Original Research Paper

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EARPHONE USAGE AND ITS IMPLICATION ON HEARING DUE TO AMPLIFIED SOUND EXPOSURE AMONG COLLEGE STUDENTS: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL IN MANDYA.

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ABSTRACT **Background:**Prolonged earphone use at high listening volumes has become increasingly common among young adults and may predispose them to noise-induced hearing loss (NIHL). This study aimed to assess the clinic audiological profile of prolonged earphone users and its association with sensorineural hearing loss among college students.**Objective:** To assess earphone usage patterns and evaluate the association between amplified music exposure, listening habits, and hearing thresholds among college students in Mandya.**Methods:**A cross-sectional study was conducted among 77 college students over three months. Earphone usage patterns were assessed using a structured questionnaire, and hearing thresholds were evaluated by Pure Tone Audiometry (125–8000 Hz). Data were analyzed using descriptive statistics and the chi-square test, with $p < 0.05$ considered statistically significant.**Conclusion:**Bilateral sensorineural hearing loss was the most common finding and was significantly associated with listening to amplified music for more than 2 hours daily and for over 2 years.

KEYWORDS : Earphone usage, Noise-induced hearing loss (NIHL), Sensorineural hearing loss, Pure tone audiometry, Amplified music exposure, College students.

INTRODUCTION

The increasing use of headphones and earphones for listening to music, watching videos, and gaming has raised concerns about their impact on hearing health, particularly among young adults. Prolonged exposure to high-volume sound can lead to noise-induced hearing loss (NIHL), tinnitus, dizziness, and ear infections, irrespective of occupational noise exposure. NIHL is a preventable condition caused by cumulative recreational noise exposure and typically presents as a notch at 3, 4, or 6 kHz on pure-tone audiometry (PTA), the standard method for assessing hearing thresholds. This study was undertaken to evaluate the clinic audiological profile of prolonged earphone users and its association with sensorineural hearing loss among college students at a tertiary care hospital in Mandya.

METHODOLOGY:

Study Design: Cross-sectional Study

Study Period: 3-month period from April 2025 to July 2025

Study Population: College students aged 18-25 with a habit of regular earphone usage in Mandya Institute of Medical Sciences, Mandya.

Sample Size: [5]

According to a previous study, the following sample size is calculated.

$n=Z2*P*(1-P)/d2$

Where:

- n = required sample size
- Z = standard normal deviate at 95% confidence interval = 1.96 P = prevalence of pressure injury= 83.4%
- d = absolute precision or margin of error =8% (0.08) n= (1.96)2*83.4*16.6/(8.34)2
- Rounded off to 77.
- n= 77

Sampling Method: Purposive sampling.

All participants whose case details meet the inclusion criteria during the study period will be included until the sample size is achieved.

Inclusion Criteria:

1. College students aged 18-25 years with a habit of regular earphone usage, Mandya Institute of Medical Science, Mandya.
2. Participants willing to give informed written consent to participate in the study. (>18 years)

Exclusion Criteria:

1. Participants with prior history of any hearing problem
2. Participants with family history of hearing loss.
3. Participants with history of chronic use of ototoxic medications.

METHOD OF DATA COLLECTION:

After Institutional Ethics Committee approval and informed consent, 77 medical students aged 18–25 years were enrolled. Data on earphone usage patterns, listening habits, and hearing-related symptoms were collected using a structured questionnaire. All participants underwent otoscopic examination and Pure Tone Audiometry (125–8000 Hz) to assess hearing thresholds and identify noise-induced hearing loss. Findings were recorded in a standardized case proforma.

Analysis:

Data were entered into Microsoft Excel and analyzed using SPSS version 2023. Descriptive statistics and the chi-square test were used for analysis, with $p < 0.05$ considered statistically significant at a 95% confidence interval.

RESULTS

Among the 77 participants, 30 (39.0%) had hearing loss, while 47 (61.0%) had normal hearing. Although hearing loss was more common among students who frequently used earphones (39.3%), the association was not statistically significant ($p = 0.333$). Similarly, the type of listening device used (earphones, headphones, or speakers) did not show a significant association with hearing loss ($p = 0.727$).

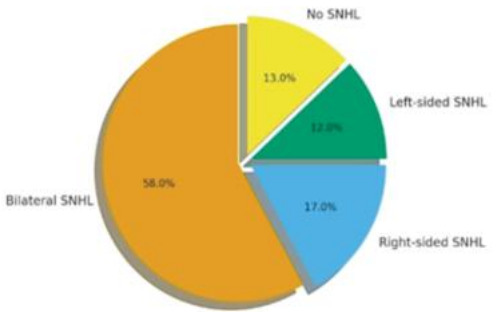
Participants who listened to amplified music for more than 2 hours per day had a significantly higher prevalence of hearing loss (68.1%) compared with those listening for less than 2 hours per day (17.0%), and this association was highly statistically significant ($p < 0.001$). Although hearing loss was observed more frequently among participants who preferred rock music (51.2%) than classical or other genres (33.3% each), the type of music was not significantly associated with hearing loss ($p = 0.200$).

These findings suggest that the duration of daily music exposure, rather than the frequency of earphone use, type of listening device, or music genre, is the major factor associated with hearing loss in this study.

	HEARING LOSS		
	PRESENT	ABSENT	p VALUE
Do you have a habit of frequently using earphones to listen to music?			
Yes	25(39.3%)	61(60.7%)	0.333
No	5(54.5%)	4(45.5%)	
Which device you prefer to listen to music?			
Earphone	25(42.7%)	55(57.3%)	0.727
Headphone	3(30.0%)	7(70.6%)	
Speakers	3(37.5%)	5(62.5%)	

On average, how many hours you usually listen to?			
Over 2 hours per day	22(68.1%)	8(31.9%)	<0.001
Less than 2 hours per day	8(17%)	61(83.0%)	
What type of music you normally listen to?			
Rock	17(51.2%)	1(48.8%)	0.200
Classical	9(33.3%)	18(66.7%)	
Others	5(33.3%)	33(66.7%)	

Distribution of Sensorineural Hearing Loss Among Exposed Participants



Summary of Key Findings

- Among the 77 participants, 39.0% were found to have hearing loss.
- Listening to amplified music for more than 2 hours per day was significantly associated with hearing loss ($p < 0.001$).

The frequency of earphone use and the type of listening device were not significantly associated with hearing loss.

Although rock music listeners had a higher prevalence of hearing loss, the type of music was not significantly associated with hearing loss.

Overall, prolonged daily exposure to amplified music emerged as the primary risk factor for hearing loss among the study participants.

DISCUSSION:

In our cross-sectional study conducted among 77 participants aged 18–25 years, we observed a statistically significant association between the duration of music exposure and the occurrence of hearing loss (p-value < 0.001). Among these participants, 48 individuals reported listening to music for more than 2 hours per day. Out of these 48, 31 participants (65%) developed sensorineural hearing loss, indicating a strong correlation between prolonged music exposure and auditory damage.

However, other characteristics related to music exposure—such as the type of earphones used, preferred volume level, and listening environment—did not show a statistically significant association with hearing loss. These results suggest that the duration of daily exposure plays a more critical role than other factors in determining the risk of developing hearing loss due to recreational music listening habits.

CONCLUSION

A significant proportion of participants exhibited bilateral hearing loss, with sensorineural hearing loss being the most common type associated with prolonged exposure to amplified music. Regular listening to amplified music for more than 2 hours per day and for a duration exceeding 2 years was found to be significantly associated with hearing loss.

Source of Support: Nil
Conflict of Interest: Nil
Benefits: The findings of this study will help the patients in the future.
Risks: Nil

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