Prevalence of hearing loss and tinnitus in young population in a tertiary hospital at the western region

Swasti Sharma[1]*, Aakash Mani Bhandari[1], Ambalika Shakya[1], Bonu Goudel[1], Bikas Gurung[1]

[1]Department of ENT-HNS, Pokhara Academy of Health Sciences, Western Regional Hospital, Pokhara, Nepal

ABSTRACT

Introduction: Use of listening devices like mobile phone is very common especially in younger population. The purpose of the present study was to estimate the occurrence of hearing problems and tinnitus in young adults with exposure to leisure noise such as music via different devices. **Methods:** A prospective study was conducted at the Out-Patient Department of ENT, Pokhara Academy of Health Sciences, Western Regional Hospital, Pokhara, Nepal. The study was carried out for a period of one year. Patients from age 15 to 45 years presenting to the OPD with various complaints were asked about the ear problems and hearing conditions. Data acquired from the study was entered in MS Excel spreadsheet and descriptive analysis was done. **Results:** Total patients enrolled in the study were 105. Ear-related problems were common in studied patients. Tinnitus was observed in 37.14% and hearing problems were seen in 21.9% of cases. **Conclusions:** Noise exposure in the form of leisure noise can lead to ear problems like hearing loss and tinnitus.

Keywords: Hearing loss, music, noise, tinnitus.

***Correspondence:**
Dr. Swasti Sharma
Pokhara Academy of Health Sciences
Pokhara, Nepal
Email: swastisharma2013@gmail.com
ORCID iD: 0000-0001-8356-7069

Submitted: December 20, 2024
Accepted: May 25, 2025

To cite: Sharma S, Bhandari AM, Shakya A, Goudel B, Gurung B. Prevalence of hearing loss and tinnitus in young population in a tertiary hospital at the western region. JGMC-Nepal. 2025;18(1):65-9.

DOI: 10.3126/jgmc-n.v18i1.72906

INTRODUCTION

Noise-induced hearing loss is a worldwide problem. It has been associated with industrial and workplace noise exposure for a long time. In recent years, attention has shifted to non-occupational noise exposure or leisure noise, for example, exposure to loud music via various devices. Such devices can be termed as personal listening devices which can be in the form of mobile phones, tablets, iPad among others.[1] There has been an increase in population owning electronic devices, especially mobile phones, over the years. Studies have determined that loud sound from such devices can cause hearing problems.[1] There can be other issues also like ear discomfort and tinnitus. Individuals might not be aware that exposure to loud music can result in hearing impairment. A number of studies have expressed concern over widespread use of listening devices.[1,2] Listening to music too loud over a lengthy period of time has been shown as a potential contributor to noise induced hearing loss.[2,3]

Hearing loss is defined as worsening of hearing ability and is expressed as an increase in the hearing threshold. Tinnitus, defined as "ringing in the ear", is a common and disturbing complaint associated with hearing loss. Daily exposure to sound of more than 85 dB is associated with hearing loss and louder noise increases this process.[4] In a study done by Poudel et al. at Dharan, Nepal, prevalence of noise induced hearing was 38.8% among people who were exposed to loud noise and 12.5% in people who were not exposed. Risk of developing noise induced hearing loss among exposed population was almost nine times to those who were not exposed.[4] A study of Canadian students found that 40% had a 10 dB or greater

loss at 4000 or 6000 Hz, and these were highly correlated to exposure to music.[5] However, Henderson et al. described that not everyone shares the same risk of hearing loss, which can be explained by the fact that some individuals have tougher ears and others have sensitive ears.[6]

Many young patients present with complaints of ear noise, hearing loss, fullness of ears and ear discomfort. Such patients are subjected to hearing assessment tests to quantify the level of hearing impairment. Hence, the objective of this study was to find out prevalence of hearing loss and tinnitus in young adults in the Western region of Nepal.

METHODS

A prospective study was conducted at Out Patient Department (OPD) of ENT, Pokhara Academy of Health Sciences, Western Regional Hospital, Pokhara, Nepal. The study was carried out for a period of one year. Prior to commencement, ethical approval was obtained from Institutional Review Committee, Pokhara Academy of Health Sciences (Ref. No. 208/080). Convenience sampling was used for the study. Verbal informed consent was taken from patients after explaining the details of the study. Patients from age 15-45 years presenting to the OPD with various complaints were asked about the ear problems and hearing condition. Ear examination including otoscopy was done in all cases. Accordingly, Pure Tone Audiogram (PTA) was obtained of each of the patients questioned. All findings were recorded in a proforma and data collection was done.

Questions were asked to subjects in history taking-whether they have a regular habit of listening to songs, regarding exposure to music for a long time, how loud they tune in. Hearing loss was assessed with history and with audiometry as well.

Subjective evaluation was done to determine the level of loudness that the patients are exposed to. Patients were asked how loud they think they listen to their devices. They were asked if they heard music that was-1. Not loud 2. Loud 3. Very loud.

Audiological tests were conducted in sound treated room of ENT Department. Audiometry was performed with Kamplex (Model AC4). Air conduction test was done in frequencies 250, 500, 1000, 2000, 4000 and 8000 Hz. Bone conduction test was carried out in frequencies 500, 1000, 2000, and 4000 Hz. Pure tone was calculated as the average of 250, 500, 1000, and 2000 Hz.

Data acquired from the study was entered in MS Excel spreadsheet. A descriptive analysis was done. Hearing loss was documented as mild, moderate, or severe hearing loss according to the WHO hearing impairment criteria.[7] Cases presenting to OPD aged 15 to 45 years were included and enquired with questions pertinent to the study. The following patients were excluded from the study: patients with history of hearing loss since childhood and patients with history of ear surgery in the past.

RESULTS

Total number of patients enrolled in the study was 105. Female patients 69(65.71%) outnumbered male patients 36(34.28%) in the study. The age of the studied population ranged from 15 to 45 years. The most common age group was found to be the second decade (20 to 29 years). The number of patients found in the second decade was 59(56.19%). Patients in other age groups were: 15 to 19 years: 21(20%), 30 to 39 years: 15(14.28%) and 40 to 45 years: 10(9.51 %). Most of the studied population consisted of students, 39 in number (37.14%). A small proportion of the rest of the patients 15(14.28%) were job holders, while the rest (48.57%) were not currently involved in any work. Co- morbidities were observed in small proportion of cases. Two patients (1.9%) were taking medications for hypothyroidism, while three patients (2.85%) were diagnosed cases of diabetes mellitus. History of chronic ear discharge was found in seven patients (6.66%). Occupational noise exposure was found in six patients (5.71%). They were all factory workers. Most of the patients studied provided history of listening to music with or without earphones (82.5%). Remaining proportion of cases also admitted to watching series and playing games in various devices.

Symptoms wise, tinnitus was present in 39 patients (37.14%) and decreased hearing was observed in 16 patients (15.23%), asymptomatic in 27 patients (25.71%) and ear fullness in 23(21.9%) as shown in Table 1.

Table 1: Patients' complaints (N=105)

Complaints	n(%)
Tinnitus	39(37.14%)
Ear fullness	23(21.9%)
Asymptomatic	27(25.71%)
Decreased hearing	16(15.23%)

Regarding exposure to sound, patients were asked how loud sound they usually listened to. Subjective response of patients was divided into four parts. Accordingly, the response was obtained as: very loud in 27(25.71%) cases, loud in 58(55.23%) cases, not loud in 7(6.66%) cases, while the rest 13(12.38%) could not specify the level or

volume. Patients were also enquired about the approximate duration that they listened to music/other contents in a day. Maximum patients i.e. 31(29.52%) responded that they did so for about two hours. (Table 2)

Table 2: Exposure to sound level (loudness) (N=105)

Volume	n(%)
Very Loud	27(25.71%)
Loud	58(55.23%)
Not loud	7(6.66%)
Could not specify	13(12.38%)
Duration of exposure/ 24 hours(approximate)	
30 minutes	36(34.28%)
2 hours	31(29.52%)
3 hours	14(13.33%)
>3 hours	5(2.85%)
Could not specify	19(18.09%)

Pure tone audiometry revealed that 82(78.09%) of the cases had normal hearing and 23(21.9%) had some degree of hearing loss. Meanwhile 8(7.61%) patients had hearing in the range of 45 to 55 dB. Duration of tinnitus was variable from two weeks to two years or more. In 66(62.85 %) patients tinnitus was not present. Out of the remaining 39 patients, 12(11.42%) patients complained of tinnitus of two years duration. About 9(8.57%) patients had history of tinnitus for six months. (Table 3)

Table 3: Hearing loss and tinnitus (N=105)

Pure Tone Audiometry (Hearing loss in dB)	n(%)
25-35 dB	2(1.9 %)
35-45 dB	7(6.66 %)
45-55 dB	8(7.61 %)
55-65 dB	6(5.71 %)
Decreased hearing (total)	23 (21.9 %)
Duration of tinnitus	
1 month	6(5.71%)
6 months	9(8.57%)
1 year	8(7.61%)
2 years	12(11.42%)
Could not specify	4(3.80%)
No tinnitus	66(62.85 %)

DISCUSSION

Different studies have implicated that music and sound exposure can lead to hearing loss and tinnitus. Balaney et al. have stated in their study of college students that female exceeded males in the music exposure group.[8] They observed that average age of participants was 19 years, where age ranged from 18 to 30 years. These results are comparable to that of the present study where the commonest age group was found to be 20 to 29 years followed by 30 to 39 years. Hulya et al. found that most of the participants (16 out of 88 participants) were found to hear music at medium level.[9] In our study, 55.23% of cases stated that they usually hear loud music while 25.71% stated that they heard very loud music (on subjective evaluation). In another study done among industrial workers, prevalence of noise induced hearing loss was 38.8% among people who were exposed to loud noise and 12.5% people who were not exposed.[4] This is comparable to hearing loss observed in the present study (21.9%). This shows that hearing loss can occur not only in industrial noise exposure but also on exposure to sound that is non-industrial.

Landalv et al. have calculated the frequency of tinnitus in adolescents in their study. They have reported that 5.4% of adolescents (281 secondary school students) had permanent tinnitus and 39.7% had experienced temporary tinnitus.[10] Some of the individuals (39.2%) were found to have sound sensitivity like annoyance to sound and fear that it may cause ear problems and tinnitus. In the present study ear problems reported were hearing loss, tinnitus and ear discomfort.

Rhee et al. studied about tinnitus in 1593 adolescents via questionnaire.[11] Prevalence of tinnitus was 46%. Tinnitus was associated with increasing age, female gender, leisure noise exposure, local-area-network gaming among other factors. Hearing loss was not seen in pure tone audiometry but participants with tinnitus had difficulty in sound localization and difficulty hearing in noise. Study also found that participants tended to have more physical and mental health problems. In our study also we found that a certain proportion of participants played games in electronic devices thereby being exposed to loud sound. In our study hearing loss was seen in some but whether it was associated with noise exposure activity was not studied in detail.

David et al. have studied the prevalence of tinnitus in leisure music exposure where they have included persons exposed to music in concerts as well.[12] They studied the relation of tinnitus with hearing loss in subjects. They found a clear relationship of increasing tinnitus with increasing hearing difficulty. But interestingly, they found that in cases with constant tinnitus there was no or only slight hearing loss. In our study, we found that hearing loss was present in 23(21.9%) cases on audiometric evaluation.

According to WHO, the output of personal audio devices may range from 75dB to 105dB.[13] In the present study we asked the patients/participants how high volume they listened to. Among them, 25.71% responded that they set the volume to very loud (highest level). Jiang et al. found that significant proportion of adolescents were found to

listen to devices for more than the daily noise dose.[14] In the present study, 14(13.33%) persons had habit of listening for three hours daily while five persons said to do so for more than three hours in a day.

WHO has formulated guidelines in recent years for ear protection from recreational noises, and is very relevant for adolescents and young adults. WHO has advised that to minimize ear problems due to music exposure a person needs to reduce the intensity (loudness), duration of exposure and frequency of the exposure.[13]

This study has some limitations. The study comprising a much larger sample spanning over years is necessary to evaluate the condition in depth and generalize the findings.

CONCLUSIONS

Most of the patients complained of tinnitus and most of them were exposed to loud noise with maximum duration of two hours. PTA findings revealed that the subjects with decreased hearing fell mostly under 45 to 55 dB range. Most of the patients studied provided history of listening to music, others admitted to watching series and playing games in various devices which were all sources of exposure to sound of varying degrees of loudness. Hence, the result of this study can provide a small contribution to public health policy making in prevention/awareness program regarding hearing health.

ACKNOWLEDGEMENT

We are grateful to the audiologists working at Pokhara Academy of Health Sciences and the whole ENT OPD team for the support provided for the study.

CONFLICTS OF INTEREST: None declared

SOURCE OF FUNDING: None

AUTHORS' CONTRIBUTIONS

SS did the design of the study along with data collection, analysis and final drafting of the manuscript. AMB was responsible for the data collection and data entry. AS contributed to referencing and data interpretation. BG and BG were responsible for final editing of the manuscript. All authors have read the final version of the manuscript and have approved the manuscript.

REFERENCES

1. Mostafapour SP, Lahargoue K, Gates GA. Noise-induced hearing loss in young adults: The role of personal listening devices and other sources of leisure noise. The Laryngoscope. 1998;108(12):1832-9. DOI: 10.1097/00005537-199812000-00013 PMID 9851500.
2. Levey S, Fligor BJ, Ginocchi C, Kagimbi L. The effects of noise-induced hearing loss on children and young adults. Contemp Issues Commun Sci Disord. 2012;39(fall):76-83. DOI: 10.1044/cicsd_39_F_76
3. Chung JH, Des Roches CM, Meunier J, Eavey RD. Evaluation of noise-induced hearing loss in young people using a web-based survey technique. Pediatrics. 2005;115(4):861-7. DOI: 10.1542/peds.2004-0173 PMID 15805356.
4. Paudel D, Bhandary S, Pokharel A, Chettri ST, Shah SP, Sah BP, et al. Noise Induced Hearing Loss among Factory Workers of Dharan Industrial Area. Journal of BP Koirala Institute of Health Sciences. 2019;2(2):34-9. DOI: 10.3126/jbpkihs.v2i2.27856
5. Lees RE, Roberts JH,Wald Z. Noise induced hearing loss and leisure activities of young people: a pilot study. Can J Public Health. 1985;76:171-3. PMID: 4016649.
6. Henderson D, Bielefeld EC, Harris KC, Hu BH. The role of oxidative stress in noise-induced hearing loss. Ear and hearing. 2006;27(1):1-9. DOI: 10.1097/01.aud.0000191942.36672.f3 PMID: 16446561.
7. Dhingra PL, Dhingra S. Diseases of ear, nose and throat. 5th ed. Elsevier; 2005, Chapter 4, Assessment of hearing; p. 27.
8. Balanay JA, Kearney GD. Attitudes toward noise, perceived hearing symptoms, and reported use of hearing protection among college students: Influence of youth culture. Noise and Health. 2015;17(79):394-405. DOI: 10.4103/1463-1741.169701 PMID: 26572699.
9. Osmanoğlu H, Dizdar HT, Koçyiğit AA. The effects of music listening time with headphones on hearing thresholds among the young population. Egypt J Otolaryngol. 2024;40(1):13. DOI: 1186/s43163-024-00574-9
10. Landälv D, Malmström L, Widén SE. Adolescents' reported hearing symptoms and attitudes toward loud music. Noise and health. 2013;15(66):347-54. DOI: 10.4103/1463-1741.116584 PMID: 23955132.
11. Rhee J, Lee D, Suh MW, Lee JH, Hong YC, Oh SH, et al.

Prevalence, associated factors, and comorbidities of tinnitus in adolescents. PloS one. 2020;15(7):e0236723. DOI: 10.1371/journal.pone.0236723

12. Moore DR, Zobay O, Mackinnon RC, Whitmer WM, Akeroyd MA. Lifetime leisure music exposure associated with increased frequency of tinnitus. Hearing Res. 2017;347:18-27. DOI: 10.1016/j.heares.2016.10.030 PMID: 27825859.

13. World Health Organization. Make listening safe. World Health Organization; 2015.

14. Jiang W, Zhao F, Guderley N, Manchaiah V. Daily music exposure dose and hearing problems using personal listening devices in adolescents and young adults: A systematic review. Int J Audiol. 2016;55(4):197-205. DOI: 10.3109/14992027.2015.1122237 PMID: 26768911.