated tools, pathogens, health risk

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ÖZET

Giriş: Güzellik salonları, patojenik mikroorganizmaların büyümesi için uygun bir ortam sağlayabilir. Bu, enfeksiyon da dahil olmak üzere müşterileri için potansiyel sağlık riskine neden olabilir. Bu sağlık riskleri, hizmetin niteliğine, güzellik salonlarında kullanılan araçlara ve ekipmana bağlı olarak değişmektedir. Güzellik salonlarında kozmetik ürünlere paylaşımı ile cilt ve göz patojenitesi bildirilebilir.

Amaç: Yüz yirmi adet nemlendirilmiş pamuklu çubuk örnekten Ranya şehrinde farklı kuaför ve güzellik salonlarında, sünger, ağda, ruj, göz kalem, rimel ve fonduyen gibi çeşitli malzemeler üzerindeki mikroorganizma türlerini belirlemek için toplanmıştır. Toplanan tüm örnekler laboratuvara hemen nakledilmiştir.

Bulgular: Toplanan 120 örnekinin %67'sinde üreme meydana geldi. Büyüme örneklerinin çoğu bakteriydi. Düşük büyüme ise mantardı. Bakteriler arasında %37 Staphylococcus, %12 Streptococcus ve %5 Enterococcus türlerini vurgulamıştır. Diğer örneklerde ise %13 Candida albicans idi.

Sonuç: Salonlardaki malzemelerin kontaminasyonunun en önemli nedeni, hijyen koşullarını dikkate alınmadan güzellik salonu araçlarının tekrar kullanıldığıdır. Bu, ciddi cilt enfeksiyonlarına neden olabilir. Salonlardaki araç ve gereçlerdeki patojenlerin neden olduğu enfeksiyonların yayılmasını önlemek için etkili sterilizasyon yöntemlerini kolyalıştırmak için eğitim, denetleme ve takip gereklidir.

Anahtar Sözcükler: Güzellik salonu, kontamine araçlar, patojenler, sağlık riski

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INTRODUCTION

Recently, cosmetics are widely used for the purpose of ladies' beauty. Salons beauty lead to transfer many of pathogenic microbes specially bacteria and fungi that cause skin & eyes infection by using make-up kits by ladies (12). Cosmetics include basic minerals, growth factors, organic, and inorganic compounds also moisture that providing suitable conditions is able to increase microorganisms. However, microbial contamination in beauty salons can be hardly found on the cosmetic tools (11). Cosmetic tools can be contaminated by three ways, firstly, usage unsterile materials in production, secondly, during processing of production, finally, during using the cosmetic tools (1). 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 contaminated hands, equipment or contact with blood and other body substances (11).

Survey on personal toiletries shows that *Bacillus, Staphylococcus sp, Pseudomonas sp, Enterobacter, Aspergillus, Penicillium and Candida* are more predominant species in cosmetics (11). Cosmetic contamination leads to several types of infections that range in severity from mild to serious (13). Gram-positive bacteria *Staphylococcus sp, Streptococcus sp, and fungus like Candida albicans* are responsible for many of the most common skin infections. Over the past several years, skin pathogenicity has increased due to repetitive use of beauty salon tools (13). Most women share makeup and applicators with their friends and family, increasing their chances of facial infection (13). Many skin diseases are not completely caused by a single pathogen (6). Opportunistic pathogens of several types may infect skin, and individual cases with identical symptoms may result from various pathogens (4) by using tools such as sponge, lipstick, wax. The common eye infection could be by eyeliner or mascara (10).

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 between clients, if proper infection control procedures are not implemented. Skin micro flora of the body can be transferred from an individual to another by the sharing beauty tools. This can threaten ladies' health through their role as a pathogen (4). In addition, in salons the cosmetics are the medium for growing pathogenic microorganisms. It makes the diverse and a density of microorganisms. This can cause skin and eyes infections, and transfer from a woman to another by using sponge, brush, wax, lipstick, mascara and eyeliner (13). The common skin infections are mostly caused by *Staphylococcus aureus* and *Staphylococcus epidermis* (3). Yearly, large number of women get eye infections by using cosmetics like mascara and eyeliner and they can cause blindness temporary or permanently (12). There is normal flora on eyelashes. Makeup on eyelid contaminate the makeup container and increase chance of eye infection. It can also cause allergic reaction of eyes by redness and irritation (2).

Infections that can be spread in salons premises include skin infections on the scalp, face and neck such as impetigo and fungal infections such as *Tinea capitis* and ring worm (5). *Tinea Capitis* is a dermatophyte infection of scalp is commonly spread by currently infected patients, asymptomatic carriers or by fomites, such as beauty salon tools. However, studies on the risk factors of *Tinea capitis* remain scarce (10). In the workplace, salons are exposed to many irritants and allergens that may cause occupational diseases. It has been estimated that 10-20% of beauty salons are affected by skin disorders (10). The majority of these cases are due to irritants, e.g. from wet work, although allergic skin diseases occur. Furthermore, they are at a high risk of respiratory diseases including occupational asthma and rhinitis (2). This present study focuses on isolation and identification of pathogenic bacterial and fungal contamination in Beauty Salons at the District of Ranya.

MATERIAL and METHODS

A total of 120 samples were randomly collected from 10 Beauty Salons in Raripan District. To determine the types of microorganisms that present on old tools of salons include Spongy, Wax, Lipstick, eyeliner, Mascara as well as foundation can. After taking each swab, the swab stick was placed back into the casing to avoid contamination and was labelled appropriately. All the collected samples were transported to the laboratory without delaying for culture and treated according to standard methods. A variety of selective and differential microbial media were used for presumptive identification of contaminating microorganisms. Gram staining, microscopic examination and confirmatory biochemical tests were performed to further identify bacteria and Fungi.

RESULTS

Out of 120 samples from 10 different beauty salons, 68 samples were positive growth as shown in Table 1. Most of them were bacteria. However, other samples were Fungi. Among all collected samples, 37% samples were *Staphylococcus sp*, 12% samples were *Streptococcus sp*, 5 % samples were *Enterococcus sp*, and 13 % samples were *Candida albicans*.

| Salons Name and NO.of microorganisms | Type of Isolated Bacteria | Type of Isolated Fungi |
|-------------------------------------|---------------------------|------------------------|
| A=12                  | Staphylococcus sp. (4/12) | Candida albicans        |
|                       | Streptococcus sp. (2/12)  |                        |
| B=12                  | Staphylococcus sp. (4/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| C=12                  | Staphylococcus sp. (5/12) | Candida albicans        |
|                       | Streptococcus sp. (2/12)  |                        |
| D=12                  | Staphylococcus sp. (4/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| E=12                  | Staphylococcus sp. (4/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| F=12                  | Staphylococcus sp. (4/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| G=12                  | Staphylococcus sp. (3/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| H=12                  | Staphylococcus sp. (3/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| I=12                  | Staphylococcus sp. (2/12) | Candida albicans        |
|                       | Streptococcus sp. (2/12)  |                        |
| J=12                  | Staphylococcus sp. (4/12) | Candida albicans        |
|                       | Streptococcus sp. (1/12)  |                        |
| Total =120            |                          | 13                     |

DISCUSSION

The result of the present study showed that most of contaminations caused by bacteria and fungi, in our current study, three pathogenic bacteria and one fungi species isolated from different salons. The ratio of bacterial contamination was 79%, while the ratio fungal contamination was 21%. *Staphylococcus* was isolated from all salons that were included in our study, and its ratio was 55% from cosmetic tools. While the present of *Streptococcus* and *Enterococcus* sp were (18%, 8%) respectively. *Candida albicans* were about 19% from cosmetic tools. The interpretation this ratio for *Staphylococcus* sp, because of these bacteria are able to cause various diseases in humans such as skin abcess scaled-sk skin syndrome, and it is the most common identified agent that is responsible for skin and soft tissue infection (12). Similarly, Iqtedar and Aftab mentioned that many authors have reported the presence of *Staphylococcus* in unpreserved cosmetic tools after use (13).

Many fungal pathogens of humans such as *Candida albicans* are capable of growing as yeast cells or as filamentous hyphae. *Candida albicans* are the most common fungal pathogen of humans, and this microorganism can grow as both yeasts and filamentous forms in the host. The relative attributes of the yeast and filamentous forms of C. albicans during the colonization of skin and mucosae, and later in the invasion of the bloodstream and deep tissues (13). Many of the cosmetic tools contaminated by *Candida albicans* can generate many infections such as skin and eye diseases in the salon beauty, and infections can be transmitted among women due to sharing salon tools. *Candida albicans* have been reported in other personal toiletries studies. Candida plays an important role in the establishment of skin lesions, rash and dermatitis (3). Due to present of these pathogen, it concluded that current disinfection techniques that is used at salons, were inadequate in preventing health risks among customers.
CONCLUSION

This study has shown that microbial contamination and transmission of pathogens among customers in beauty salons caused by the use of unfavorable sterilization and disinfection procedures as well as poor knowledge. Therefore, it is suggested to avoid sharing public cosmetics in salons and keep the used cosmetics in dry, cool, and fastened packets. It is also necessary to promote the use of individual cosmetic kits in the beauty salons, intensify the hygiene inspections from the beauty salons, monitor behavior of the beauty salon workers, and implement continuous health education programs by the hygiene inspectors for the beauty salon workers.

Conflict of interest
No conflict of interest was declared by the authors.

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