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HEARING LOSS IN HEADPHONE USERS OF YOUNGER AGE GROUP: A RANDOMIZED TRIAL OF 500 STUDENTS

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ABSTRACT

Introduction: Approximately, 20-30 million people between the age group of 20 and 69 years have high frequency hearing loss due to chronic exposure to loud noise above 90 decibels (dB) which is mainly due to the advent of MP3 players and cell phones, according to the National Institute of Deafness. Studies have shown that most MP3 players today can produce sounds up to 120 dB and that long-term cell phone use to hear music may cause damage in the inner ear. Hence, this study was conducted to create awareness regarding prolonged exposure to loud noise either through an MP3 player or cell phone music. **Results and Observations:** The study revealed high frequency hearing loss in 8% of Group A and 2% in Group B; whereas, in there were no hearing impairment in Groups C and D indicating a significant role of prolonged ear phone music as a cause of high frequency hearing loss in students. The thin percentage and absence of hearing loss in Groups B, C, and D suggests the impact of the duration of exposure also has a role in the pathology. **Conclusion:** This study proves that the prolonged usage of loud ear phone music is harmful to the ears and hearing to ear phone music might cause hearing loss.

INTRODUCTION

Music has always been an effective way to pass time throughout the ages.. In the 1990s and early 21 st century, MP3 players were an effective means to pocket music, but due to affordability issues only 20-30% of student population was used to it. But with the advent of cell phones, almost all the students have an easy means to access music since almost all the phones are capable of playing music these days. With the massive spread in the popularity of portable MP3 players and cell phone music, exposure to high sound levels has increased dramatically, and millions of adolescents and young adults are potentially at risk of permanent hearing loss through listening to their favorite music. [2] Music-induced hearing loss may be evolving into a significant social and public health problem. Increasing numbers of adolescents and young adults already show related symptoms, such as distortion, tinnitus, hyperacusis, or threshold shifts. Although studies investigating the hazardous effects of headphone listening have yielded equivocal results, the output levels from the headphones of commercially available portable music players or even cell phones are high enough to cause music-induced hearing loss when the phones are used at high volumes for long periods. Because they are equipped with improved headphones, sound-leakage is minimal, allowing them to be used at high volume levels in most environments without disturbing others. Especially in noisy environments, listeners often choose high volumes. As a result, they create the conditions for higher sound levels and longer exposure times, both of which are known to increase the risk of hearing damage. MP3 players and cell phone music thus may be the most important risk factor for music-induced hearing loss in young people. To prevent such music-induced hearing loss, adolescents using MP3 players and cell phone music should take precautionary measures or external measures, such as introduction of legal sound limits, should be considered. Either way, useful inputs on possible prevention strategies and interventions would be provided if modifiable determinants of behavior related to sound exposure were explored. [3] Because of the absence of studies on the behavioral determinants of hearing conservation in adolescents, we conducted focus group interviews with adolescents to explore their behaviors and opinions about exposure to loud music from MP3 players and cell phones.

MATERIALS AND METHODS

A total of 500 students from Muzaffarnagar Medical College and Nursing College were chosen as part of the study in between July 16 to Feb 17. Group A comprising 125 students who had a habit of listening to music through headphones at least 2 hours a day, Group B comprising 125 students who are used to headphone music less than 1 h per day and Group C comprising of 125 students who very occasionally use headphones, but hear music mostly through speakers and Group D comprising of 125 students who are usually unaware of headphone music and are not used to it. The persons who had a history of decreased hearing from any other cause like discharging ears or trauma were excluded from the study. Informed consent was taken from all the 500 students about the nature of the study and the investigation they were to undergo. All the groups were subjected to pure tone audiometry at the Ear, Nose, and Throat (ENT) and Head and Neck Surgery (HNS) Department of Muzaffarnagar Medical College and the audiogram obtained. Group A persons were advised to refrain from further use of headphone music after the first audiometry. Repeat audiometry was done for all the four groups after a period of 6 months and the results noted.

OBSERVATION AND RESULTS

Pure tone audiometry of all the students revealed that 16% (20 students) of Group A had high frequency sensorineural hearing loss (4 students had a hearing loss of 10-20 dB and 16 students had a loss of 20-30 dB). Group B showed high frequency hearing loss in 4% (5 students, that is, 4 having loss of 10-20 dB and 1 having 20-30 dB). Groups C and D showed no abnormal changes in audiometry.

After 6 months the repeat audiometry results showed a drastic decrease in the number of students showing hearing loss. Group A had a significant reduction in the positive result, that is, out of 20 students who had high frequency hearing loss in Group A, the repeat audiometry revealed only 8 to be persisting within the loss that too of only 10-20 dB. So there was a substantial decrease in the number and the amount of hearing loss after the period of abstinence from headphone music. Also Group B who had 5 persons suffering from hearing loss in the first instance showed only 1 person persisting with the loss after 6 months that too in the 10-20 dB category.

This study clearly reveals the harmful effects of prolonged ear phone music usage by showing the significant number of persons having high frequency hearing loss. Also this study stresses that the changes occurred are temporary and are reversible if intervened at the right time.

DISCUSSION

The pervasive MP3 music player or the more common cell phone music has become one of the most common devices for listening to music for both adults and teens. It is very common practice among students to put on their headphone and listen to music whenever they get time and also the ease of availability of music in all the cell phones has made the usage more rampant. The private and continual blaring of music through ear buds is seductive to so many because it creates a personal buffer that drowns out the outside world and relieves stress by bringing beats so close one can feel the vibrations. This intense, intimate merger with music, however, can be fatal to hair cells in the ears and lead to hearing loss. The risk is most prevalent among teens, according to Colorado University audiologists whose research determined that not only do teens blast music louder than the average adult but that they are mostly oblivious to how excessive their volume is. [4]

Many MP3 and cell phone music hearing loss candidates often dial the volume up to the maximum level as a normal routine. Researchers warn however that just 5 min of listening at the highest volume on a daily basis is enough to erode hearing over time. Once hair cells are killed by hearing loss and music use, they will skew the sound signals being sent from the ears to the brain. At that point, the brain may not be able to decipher sounds at normal pitches.

Some listeners can suffer loss after one-time exposure to loud music in a concert, particularly if they have sat close to speakers. Generally, such individuals will notice tinnitus, or ear ringing, the day after; such ringing is a warning sign. Usually this is not the case in MP3 or cell phone music usage, the changes that occur are gradual and the warning signs like tinnitus are less and so the usual findings of hearing loss are detected late. Also, the losses from infrequent exposure to loud music are mostly temporary; whereas, in prolonged usage of MP3 or cell phone music the changes that occur are usually long standing unlike this study.

This study stresses the importance of awareness regarding prolonged usage of ear phone music by demonstrating the significant number of persons affected by ear phone music and also the remission in the findings following abstinence from usage of ear phone music.

In a study carried out among college students in New York, nearly one-third of the users of personal music players exceeded permissible exposure levels, and many of them exceeded them drastically. In a later study, the listening habits of 5% of users exceeded those levels, which would lead to hearing damage in the case of long-term use. In the light of current guidelines, which are even more stringent, 10% of the users covered by this study would have exceeded permissible levels. In 1995, a study concluded that 5% of the young people they tested could have a permanent hearing loss of 20 dB after 5 years of use of personal music players. Restricting the maximum output level of personal music players to 90 dB would therefore limit the risk of hearing loss. [5]

Even though most of the students are aware of the fact that loud noise is dangerous to the ears, they tend to underestimate the significance of the exposure through a MP3 player or a cell phone music usage. A plausible explanation for this underestimation might lie in the gradual development of hearing loss and because most people with mild high-frequency hearing loss are unaware of their impairment. Indeed, participants who had experienced tinnitus did not consider this as a warning that their hearing was susceptible to damage from loud music, because the tinnitus later disappeared without leaving any noticeable damage. Furthermore, adolescents showed no true understanding of how to determine which volume was too loud; although volumes near 90 dB are assumed to be dangerous, only those of approximately 120-140 dB are experienced as unpleasant and painful. The danger of hearing loss is thus easily underestimated.

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