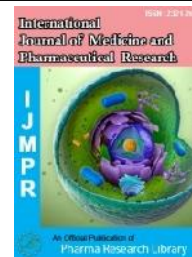




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## RESEARCH ARTICLE

### A Study on Identification of Bacterial Contamination in the Headphones among Students Using Mobile Phones

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#### ABSTRACT

This study was conducted to assess the bacterial contamination on mobile phone headsets among students. Mobile phone headsets were sampled by mean of sterile cotton swabs moistened in sterile normal saline. The swabs were cultured on nutrient agar to determine the bacteria through pour plate method. The isolated bacterial were identified by colony morphology, Gram stain and biochemical test. Among 50 voluntary of both male and female high bacterial load was observed in male volunteers (20 ears) compared to male (10 ears) and also both gram positive and negative bacteria was isolated. Due to high usage and sharing of headphones the bacterial load was high among males when compared to females. It is advised to maintain headphones clean and not to share.

**Keywords:** bacterial contamination, biochemical test, Gram stain

#### ARTICLE INFO

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### 1. Introduction

Mobile phones are portable electronic devices used for personal telecommunications over long distance. The use of ear phones is very common now days for easy handling. Ear phones are also a source of bacterial diseases which forms microbial biofilms like airline. The ear phones are easy route for potential pathogens and frequent use of earphones leads to infection in ear and triggers hearing

problem [1]. Usages of cell phones especially smart phones are increasing due to its affordable price, technical advantages like operating internet, email and apps. Cell phones are now used very common places like kitchen, dining, gym, and restaurant and even in bathroom (Fig 1). Due to heat generated by cell phones the bacteria are harbouring on the device at a rapid levels. Since cell phones

are used in direct contact with the face, mouth, ears and hands the direct risk of infection is very high [2]. The ear canal is a self-cleansing one where the cerumen coat migrates laterally and sloughs externally. Headphones and headsets leads to common infection and the most common organism isolated were *Staphylococci soecies* [3].

During every call the mobile phone and headsets come into close contact with human body. Hence it acts as a perfect habitat for microbes to breed in high temperature and humid conditions. It serves as a place of microorganisms that can transform easily from mobile phones to other areas. Microbial contamination is most commonly found on the mouthpiece and earpiece. So the risk of bacterial infection are high [4]. The present study is carried out to assess the bacterial contamination in the earphones among the frequent users.



Figure 1: Ear phone

## 2. Materials and Methods

The study was conducted among Sree Narayana guru college students of 50 volunteers of both male and female in the age group of 18-23. The group was categorized into subgroups A (25 Male) and B (25Female). The group people involve listening music with earphones were selected. Study involves the students who use mobile headphones were randomly selected. Sterile cotton swabs moistened in sterile normal saline were used to swab the headphones. The swabs are then inoculated in nutrient broth. Then the bacterial load was carried out by pour plate method follows the procedure [5]. Gram staining was done

to detect the gram positive and negative bacteria [6] and biochemical test was carried out to detect the organism [7].

## 3. Results and Discussion

The bacterial load observed among students was depicted in table 1. Bacterial load was high in male volunteers when compared to female volunteers. The percentage was high among males. Group of 50 volunteers of male 25 and female 25 was involved in the study. The percentage of load was depicted. In supporting to this a study conducted among college students to detect bacterial load in ear and earphones. The results reveal the high percentage was found in ear than ear phones of people who use earphones very frequently [1]. The staining results were showed in table 2. Which reveals gram positive bacteria was high in male volunteers with compared to female ones. Also fewer amounts of gram negative bacteria were present in both subgroups.

Table 1: The bacterial load in Group A and B (Headphones)

Headphone	Group (50)	
	A (25)	B (25)
	20 (80%)	10 (40%)

Table 2: Screening of organism

Organism	Group	
	A	B
Gram Positive	12	8
Gram Negative	7	4

Study conducted in West Indies among medical staff and students. 40% among 266 volunteers showed positive culture for bacterial growth. Whereas gram negative bacteria isolated was 2 (18.2%) [8,9]. Bacterial identification reveals *S. aureus* in gram positive samples and Enterobacteriaceae in gram negative samples. The follow table reveals the biochemical test (Table 3,4). Study conducted by Liaqat I (2015) showed catalase, citrate positive in samples collected from head phones for the characterization of biofilm [10]. Similar findings were observed in study conducted by Ekkrakene in nigeriia it shows *Klebsiella pneumonia* is the only gram negative organism in headphones.

Table 3: Screening of gram positive organism

Sample	Catalase	Coagulase	Ferment Glucose	Mannitol	Sucrose	Lactose	Organism
Headphone Isolates of gram positive organism	+	+	+	+	+	+	<i>S. aureus</i>

Table 4: Screening of gram negative organism

Sample	Indole	Urease	Citrate	Motility	Organism
Headphone Isolates of gram negative organism	-	-	-	-	Enterobacteria

#### 4. Conclusion

Potential pathogenic gram positive and gram negative bacteria were found in samples isolated from headphones. Routine hygiene practice such as cleaning the earphones, reducing the usage and stop sharing of earphones are recommended to avoid the contamination and spreading of pathogens.

#### 5. References

- [1] C Mukhopadhyay, S Basak, S Gupta, K Chawla, & I Bairy. A comparative analysis of bacterial growth with earphones use. *Journal of Health and Allied Science*, 2008, 7(2): 1-4.
- [2] S Abbinay, and P Bharathi. Mobile Phones in Hospital Settings: A serious Threat to Infection Control Practices. *Occupational Health and Safety*, 2012, *Journal of Dental Education*, 2012, 74: 115-118.
- [3] D Stroman, P Roland, J Dohar, and W Burt. Microbiology of Normal External Auditory Canal. *Laryngoscope*, 2001, 111:2054-9.
- [4] YJ Lee, CG Yoo, CT Lee, HS Chung, YW Kim, SK Han, and JJ Yim. Contamination rates between smart cell phones and nonsmart cell phones of healthcare workers. *Journal of Hospital Medicine*, 2013, 5:1254-1259.
- [5] J Reynolds. Working dilution problem. Fall ; Richland College. *Biology*, 2011, 2421.
- [6] T Ekraene, and C Igeleke. Micro-organisms Associated with public mobile phones along Benin-sapele Express way, Benin city, Edo State of Nigeria. *Journal of Applied Science and Research*, 2009, 3(8).
- [7] EW Koneman, SD Allen, WM Janda, PC Schreckenberger, WC Winn. *Color Atlas and Textbook of Diagnostic Microbiology*. 5th ed. Lippincott, NY; 1997.
- [8] J Ramesh, AO Carter, MH Campbell, N Gibbons, C Powlett, H Moseley, D Levis, and T Carter. Use of mobile phones by medical staff at Queen Elizabeth Hospital Barbados: evidence for both benefit and harm. *Journal of Hospital Infection*. 2008, 70: 160-165.
- [9] C Mukhopadhyay, S Basak, S Gupta, K Chawla, I Bairy. A comparative analysis of bacterial growth with earphone use. *Online Journal of Health Allied Science* 2008, 7(2):4.
- [10] I Liaqat, A Tariq, A Jamil, and S Amin. Isolation and characterization of biofilm formation of microbes from Children nails, ear, earphones and feeding bottles. *Biologia (Pakistan)*, 2015, 61 (1): 55-62.