ORIGINAL ARTICLE

The Effect of Chronic Use of Earphones on Hearing Threshold among Saudi Adult Population

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Abstract

Background: People frequently wear headphones to improve their concentration. However, little is known about the effects of wearing headphones on the ears and the possible health hazards of extended use. **Aim of Study:** The purpose of this study was to evaluate the frequency and usage patterns of earphones and look into the connection between earphone use and hearing issues. **Materials and Methods:** One hundred and eighty-four adult Saudi populations participated in a cross-sectional study. To assess hearing issues, it contained a questionnaire to measure earphone listening habits. The questionnaire asked about ear-related issues and the frequency with which they utilized hearing aids. **Results:** About 95.6% of participants used headphones or earbuds, according to headphone usage habits. Half of the population has been wearing headphones for more than 4 years, and at home. Over half of the individuals had some kind of ear-related problem. **Conclusion:** Long-term headphone use has been found to be associated with hearing impairment, highlighting the significance of encouraging safe listening practices. Implementing educational initiatives is vital for changing young people's perceptions of earphones and increasing their awareness of how to use them properly.

Key words: Earphones, hearing problems, questionnaire, Saudi population, tinnitus

INTRODUCTION

Noise-induced hearing loss has been connected to the extensive use of personal audio devices, such as headphones and earbuds, at loud volumes. According to studies, sounds higher than 85 dB, which are easily attainable with a variety of personal listening devices, can harm the inner ear permanently. For those who frequently use headphones for extended periods of time, whether for socializing, learning, or pleasure, this is a significant problem. There are numerous varieties of earbuds, such as Bluetooth or wireless earphones and corded earphones. However, the majority of people who use earbuds are ignorant of the possible risks. The impact of earphones on hearing can be influenced by a number of factors, including the type of earphone used, the time of exposure, and the sound level.[1] The inner ear's spiral-shaped cochlea

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Received: 18-11-2025
Revised: 23-12-2025
Accepted: 29-12-2025

is in charge of converting sound waves into nerve impulses that the brain can understand. Hair cells in the cochlea are especially sensitive to loud noises.[2] These hair cells can be harmed or destroyed by prolonged exposure to noise levels above 85 dB, which can cause hearing loss at high frequencies, usually between 3 and 8 kHz. A muted hearing experience or difficulty understanding speech in noisy environments is common early sign of hearing loss. People might therefore put off getting medical help until more severe harm has been done.

The World Health Organization believes that over 1 billion young people worldwide are at danger of hearing loss due to unsafe high-volume listening habits. To filter out outside noise, users of personalized listening devices often turn up the volume to dangerously high levels in noisy environments like crowded areas or public transportation.[3] About 90% of people in developed nations like the United States use cell phones and headphones, and the Kingdom of Saudi Arabia is no exception. Many headphone users are still unaware of the dangers of prolonged exposure to loud audio levels, despite the fact that hearing loss is becoming more common among them.[4] It is possible that high-frequency hearing loss won't show symptoms until serious harm has been done.[5] As more frequencies become involved, people may eventually begin to have more obvious hearing problems, such as tinnitus (ear ringing) or difficulty identifying speech in noisy environments. Early detection and prevention are crucial since, regrettably, once the cochlea's hair cells are lost, they cannot be restored. There is little research specifically focused on the effects of prolonged listening device use among populations that may be at higher risk due to long study hours and frequent use of these devices to relieve stress through music or podcasts, despite the growing concern over noise-induced hearing loss related to listening devices.[6] The purpose of this study is to ascertain the hearing problems caused by headphones usage in the Saudi population. In addition, it is essential to comprehend the prevalence and risk factors of hearing loss in this community to create focused prevention strategies.

MATERIALS AND METHODS

A self-administered questionnaire was used in a cross-sectional research of 184 adult individuals in Al Kharj to evaluate their earphone listening habits and hearing function. The study was approved by the Institutional Ethics Committee and the Scientific Research Committee, and informed permission was acquired (SCBR-591-2025). The study's voluntary nature and the participants' freedom to decline or omit any questions were explained to them. Only those who finished the surveys were included in the study. Those who have accepted to participate, use headphones, and reside in the Kingdom of Saudi Arabia are among the inclusion criteria. To guarantee that participants were aware of the dangers of extended headphone use, they had to have worn them for at least 6 months. To evaluate the relationship between usage patterns and hearing acuity, only individuals who regularly wore headphones were included. To exclude confounding variables and guarantee that the study only assessed the effects of headphone usage on hearing acuity, participants with any known hearing loss were excluded. Individuals with a history of Meniere's disease, acute or chronic otitis media, ear surgery, traumatic head injuries, or use of ototoxic medications were not allowed to participate in the study. The questionnaire was adapted from an earlier study. The questionnaire is divided into sections that allow for the collection and assessment of various sorts of headphones as well as demographic information (such as gender, age, marital status, and place of residence). It also includes how frequently they use headphones each day and how long they have been using them. The questionnaire also evaluated the participants' living circumstances (e.g., kind of housing, place of residence), as well as their auditory experiences, including symptoms like fullness or pressure in the ear, dizziness, tinnitus (ringing sensations), and any challenges with hearing or comprehending sounds. Demographic information and headphone usage trends were summarized using descriptive statistics. The types of variables and differential statistics, such as the independent samples T test and one-way analysis of variance test, were the basis for the analysis, which was carried out using the Statistical Package for the Social Sciences statistics version 23.0. The frequency, percentage of demographic factors, and headphone usage patterns were analyzed using descriptive statistics. The chosen demographic variable was linked to headphone use using the chi-square method.

RESULTS

There were 184 participants in this cross-sectional study, most of whom were Saudi residents residing in Al Kharj City, Saudi Arabia. All the people participants completed the questionnaire and took part in the study. About the characteristics of the demographics, the majority of the 184 participants in the study were between the ages of 18 and 25 (71.7%), with 78.2% of them being male and 21.7% being female. The majority of participants (65.2%) reside in private housing, while 11.9% share a home with their parents [Table 1].

About 95.6% of participants used headphones or earbuds, according to headphone usage habits. Wireless headphones were the most frequently used hearing aid (38%). The types of earphones, how they are used, and the connection between using them and hearing issues are displayed in Table 2. Half of the population has been wearing headphones for more than 4 years, and at home. About 48.9% of respondents reported using earbuds for 1–3 h every day. Over half of the individuals, 102 (55.4%), had some kind of ear-related problem

[Figure 1]. The majority of them are concerned of ear pressure.

DISCUSSION

Our study attempted to find out the prevalence of hearing issues brought on by headphones among Saudi population. According to our findings, more than half of the participants experienced an ear-related issue. One medical disorder that can greatly affect a person's quality of life is hearing loss.[3] In contrast, a prior cross-sectional survey carried out in the Kingdom of Saudi Arabia found 52% utilization at home and 16% usage at school and college.[7] The results of this study are comparable to those of a prior study that polled

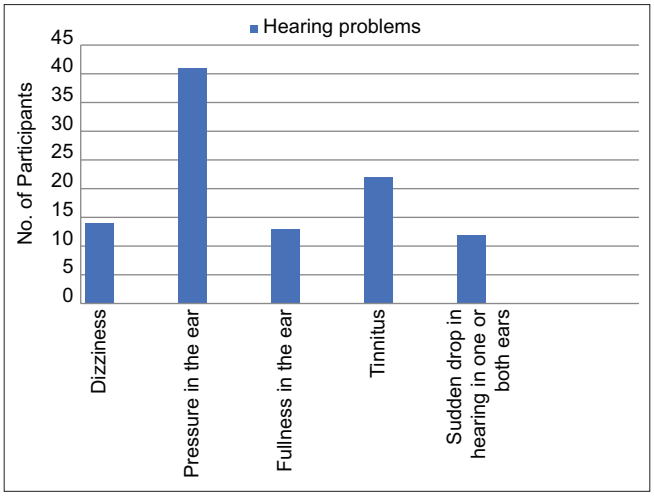

Figure 1: Hearing problems caused by headphones usage (*n*=102)

Table 1: The scores from the hearing loss questionnaire based on earphone usage patterns and demographic characteristics (*n*=184)

Parameter	Category	*n*	Percentage
Gender	Male	144	78.2
	Female	40	21.7
Age	18–25	132	71.7
	26–33	30	16.3
	34–41	6	3.2
	42–49	4	2.1
	50 and above	12	6.5
Marital status	Single	152	82.6
	Married	28	15.2
	Divorced	3	1.6
	Widow	1	0.5
Where do you live?	Private accommodation	120	65.2
	Single house	42	22.8
	Parents' house	22	11.9

280 college students to learn about their headphone usage patterns and the related effects on their academic performance and health. Significant trends were discovered, such as 79% of users listening at high volumes for more than an hour, and 84% of daily users.[8] Numerous studies conducted in other nations have also shown that adolescents and young people use earphones improperly, such as by listening to loud music, wearing them for extended periods of time, and not taking breaks.[9,10] Raising awareness is crucial to addressing the improper use of earbuds among the younger population because there is an increasing tendency in the usage of personal listening devices and earphones among adolescents and youth. The prevalence of tinnitus in people

Table 2: Type of earphones, how they are used, and the relationship between using them and hearing problems (*n*=184)

Parameter	Category	*n*	Percentage
Do you use headphones or earbuds?	Yes	176	95.6
	No	8	4.3
Type of hearing aid	Earphone wired	24	29.44
	Earphone wireless	64	13
	Headphone wired	18	9.7
	Headphone wireless	70	38
	All types	8	4.3
Which ear do you use	Right	138	75
	Left	16	8.6
	Both	30	16.3
Duration of use	<1 year	12	6.5
	1 year	18	9.7
	1 years	18	9.7
	3 years	32	17.3
	4 years	12	6.5
	More than 4 years	92	50
Frequency in hours/day	<1 h	48	26
	From 1 to 3 h	90	48.9
	From 3 to 6 h	34	18.4
	More than 6 h	12	6.5
Place of use	School/college	18	19.7
	Car	6	3.2
	Gym	56	30.4
	Home	92	50
	Others	12	6.5
Hearing trouble	Yes	102	55.4
	No	82	44.5
Which ear do you have the hearing problem	Right	36	19.5
	Left	26	14.1
	Both	40	21.7
	No complaints	82	44.5

who used headphones and those who used headsets has not been found to be significantly correlated in some research.[11] Another study conducted in Pakistan revealed prevalence that was comparable to our findings.[12] According to our research, 48.9% of participants said they used earbuds for 1–3 h each day. Another study supported this conclusion by explaining that wearing headphones for more than 60 min a day on average may cause hearing issues.[13] Canal occlusion and the potential for ear-related problems are determined by the length of time that earbuds are placed directly into the external ear canal, the degree of temperature variations or humidity inside, and the sanitary practices.[14] Another study supported this conclusion by showing a correlation between difficulty hearing and wearing headphones for more than 60 min a day on average.[15] Finally, a previous study found that the higher score of hearing issues among headphone users necessitates more focus to execute interventions and develop strategies for raising people understanding and attitude regarding the usage of personal listening devices.[16]

Larger sample numbers could help future research improve accuracy even further and investigate the complex connections between headphone use and hearing issues.

CONCLUSION

Ear-related problems may be affected negatively by both increased and sustained use of hearing devices. To provide a safe and appropriate evidence-based exposure, more comprehensive multicentric prospective studies with large samples are required to confirm or reject the association or causal influence of hearing devices on the incidence of various ear-related diseases.

ACKNOWLEDGMENTS

The author is grateful to the Deanship of Scientific Research, Prince Sattam bin Abdulaziz University, Al-Kharj, Saudi Arabia, for its support and encouragement in conducting the research and publishing this report.

AVAILABILITY OF DATA AND MATERIALS

The data are available on request from the authors.

ETHICS APPROVAL

All series of steps that were implemented in this study that complied with Ethics Committee of Prince Sattam bin Abdulaziz University Institutional Review Board (SCBR-591/2025).

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Source of Support: Nil. **Conflicts of Interest:** None declared.