



ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2016, 5, 9S:368-371

## Evaluation of Bacterial and fungal Contaminations in Barbershops in Kamyaran city, Iran-Summer 2015

Farzaneh Janmohammadi<sup>1\*</sup>, Ghodous Fathi<sup>1</sup>, Daem Roshani<sup>2</sup> and Kayvan Farahmandi<sup>3</sup>

<sup>1</sup>Health Center, Kurdistan University of Medical Sciences, Sanandaj, Iran

<sup>2</sup>Social Determinants of Health Research Center, Kurdistan University of Medical Sciences, Sanandaj, Iran

<sup>3</sup>MD-TUMS, Tehran University of Medical Sciences, Tehran, Iran

\*Corresponding Email: [mohammadif\\_58@yahoo.com](mailto:mohammadif_58@yahoo.com)

### ABSTRACT

Barbershops are considered as public places and can contribute to the transmission of many diseases. In this study, samples were obtained from a total of 18 barbershops in Kamyaran, Iran, to evaluate the type of bacterial and fungal contaminations. Sampling was carried out through sterile swab in both blood agar and Saborad Dextrose agar mediums. After identification of the bacteria through biochemical tests and determining their count, the relationship between type and amount of contaminations and several other factors were examined through statistical tests. A total of 6 bacterial species including *gr<sup>-</sup> Bacilli*, *gr<sup>+</sup> cocci*, *Micrococcus*, *Staphylococcus*, and *gr<sup>+</sup> Bacilli* and 7 fungi species including *Cladosporium*, *Trichophyton*, *Mucor*, *Aspergillus*, *Candida*, *Penicilium*, *Rhizopus* were isolated and identified. *Staphylococcus* with a frequency of 29.6% and *Aspergillus* fungi with a frequency of 26.5% were the most frequent bacterial and fungal colonies, respectively.

**Key words:** Barbershops, Bacterial Contaminations, Blood agar mediums, Disinfectant, personal tools.

### INTRODUCTION

Barbershops are classified as personal service agencies and can lead to transmission of many diseases [1]. Infection can be transmitted accidentally through blood during haircut and shaving in barbershops; therefore, those who work in barbershops play an important role in the spread or control of infections [2]. In recent decades, visits to barbershops have increased significantly due to increased income, peer pressure, emergence of different hair styles, and taking athletes and actor as role models [3]. Exposure to bacteria and fungi may be responsible for a large percentage of the cause of diseases such as rhinitis, asthma and pneumonia [4]. A large number of barbershop employees have symptoms of allergy [5]. The detrimental effects of fungi and bacteria in different locations sometimes lead to mortality and morbidity in patients [6]. Thus, if proper hygiene measures are not taken, barbershops may have a potential role in the transmission of diseases [2]. A large number of barbershops in Iran have no autoclave or oven, and 70% alcohol is the main disinfectant used. However, since most users are not aware of how to use these substances, provision of continuing trainings on this issue seems essential [7]. This study aimed to determine the level of bacterial contamination in barbershops in Kamyaran in 2015.

## MATERIALS AND METHODS

### Study Area

With an area of 1852 square kilometers, Kamyaran is located in southern Kordestan Province with coordinates of 46° 54' E 34° 47' N with an altitude of 1464 m. The city has a population of 105,895, of which, 47.5% are urban population, and 52.5% are rural population. In Kamyaran, there are 52 barbershops and 75 beauty salons.

### Sampling

In this study, a total of 28 samples were taken from the barbershops. Sampling locations were selected in such a way that it represents the entire city. In this regard, location of the barbershops in suburbs, downtown, and densely-populated centers, the type of disinfectants used in the barbershops and the method of using them, and the use of personal tools for costumers were considered to evaluate the relationships between these factors and the type and number of fungal and bacterial colonies in the barbershops. Sterile swab was used for sampling [8]. Swabs and culture mediums were sterilized in an autoclave at 15 psi pressure and a temperature of 121° C for 15 min. Bacterial samples were collected in blood agar medium and fungal samples in Saborad Dextrose agar [9]. Chloramphenicol was used in order to prevent fungal growth in the blood agar medium [9]. Samples were obtained from tools used in barbershops such as scissors, combs, and electric trimmers and then were taken immediately to the laboratory [1].

### Fungi and Bacteria Identification

Bacterial samples were kept for 72 hours in an incubator at 37°C. After purification of all colonies, samples were identified through differential tests. Fungal samples were kept at room temperature to appear colonies, samples were identified through viewing under the microscope.

### Data collection

The data were collected from of 28 barbershops in Kamyaran, Iran. After sampling and identification through differential tests, Information was collected and recorded on a spreadsheet (SPSS version 20). Data included used disinfectants and not use disinfectants, use and not use of personal tools, location of barbershops. T-test, ANOVA and Tukey's test were used for statistical analysis.

## RESULTS AND DISCUSSION

Figure 1 shows the frequency diagram of bacterial colonies. *Staphylococcus* had the highest frequency in the obtained samples with 29.6%. Other bacteria found included *gr<sup>+</sup> cocci* (27.8%), *Micrococcus* (5%), *gr<sup>-</sup> bacilli* (11%), *gr<sup>+</sup> positive* (6%), and *non-spore-forming gr<sup>+</sup> bacilli* (1.9%).

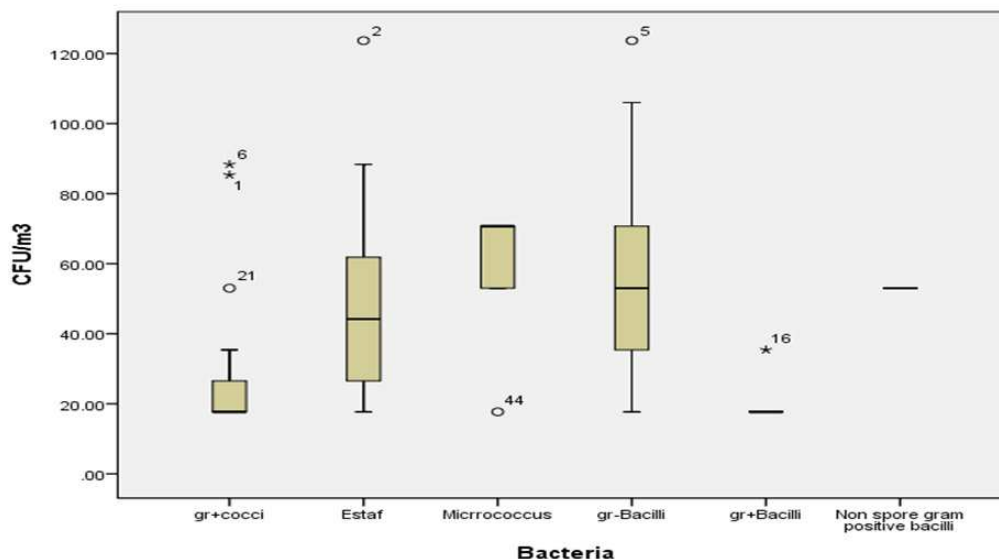


Figure 1. The frequency of bacterial colonies in barbershops in Kamyaran

Figure 2 shows the frequency diagram of fungal colonies. *Aspergillus* had the highest frequency in the obtained samples with 26.5% other fungus found included *Mucor* (20.4%), *Candida* (18.4%), *Penicillium* (18.4%), *Trichophyton* (4.1%), and *Cladosporium* (4.1%).

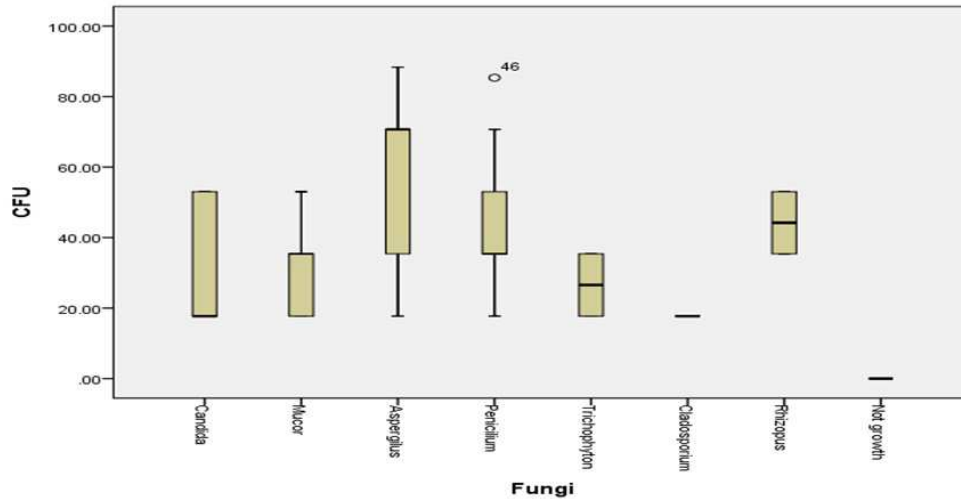


Figure 2. The frequency of fungal colonies in barbershops in Kamyaran

## DISCUSSION

In this study, a total of 6 bacterial species with a count of 2227.63 CFU/m<sup>3</sup> and 7 fungi species with a count of 2012.76 CFU/m<sup>3</sup> were isolated and identified from 28 barbershops in Kamyaran city. The identified bacterial colonies included *gr<sup>+</sup> cocci* (27.8%), *Micrococcus* (5%), *gr<sup>-</sup> Bacilli* (11%), *gr<sup>+</sup> bacilli* (6%), *non-spore-forming gr<sup>+</sup> Bacilli* (1.9%), and *Staphylococcus* (29.6%). Fungal species were identified respectively including *Aspergillus* (26.5%), *Cladosporium* (4.1%), *Trichophyton* (4.1%), *Mucor* (20.4%), *Candida* (18.4%), *Penicillium* (18.4%). The obtained results revealed that difference between the number of bacterial colonies in the barbershops that used disinfectants and the use of personal tools was significant, but about number of fungal colonies difference was not significant. Statistical analysis revealed a significant relationship between the number of bacterial colonies and the use of disinfectants, and the use of personal tools for clients; however, the relationship between the number of bacterial colonies and location of barbershops was not significant. Considering the significant relationship between the number of bacterial colonies and the use of disinfectants and the use of personal tool for clients. Alcohol which is used as disinfectant is supplied in the 90% concentration in the Iranian market, and to increase its disinfection effect, it must be diluted by the barbers to the 70% alcohol. The increased number of bacterial and fungal colonies in the barbershops that used this type of disinfectant may be attributed to the poor awareness of barbers about the methods of preparing and diluting it, as well as its extended use.

Barbershops located in the outskirts had lower quality facilities, equipment and tools, while the shops located in the central city areas had high level equipment. Barbershops located in crowded areas had more clients and observed the hygiene principles more carelessly. The relationship between bacterial contamination and hygiene levels and standards in shops has been proven in previous research. In the study by Yassin and Almouqatea [10], a significant direct relationship was found between the number of bacterial colonies and the hygiene levels of the shop, so that reduced level of hygiene significantly increased the number of fungal and bacterial colonies. Mbaj et al. [1] conducted a study on the college barbershops in Nigeria and isolated and identified two colonies of bacteria including *Staphylococcus aureus* and *Streptococcus* from the samples. In a study on the college barbershops in Nigeria, Enemor [2] isolated and identified five bacterial colonies. The colonies included *staphylococcus aureus*, *Streptococcus*, *Anterobacteria Enterococcus*, and *Staphylococcus epidermidis*.

## CONCLUSION

For reduce fungal and bacterial infections, it is recommended to plan continuous and suitable trainings for barbers regarding the use of disinfectants and encourage clients to use personal tools at barbershops.

**Acknowledgments**

We are very grateful to vice chancellor for research & technology, Kurdistan University of Medical Sciences and the respected health center staff (especially those who participated in our study) working in health center of Kamyaran city.

**REFERENCES**

- [1] Mbaj I Ch S, Obeagu E I, Ochei K. Evaluation of microbial contamination of tools used in hair dressing salons in Michael Okpara University of Agriculture Umudike Abia State. *Journal of Dental and Medical Sciences* 2014; 7(1): 22-27.
- [2] Seyed M A, and Mehdi A. Evaluation of knowledge and practice of hairdressers in women's beauty salons in Isfahan About Hepatitis B, Hepatitis C, and AIDS in 2010 and 2011. *International monthly journal in the field of hepatology*, 2011; 13(3):1-6.
- [3] Mohammad N, Shahin K, Raheb Gh, Mahnaz M, Batool K, Hossein H, Abbas D, Gholamreza I, Masoud B, Rahmane F, Saeed H, Soheila Gh, Mashallah K, Sakine S, Ali K, Jamile M. The Effects of Interventional Health Education on the Conditions of Hairdressing Salons and Hairdressers Behaviors. *Middle East J Rehabil Health* 2015; 2(1):1-6.
- [4] Zhiguo F, Chanjuan G, Zhiyun O. characteristic and concentration distribution of culturally airborne bacteria in residential environments in Beijing, China. *Aerosol and Air Quality Research* 2014; 14(3): 943-953.
- [5] Sukran K, Ayhan G, Melda T, and Lutfiye K. Occupational health risks of barbers and coiffeurs in Izmir. *Indian J Occ. Environ. Med.* 2009; 13(2): 92-96.
- [6] Zhenqiang Xu, Maosheny Y. Analysis of culturable bacterial and fungal aerosol diversity obtained using different samplers and culturing method. *Aerosol science and tech.* 2014; 45(9): 1143-1153.
- [7] M Sadeghi., A Charkazi , N Behnampour , A Zafarzadeh , S Garezgar , S Davoudinia , P Borgheie. Evaluation of infection control and disinfection used in barbershops and beauty salons in Gorgan. *Iranian journal of health and environment*, 2014; 7(4): 427-436.
- [8] Enemuor S C, Ojih M I, Isah S and Oguntibeju O. Evaluation of bacterial and fungal contamination in hairdressing and beauty salons. *African Journal of Microbiology Research* 2013; 7(14): 1222-1225.
- [9] Yassin M F, Almouqatea S. Assessment of airborne bacteria and fungi in an indoor and outdoor environment. *International Journal of Environ Sci. Tech.* 2010; 7(3): 535-544.
- [10] Shiaka G P & Yakubu S E. Comparative Analysis of Airborne Microbial Concentrations in the Indoor Environment of Two Selected Clinical Laboratories. *Journal of Pharmacy and Biological Sciences*, 2013; 8(4): 13-19.