

Incidence of Bacterial Flora Associated with Earphones used Among Students of Saveetha Medical College and Hospital, Chennai, Tamilnadu

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Abstract:- The bacterial growth associated with earphones used among students of Saveetha Medical College and Hospital, Chennai was investigated. A total 60 earphone users were randomly selected. Swabs were taken from the ear canal and samples were analyzed using standard microbiological methods. The bacteria isolated from the ear swabs include; Pseudomonas and Staphylococcus aureus. The distribution of bacterial isolates includes; Pseudomonas (21.5%), Staphylococcus (15.1%), and no organism isolated (63.4%). The earphone users were categorized under four categories depending upon the duration of daily usage of earphones; 0-15 minutes (Group A), 30-45 minutes (Group B), 1-2 hours (Group C), more than 2 hours (Group D). By comparing the occurrence values of the isolates between the four categories, of earphone users, the study concluded that bacterial growth does increase with frequent and continuous use of earphones. The significantly higher occurrence values of isolates in Group D when compared to the other groups are indicative of a person relationship between bacterial frequency and duration of use of earphones. Therefore, regular cleaning of earphones with disinfectants before and after each usage is recommended to help reduce the bacterial load of earphones and to help prevent the incidence of otitis media and other ear infections amongst the earphone users (1).

I. INTRODUCTION

Everywhere we go, we see people carrying a phone and along with it, a set of earphones. Unfortunately, people who constantly use them are unaware of its consequences. Studies have shown that the continuous use of earphones causes damage to the ear canal which can result in ear pain and hearing loss (2). The common commensals that reside in the ear are species of Staphylococcus aureus and Pseudomonas (3).

However, frequent use of these earphones significantly increases the bacterial flora in the ear. This is because when earphones are used constantly, they increase the temperature and humidity of the ear canal. This becomes an ideal environment for the bacteria to grow.

In addition, sharing earphones with others can spread bacteria from one person to the other. Furthermore, some earphones are covered with rubber or soft sponges which accumulate a number of microbes. So when they are used, these microbes enter the ear canal (4). In this study, the relationship between bacterial growth and the duration of usage of earphones will be evaluated.

II. AIM

To find out the incidence of bacterial flora in the ear canal of students using earphones and to create awareness amongst the students.

III. OBJECTIVES

- To educate about ear hygiene to all the students who use earphones for prolonged duration.
- To determine the most common organism found in the bacterial flora of those frequently using earphones.

IV. METHODOLOGY AND RESEARCH DESIGN

❖ *Design:*

Prospective, Comparative study

❖ *Sample Size:*

A total of 60 samples were taken for the study.

❖ *Data Collection Procedure:*

1. All the students who use earphones were included in the study after appraising them about the contents of the study and obtaining written consent.

2. Information was collected by the principle investigator through a validated questionnaire. The questionnaire gave details about;

- How long of a duration does one use earphones in a day?
- What type (plastic, rubber cap) of earphone is used?
- What preference (earphones, over headphones, loud speaker) does one have when it comes to listening to music?

- Does one experience any symptoms (such as ear pain, difficulty in hearing, ear obstruction) due to usage of earphones?
- 3. Next, a swab was taken from the ear canal, from either side of the participants to find out the most common bacterial organism.
- 4. The collected ear swabs were then sent to the Microbiology department for further analysis through culture and sensitivity procedures.
- 5. Once the data was collected, it was entered into an Excel sheet for statistical analysis. The entire data during the period of the study was secured under lock and key in a password protected laptop.
- 6. The data was analyzed using statistical software, SPSS Version 21, for significance.

V. RESULTS AND DISCUSSION

The comparative study carried out on bacteria associated with earphones among students in Saveetha Medical College and Hospital gave the following results:

- The earphone users were categorized under four categories depending upon the duration of daily usage of earphones; 0-15 minutes (Group A), 30-45 minutes (Group B), 1-2 hours (Group C), more than 2 hours (Group D). As shown in Figure 1, amongst the 60 students who were a part of the study, 27% belong to Group D (use earphones for more than two hours per day).
- During the course of the study, it was discovered that 48% of the students prefer listening to music using earphones as shown in Figure 2. Out of the remaining percentage of students, 15% prefer using over headphones and 37% prefer listening to music using a loud speaker.
- Figure 3 shows the percentage of earphone users having the following symptoms; ear pain, difficulty in hearing, ear obstruction, ear itching. The symptom of highest occurrence was ear pain which was seen in 17% of the students.
- Amongst the bacterial isolates, Pseudomonas had the highest occurrence followed by Staphylococcus aureus as represented in Figure 4. Pseudomonas was the most predominant organism detected in 13 out of 60 samples with a percentage occurrence of 21.5%. And Staphylococcus aureus was detected in 9 out of 60 samples with a percentage occurrence of 15.1%. Staphylococcus aureus and Pseudomonas are the most common bacteria isolated from the ear canal of healthy people; however they can become pathogenic if the conditions become congenial (5).
- The relationship between the incidence of bacterial flora and duration of usage of earphones is shown in Figure 5.

According to the bar graph, those belonging to Group A, have a higher percentage occurrence for no organism (13.3%) being isolated from the swab and lower occurrence for Pseudomonas (1.66%) and Staphylococcus (3.33%). Whereas Group D, has a higher percentage of occurrence for Pseudomonas (15%) followed by Staphylococcus (8.3%) and a lower occurrence for no organism (3.33%) isolated from the swab.

VI. POSSIBLE RISKS TO THE PARTICIPANT

There were no potential risks involved in this study.

VII. BENEFITS OF THE STUDY

The study will enhance awareness and education amongst students about earphone usage and its associated complications when they are used for prolonged durations.

VIII. OUTCOME

Bacterial transfer does increase with frequent and continuous use of earphones. In this study, the most common bacterial organism found was Pseudomonas followed by Staphylococcus. The incidence of bacterial flora is high when people tend to share earphones or do not clean them on a regular basis. This may increase ear infections and otitis media as well, especially if there is any abrasion in the external ear (1). In conclusion, frequent and constant use of earphones increases the bacterial growth in the ear (5).

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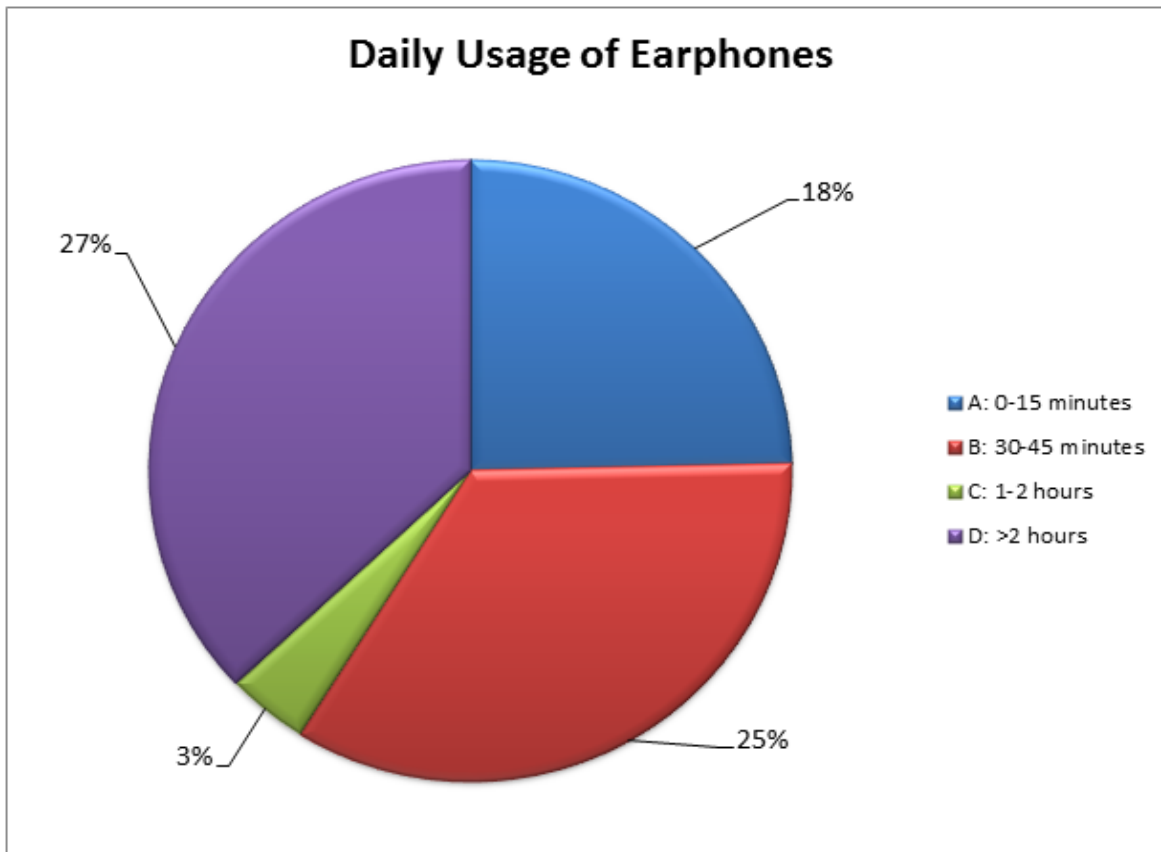


Fig 1:

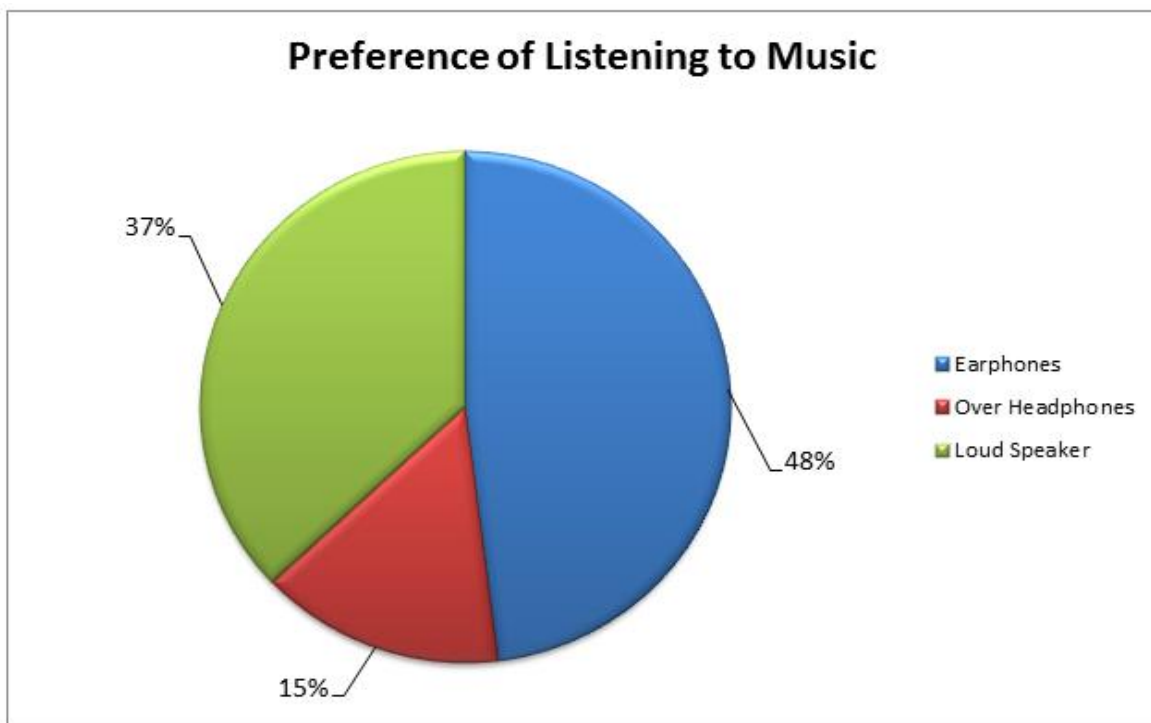


Fig 2:

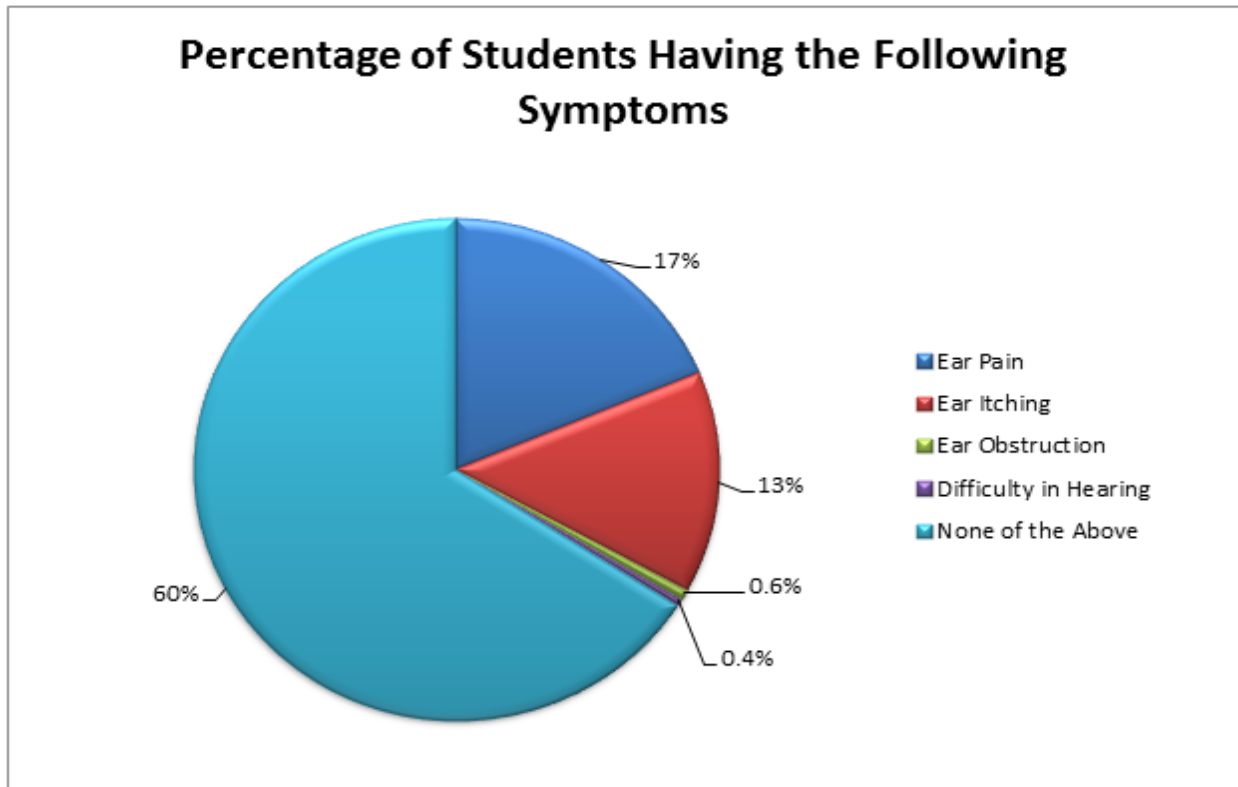


Fig 3:

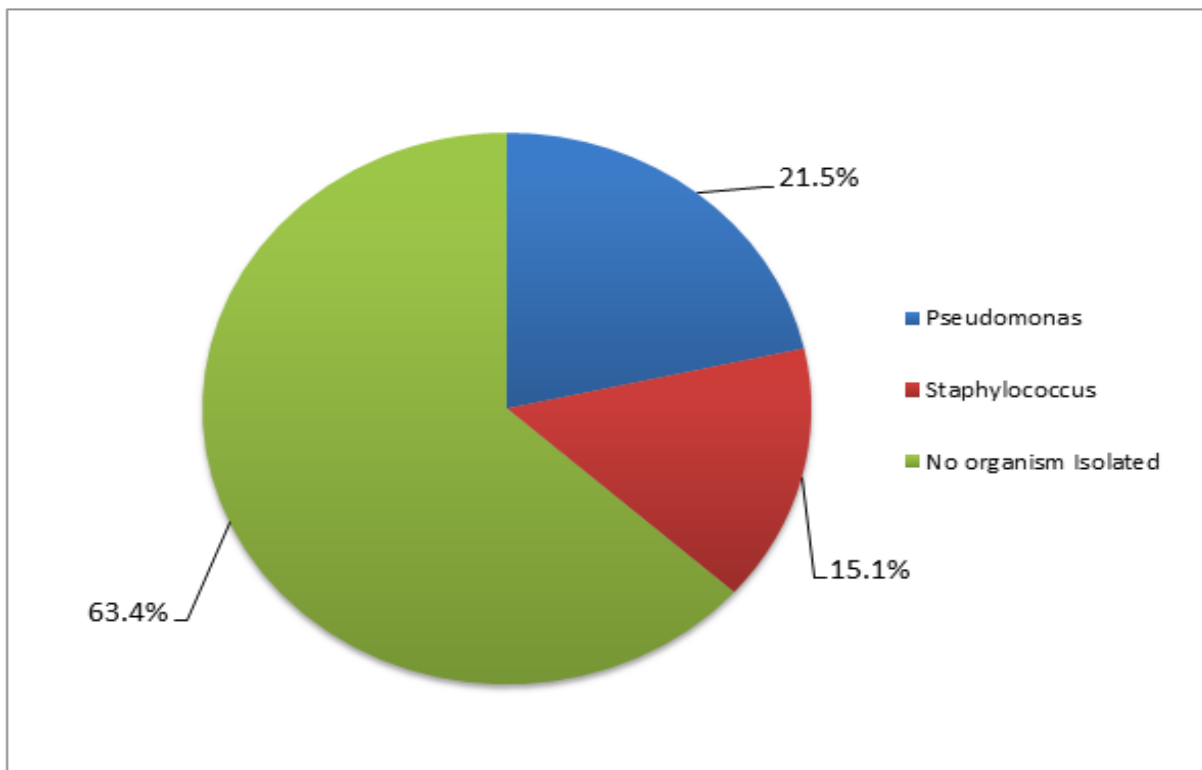


Fig 4:- Percentage of Occurrence of Bacteria Isolated From Ear Swabs

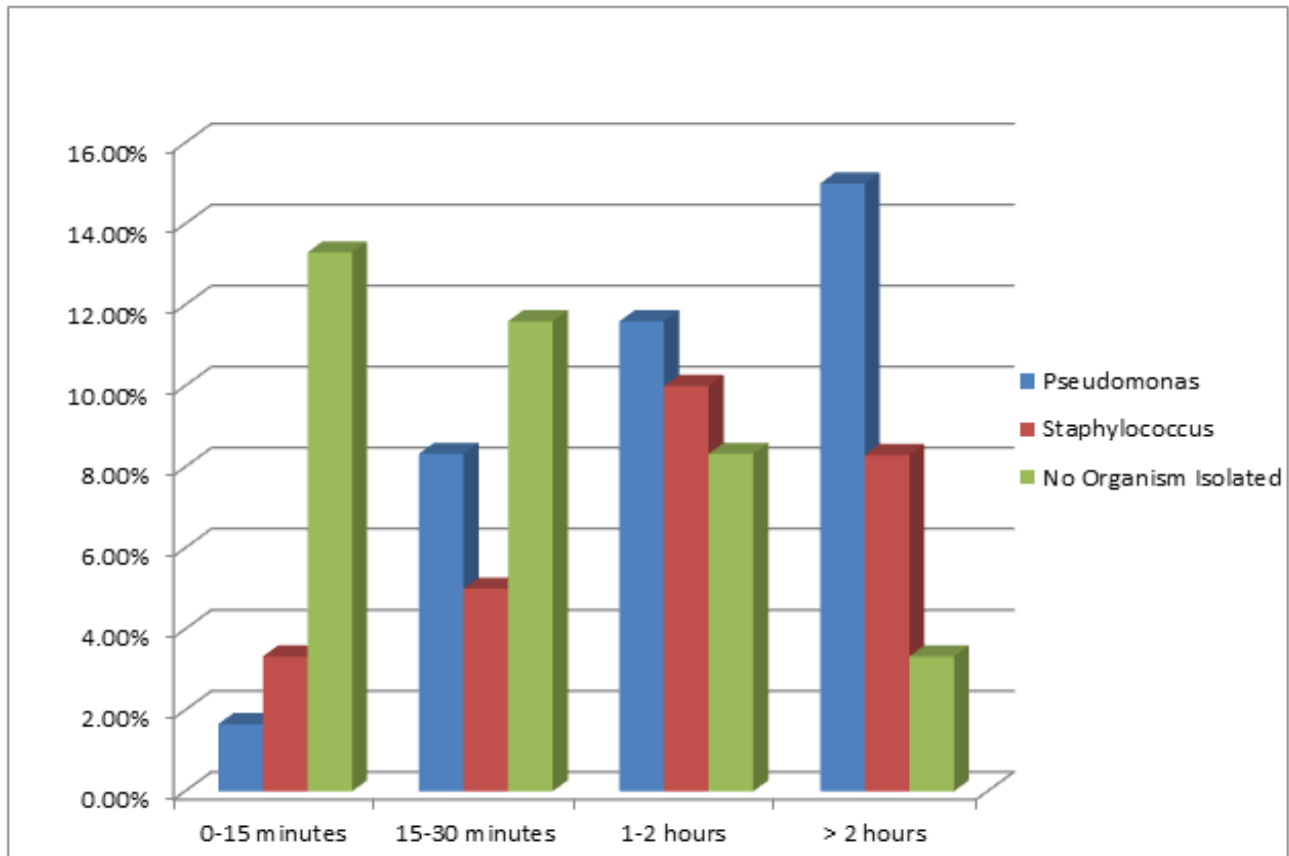


Fig 5:- Relationship between Incidence of Bacterial Flora and Duration of Earphones