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ORIGINAL ARTICLE

Pattern of Hearing Loss Among Patients Attending ENT Department of a Tertiary Hospital in Nepal: A Retrospective Study

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Abstract This study aims to analyze the pattern of hearing loss among patients visiting ENT department in Nepal Police Hospital. Pure tone audiometry results of 1654 patients with a complaint of the hearing loss were analyzed and the results were expressed in number and percentage. Among 1654 patients, 294 patients had normal hearing on both ears. So, a total of 1360 patients had hearing loss. Among 1360 patients, 897 (66%) cases were male and 463 (34%) were female. Most commonly affected age group was 31–40 years followed by 21–30 years age group. Out of 1360 patients, 432 (31.76%) patients had unilateral hearing loss whereas 928 (68.24%) cases had bilateral hearing loss. Sensorineural hearing loss was the most common 1349 (49.60%), followed by conductive 683 (25.11%) and mixed 256 (9.41%) hearing losses respectively. Conductive hearing loss was more common in younger age groups whereas sensorineural hearing loss was more common in older age groups. Mild hearing loss was seen in 1079 ears (39.67%), moderate in 671 (24.67%), severe in 368 (13.52%) and profound in 170 (6.25%). The mean hearing threshold was 42.90 ± 19.26 dB on right ear and 42.60 ± 18.76 dB on left ear with no statistically significant difference (p value −0.68). Hearing loss was more common in male population with younger age group involvement. Sensorineural hearing loss was the most common type. Mild degree of hearing loss and bilateral involvement was most common.

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Keywords Conductive hearing loss · Hearing loss · Mixed hearing loss · Pure tone audiogram · Sensorineural hearing loss

Introduction

Hearing impairment is a common problem that affects people of all age groups. It affects more than 1.33 billion people globally [1]. Hearing impairment at any stage of life can compromise individual's quality of life [2]. Hearing impairment may lead to negative consequences like poor general health, poor academic performance, higher unemployment, social isolation and an increased risk of depression [3]. The burden of hearing loss is higher in developing countries [4]. A study conducted in Nepal has shown that 16.6% of total population had hearing impairment [5].

Hearing loss can affect one or both ears. It can be classified as conductive, sensorineural or mixed type [6]. Conductive hearing loss is due to the defect in the sound conducting mechanism of the ear. Sensorineural hearing loss occurs due to the abnormality in the cochlear nerve, neural pathway, or the auditory cortex. Mixed hearing loss has components of both conductive and sensorineural hearing losses. World Health Organization (WHO) has developed the grading system to assesses the degree of hearing impairment [7].

Pure tone audiometry (PTA) is a tool used for the diagnosis of hearing loss. It is performed by the audiologists as per the recommendation from the otorhinolaryngologists [8]. PTA gives information regarding the degree, type, configuration of hearing loss and helps in further management planning [9].

Methods

This is a retrospective review of data retrieved from the record of Pure Tone Audiometry (PTA) results from ENT department of Nepal Police Hospital between 1st April 2016 to 31st May 2020. Total 1654 patients who had undergone PTA for a suspected hearing loss, were selected for the study. PTA was performed by two experienced audiologists using Amplaid 309 clinical audiometer. Pure tone average of 0.5, 1, 2 and 4 kHz frequencies was used to calculate the hearing threshold for bone and air conduction. PTA records of 1654 patients were tabulated and analyzed. The results were expressed in number and percentage. Degree of Hearing loss was measured using WHO classification [7]. Data were analyzed using Microsoft excel and SPSS 21. p value <0.05 was taken as level of significance.

Results

Total of 1654 patients with a complaint of hearing loss, who underwent PTA, were selected for the study. Among them 294 patients had normal hearing on both ears. So, a total of 1360 patients had hearing loss on either one or both ears. Among them, most commonly affected age group was 31–40 years followed by 21–30 years group (Table 1). The mean age was 43.6 ± 17.7 years (8–90 years). Among 1360 patients, 897 (66%) were male and 463 (34%) were female, and the male to female ratio was 1.94:1 (Table 1).

Out of 1360 patients, 227 cases (16.69%) had hearing loss in right ear only, 205 (15.07%) cases had hearing loss in left ear only, whereas 928 (68.24%) cases had bilateral hearing loss (Table 2). So, total of 2288 ears had hearing loss. Total number of right ears involved was 1155(50.48%) whereas left ears was 1133 (49.52%). Sensorineural hearing loss was the most common 1349 (49.60%), followed by conductive 683 (25.11%) and mixed 256 (9.41%) hearing losses respectively (Table 3).

On correlating the age groups with the type of hearing loss, conductive hearing loss was more common in the lower age groups while sensorineural hearing loss was more common in the higher age group of patients. Mixed hearing loss was more common in the middle-aged population (Table 4).

On evaluating degree of hearing loss, mild hearing loss was seen in 1079 ears (39.67%), moderate in 671 (24.67%), severe in 368 (13.52%) and profound in 170 (6.25%) ears (Table 5). Mean hearing threshold was 42.90 ± 19.26 dB on the right ear and 42.60 ± 18.76 dB on the left ear. This difference was not statistically significant (p value −0.68).

Table 1 Age and sex distribution of the respondents

Variables	Hearing loss	Normal hearing	Total
Age (Years)			
0–10	22	3	25
11–20	64	19	83
21–30	286	105	391
31–40	305	85	390
41–50	222	58	280
51–60	184	16	200
61–70	169	5	174
71–80	86	2	88
81+	22	1	23
Gender			
Male	897	168	1065
Female	463	126	589
Total	1360	294	1654

Discussion

Hearing loss is a significant public health problem in countries like Nepal. Hearing loss has a significant financial and socioeconomic burden in low- and middle-income countries [4]. Hearing loss has a negative impact on the individual, which may result into poor general health, poor academic performance, higher risk of unemployment and depression [3]. Hearing loss also increases the financial burden to the society.

The pattern of hearing loss may vary between different geographic regions and between different hospitals. Knowledge of pattern of hearing loss can help health personnel to make the proper diagnosis and provide best treatment to the patients. Such study helps in early identification of the hearing problems and their management, ultimately helping to reduce morbidity and improve the quality of life [8].

In this study, pure tone audiograms of 1654 patients who presented to ENT outpatient department with the complaint of hearing loss were analyzed. Among 1654 patients, 294 patients had normal hearing on both ears. So, a total of 1360 patients had hearing loss on either one or both ears. In this study, hearing loss was highest in 31–40 years age

Table 2 Involvement of ear in disease process (n = 1360)

Ear involved	No. of patients	Percentage (%)
Only right ear	227	16.69%
Only left ear	205	15.07%
Both ear	928	68.24%
Total	1360	100%

Table 3 Type of hearing loss among the patients (n = 1360)

Type of hearing loss	Right ear No. of ears (%)	Left ear No. of ears (%)	Total (Right + Left Ear) No. of ears (%)
Normal	205 (15.07)	227 (16.69)	432 (15.88)
Conductive	334 (24.56)	349 (25.66)	683 (25.11)
Sensorineural	694 (51.03)	655 (48.16)	1349 (49.60)
Mixed	127 (9.34)	129 (9.48)	256 (9.41)
Total	1360 (100)	1360 (100)	2720 (100)

Table 4 Type of hearing loss according the age group of patients (n = 1360)

Age group	Type of hearing loss		
	Conductive	Sensorineural	Mixed
0–10	10	12	–
11–20	40	24	–
21–30	159	107	20
31–40	134	146	25
41–50	37	167	18
51–60	13	153	18
61–70	7	153	9
71–80	1	80	5
81 +	1	21	–

group and it was 305 (27.74%). The next order was seen in age group of 21–30 and it was 286 (21.03%), followed by 41–50 years which was 222 (16.32%). Lowest incidence was seen in age group of above 80 years which was 22 (1.62%). These results are different from the study by Browning et al. [10] which showed that the hearing loss was highest in 61–80 years age group (45.3%) followed by 41–60 years age group (17.4%). This difference might be due to lack of awareness about hearing impairment and poor access to health care services especially among elderly in the developing country like Nepal.

In present study, maximum number of hearing loss was seen in 31–40 years followed by 21–30 years. This may be due to higher level exposure to risk factors among these age groups as these age groups constitute working class of people. Most of peoples in these age groups have increased awareness as well as easy access to hospital services compared to other age groups. Early visit to hospitals among these age group even after mild hearing impairment is common as slightest loss in hearing power may have negative impact on their work.

In present study, among 1360 patients with hearing loss, 897 (66%) were male and 463 (34%) were female. The male to female ratio was 1.94:1. The study performed by Uju [11] also found the higher prevalence of hearing loss in male as compared to female. Similar results have been shown by other studies [12, 13]. The higher prevalence of disease in male has been attributed to their increased exposure to the outdoor activities and other risk factors as well as early and easy access to healthcare services compared to females.

In present study bilateral hearing loss was seen in 928 (68.24%) cases and 432 (31.76%) had unilateral involvement. There was similar distribution of disease in the both ears i.e. 50.48% right ear and 49.52% left ear involvement These results are similar to the studies by Rabbani et al. [9] and Varshney et al. [14], which have shown that bilateral hearing loss more common and similar distribution of right and left ear involvement.

In present study, sensorineural hearing loss was the commonest type (49.60%) followed by conductive type (25.11%) and mixed type (9.41%). In right ear 51.03% was sensorineural, 24.56% was conductive and 9.34% was

Table 5 Degree of hearing loss among the patients (n = 1360)

Degree of hearing loss	Right ear No. of ears (%)	Left ear No. of ears (%)	Total (Right + Left Ear) No. of ears (%)
Normal (≤25 dB)	205 (15.08)	227 (16.70)	432 (15.89)
Mild (26–40 dB)	557 (40.96)	522 (38.38)	1079 (39.67)
Moderate (41–60 dB)	330 (24.26)	341 (25.07)	671 (24.67)
Severe (61–80 dB)	181 (13.30)	187 (13.75)	368 (13.52)
Profound (≥81 dB)	87 (6.40)	83 (6.10)	170 (6.25)
Total	1360 (100)	1360 (100)	2720 (100)

mixed. Similarly, in left ear, 48.16% was sensorineural, 25.66% was conductive and 9.48% was mixed. These results are similar to the findings of studies by Louw et al. [15], Shuaibu et al. [16] and Browning et al. [10]. In this study mild hearing loss was seen in 39.67% of ears, followed by moderate in 24.67%, severe in 13.52% and profound in 6.25%. These findings are similar to the results of other studies. [10, 13, 15, 16]

The main limitation of this study is that it is a retrospective study and correlation of the hearing loss with ear pathology was not done. Another limitation is the relatively smaller sample size. Studies with larger sample size are required to have better result.

Conclusion

This study concluded that sensorineural hearing loss was the commonest type among the patients with a complaint of the hearing loss. Most of them were adult male with bilateral mild hearing loss (26–40 dB). Audiometric assessment is an important tool that helps in early diagnosis and proper management of the hearing impairment.

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Compliance with Ethical Standards

Conflicts of interest The authors declare that they have no conflict of interests.

Research involving Human Participants and/or Animals This article does not contain any studies with human participants performed by any of the authors.

References

1. Vos T, Allen C, Arora M, Barber R, Bhutta Z, Brown A et al (2016) Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 388(10053):1545–1602. https://doi.org/10.1016/S0140-6736(16)31678-6
2. Nunes AD, Silva CR, Balen SA, Souza DL, Barbosa IR (2019) Prevalence of hearing impairment and associated factors in school-aged children and adolescents: a systematic review. Braz J Otorhinolaryngol 85:244–253. https://doi.org/10.1016/j.bjorl.2018.10.009
3. Arlinger S (2003) Negative consequences of uncorrected hearing loss: a review. Int J Audiol 42(sup2):17–20. https://doi.org/10.3109/14992020309074639
4. Stevens G, Flaxman S, Brunskill E, Mascarenhas M, Mathers C, Finucane M (2011) Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries. Eur J Public Health 23(1):146–152. https://doi.org/10.1093/eurpub/ckr176
5. Little P, Bridges A, Guragain R, Friedman D, Prasad R, Weir N (1993) Hearing impairment and ear pathology in Nepal. J Laryngol Otol 107(5):395–400. https://doi.org/10.1017/s0022215100123278
6. Beigh Z, Malik M, ul Islam M, Yousuf A, Pampori R, (2012) Clinical and audiological evaluation of hearing-impaired children. Indian J Otol 18(4):200–207. https://doi.org/10.4103/0971-7749.104799
7. Grades of hearing impairment [Internet]. World Health Organization. 2020 [cited 24 August 2020]. https://www.who.int/pbd/deafness/hearing_impairment_grades/en/
8. Rajbhandari P, Shrestha BL, Pradhan A, Dhakal A (2017) Pattern of hearing loss among patients attending otorhinolaryngology outpatient Department at Kathmandu University Hospital. Otolaryngol Open Access J 2(2):000153
9. Rabbani S, Chowdhury M, Shumon A, Yasmeen N, Rashid M, Nuruzzaman M et al (2014) Pattern and causes of hearing loss among the patients attending in an ENT OPD. Anwer Khan Mod Med Coll J 5(2):9–13. https://doi.org/10.3329/akmmcj.v5i2.21125
10. Browning G, Gatehouse S (1992) The prevalence of middle ear disease in the adult British population. Clin Otolaryngol 17(4):317–321. https://doi.org/10.1111/j.1365-2273.1992.tb01004.x
11. Uju I (2020) Hearing impairment in a tertiary hospital in the Niger delta region: prevalence, aetiology and pattern. Asian J Med Health 18(2):1–10. https://doi.org/10.9734/ajmah/2020/v18i230180
12. Kishve S, Kishve SP, Kumar N, Kishve PS, Syed MMA, Kalakoti P (2010) Ear, nose and throat disorders in paediatric patients at a rural hospital in India. Aust Med J 3(12):786–790. https://doi.org/10.4066/AMJ.2101.494
13. Kabir A, Chowdhury S, Rahim Z, Sarker M, Chakraborty M (2020) Degree and pattern of hearing impairment among patients attending in audiology department of a tertiary level Hospital in Bangladesh. Bangladesh J Otorhinolaryngol 23(2):115–121. https://doi.org/10.3329/bjo.v23i2.45138
14. Varshney S, Bansal D, Malhotra M, Joshi P, Kumar N (2016) Unilateral sensorineural hearing loss: a retrospective study. Indian J Otol 22(4):262–267. https://doi.org/10.4103/0971-7749.192174
15. Louw C, Swanepoel D, Eikelboom R, Hugo J (2018) Prevalence of hearing loss at primary health care clinics in South Africa. Afr Health Sci 18(2):313–320
16. Shuaibu I, Chitumu D, Mohammed I, Shofoluwe N, Usman M, Bakari A et al (2018) Pattern of hearing loss in a tertiary hospital in the North Western Nigeria. Sahel Med J 21(4):208–212. https://doi.org/10.4103/smj.smj_57_17