

Original Article

Degree and Pattern of Hearing Loss among Community Level Patients attended at ENT Department of a Tertiary Care Hospital Outside Dhaka City in Bangladesh: A Retrospective Study

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Abstract

Background: Hearing loss is one of the major health hazards specially in under develop and developing countries including Bangladesh. Here it is significantly increasing trend affecting all age group. **Objective:** The purpose of the present study was to analyze the degree and pattern of hearing loss among patients attending ENT outpatient department. **Methodology:** This was a retrospective review of data retrieved from the record of Pure Tone Audiometry (PTA) results from Department of Otorhinolaryngology in Monno Medical College Hospital, Manikganj, Bangladesh between January 2017 to December 2024. Total 840 patients with hearing loss, who had undergone PTA were included in this study. The data were tabulated, analyzed and results were expressed in number and percentage. **Results:** Among 840 patients, 80 patients had normal hearing on both ears. So, a total of 760 patients had hearing loss. Among 760 patients, 428 (56.31%) cases were male and 332 (43.68%) were female. Most commonly affected age group was 21-30 years followed by 41-50 years age group. Out of 760 patients, 189 (24.85%) patients had unilateral hearing loss whereas 571 (75.15%) cases had bilateral hearing loss. Conductive hearing loss was the most common 663(43.6%), followed by mixed 381(25.1%) and sensorineural 127 (8.35%) hearing losses respectively. Conductive hearing loss was more common in younger age groups whereas mixed hearing loss was more common in older age groups. Mild hearing loss was seen in 604(39.7%) ears, moderate in 316 (20.8%), severe in 125(8.2%) and profound in 64 (4.2%). Regarding cause chronic suppurative otitis media was found most common cause which was 314 (41.3%) cases followed by otitis media with effusion in 136(17.9%) cases and presbycusis in 86(11.3%) cases. **Conclusion:** In conclusion, the commonest type of hearing loss is conductive and the commonest degree of hearing loss is mild degree.

Keywords: : Hearing loss; pure tone audiometry; conductive hearing loss; sensorineural hearing loss; mixed hearing loss

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Introduction:

Hearing is a special sense and no doubt it is the blessing contact with each other by means of language. A person can learn to speak and express himself/herself through hearing. Hearing impairment and its effects is an invisible disability. Thus, its impairment of any degree will be certainly significant. It is in one sense our hearing is like that of an antenna (along with other special senses) if we compare our brain to a television set. Like that of our brain response depends on its input signals. So if anyone is unable to enjoy this privilege is really unfortunate. We have witnessed in an Oscar award winning movie 'Children of lesser God' where the actress was a 'deaf and dumb' and thereby expressed her agonies of being deprived of these blessings in her master class acting. Indeed, it was very touchy.

Anyhow hearing impairment is one of the common health hazards globally and Bangladesh is a part of it. It is a hidden handicap initially but very soon become visible when it hampers speech leading to become a 'deaf n dumb' and thus detaching him from the society. Hearing impairment is a common problem that affects people of all age groups. It affects more than 1.33 billion people globally¹. Hearing impairment at any stage of life can compromise individual's quality of life². Hearing impairment may lead to negative consequences like poor general health, poor academic performance, and lack of confidence, higher unemployment, social isolation and an increased risk of depression³. The burden of hearing loss is higher in developing countries⁴.

Hearing loss can affect one or both ears. It can be classified as conductive, sensor neural and mixed type⁵. Conductive hearing loss is due to the defect in the sound conducting mechanism of the ear. Sensory neural hearing loss occurs due to the abnormality in the cochlea along with cochlear nerve, neural pathway, or the auditory cortex. Here two distinct subdivisions are cochlear (sensory) and retro cochlear (neural). It is also called perceptive type hearing loss. Mixed hearing loss has components of both conductive and sensory neural hearing losses. World Health Organization (WHO) has developed the grading system to assess the degree of hearing impairment⁶.

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^{7,8}. PTA gives information regarding the degree, type, configuration of hearing loss and helps in further management planning⁹. This study carried with the motive to analyze the degree and pattern of hearing loss among patients reporting ENT

department in Monno Medical College which is 70 km away from Dhaka city. Study was done totally on the basis of pure from our creator. The sense of hearing enables to establish Tone Audiometry finding. Total 840 patients with hearing impairment complain undergone pure tone audiometry and after analysis the results were expressed in number and percentage.

Methodology

Study Settings and Population: The retrospective cross-sectional study was conducted in the ENT Department at Monno Medical College Hospital, Manikganj, Bangladesh from January 2017 to December 2024 for period of 8 years. Patients were living in the rural area. This area is 70 km away from the capital of Bangladesh. All the patients complain of hearing loss were selected from OPD irrespective of age, sex and religion. For the collection of data, we used a pretested data sheet, prior to interview verbal consent was taken and the purpose of the study was elaborate clearly.

Sample Collection Procedure: The clinical diagnosis was established by history, detailed clinical examination including otoscopic examination after taking a verbal informed consent from patient or legal guardian and all findings were recorded. All hearing test were done in acoustically treated room (20 dB ambient noise) of Monno Medical College Hospital by well- trained audiometrician. Pure tone average (PTA) was done on averaging the hearing threshold at 0.5, 1 and 2kHz with reference to ISO:R 389-1970. For the collection of data, we used a pretested data sheet.

Statistical Analysis: Statistical analysis was performed with SPSS software, versions 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data that were normally distributed were summarized in terms of the mean, standard deviation, median, minimum, maximum and number of observations. Categorical or discrete data were summarized in terms of frequency counts and percentages. When values are missing, the denominator was stated. Chi-square test was used for comparison of categorical variables. Every effort was made to obtain missing data. A two-sided P value of less than 0.05 was considered to indicate statistical significance. All the data were checked and verified thoroughly. The data obtained from the study were compiled and standard calculator as well as computer software were used.

Ethical Clearance: All procedures of the present study were carried out in accordance with the principles for

human investigations (i.e., Helsinki Declaration) and also with the ethical guidelines of the institutional research ethics. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and analyzed using the coding system.

Results

Total of 840 patients with a complaint of hearing loss, who underwent PTA, were selected for the study. Among them 80 patients had normal hearing on both ears. So, a total of 760 patients had hearing loss on either one or both ears. Among them, most commonly affected age group was 21-30 years followed by 41-50 years group. Among 760 patients, 428 (56.31%) were male and 332 (43.68%) were female, and the male to female ratio was 1.28:1 (Table 1).

Table 1: Age and sex distribution of the respondents

Variables	Hearing Loss	Normal Hearing	Total
Age Group			
0 to 10 Years	57	7	64
11 to 20 Years	98	23	221
21 to 30 Years	147	16	163
31 to 40 Years	120	25	145
41 to 50 Years	134	7	141
51 to 60 Years	106	1	107
61 to 70 Years	71	1	72
71 to 80 Years	22	0	22
More Than 80 Years	5	0	5
Gender			
Male	428		473
Female	332		367
Total	760		840

Out of 760 patients, 82 cases (10.78%) had hearing loss in right ear only, 107 (14.07%) cases had hearing loss in left ear only, whereas 571 (75.15%) cases had bilateral hearing loss (Table 2).

Table 2: Involvement of ear in disease process (n = 760)

Ear Involved	Frequency	Percent
Only Right Ear	82	10.8
Only Left Ear	107	14.1
Both Ear	571	75.1
Total	760	100.0

In our study conductive hearing loss was the most common 663 (43.61%), followed by mixed 381(25.06%) and sensorineural 127(8.35%) hearing losses respectively. In right ear 332 (43.7%) was conductive, 192(25.3%) cases

were mixed and 52(6.84%) was sensorineural. whereas, in left ear, 331(43.55%) was conductive, 189(24.86%) was mixed and 75(9.86%) was sensorineural. (Table 3).

Table 3: Type of hearing loss among the patients (n=760)

Type of Hearing Loss	Right Ear	Left Ear	Total
Normal	184 (24.2%)	165 (21.71%)	349 (22.96%)
Conductive	332 (43.7%)	331 (43.55%)	663 (43.61%)
Sensorineural	52 (6.8%)	75 (9.86%)	127 (8.35%)
Mixed	192 (25.3%)	189 (24.46%)	381 (25.06%)
Total	760 (100%)	760 (100%)	1520 (100%)

On correlating the age groups with the type of hearing loss, conductive hearing loss was more common in younger age groups whereas mixed hearing loss was more common in older age groups. On evaluating degree of hearing loss, mild hearing loss was seen in 604 ears (39.73%), moderate in 316 (20.78%), severe in 125 (8.22%) and profound in 64 (4.21%) (Table 4).

Table 4: Type of hearing loss according the age group of patients (n = 760)

Age Group	Type of Hearing Loss		
	Conductive	Sensorineural	Mixed
0 to 10 Years	47	4	9
11 to 20 Years	80	11	7
21-30 Years	118	10	19
31 to 40 Years	85	7	28
41 to 50 Years	68	12	54
51 to 60 Years	41	14	51
61 to 70 Years	26	6	39
71 to 80 Years	4	8	10
More Than 80 Years	0	1	4

Regarding degree of hearing loss most common was mild 604 (39.73%) followed by moderate 316 (20.78%), sever 125 (8.22%), profound 64 (4.21%), moderately severe 62 (4.07%). (Table 5).

In this series regarding causes of hearing loss, most common cause was Chronic Suppurative Otitis Media 314(41.30%) followed by otitis media with effusion 136(17.89%), presbycusis 86 (11.31%), SSNHL 51(6.71%), otosclerosis 49(6.40%), congenital hearing loss 36(4.73%), NIHL 24 (3.15%), ET Tube dysfunction 23 (3.02%) (Table 6).

Table 5: Degree of Hearing Loss among the Patients (n = 760)

Degree of Hearing Loss	Right Ear	Left Ear	Total
Normal (<25 dB)	184 (24.21%)	165 (21.71%)	389 (22.96%)
Mild (26–40 dB)	283 (37.23%)	321 (42.23%)	604 (39.73%)
Moderate (41–55 dB)	151 (19.46%)	156 (21.71%)	316 (20.78%)
Moderately Severe (56–70 dB)	37 (4.86%)	25 (3.28%)	62 (4.07%)
Sever (71-90 dB)	67 (8.81%)	58 (7.63%)	125 (8.22%)
Profound (>90 dB)	38 (5.00%)	26 (3.42%)	64 (4.21%)

Table 6: Causes of Hearing Loss Among the Patients (n = 760)

Causes of Hearing Loss	Frequency	Percent
Chronic Suppurative Otitis Media	314	41.30
Otitis Media with Effusion	136	17.89
Presbycusis	86	11.31
SSNHL	51	6.71
Otosclerosis	49	6.40
Congenital hearing loss	36	4.73
NIHL	24	3.15
ET Tube dysfunction	23	3.02
Traumatic rupture of Tympanic Membrane	14	1.84
Meniere’s disease	10	1.31
Drug induce hearing loss	8	1.05
Ossicular discontinuity	7	0.92
Microtia and External Auditory Canal atresia	2	0.26
Total	760	100

Discussion

Hearing loss is a significant public health hazard in countries like Bangladesh. The prevalence of adult hearing impairment substantially higher in middle- and low-income countries than high-income countries⁶. WHO estimates 38,000 deaf children are born every year in South East Asian Region⁷⁻⁸. The pattern of hearing loss may vary from community to community, place to place, one geographic region to other and from hospital to hospital. Knowledge of pattern of hearing loss can help health personnel to make the proper diagnosis and treatment as per requirement. Such study helps in timely detection of the disease and treatment, ultimately will help in reducing morbidity and improve quality of life.

Hearing loss has a significant financial and socio economic burden in low and middle-income countries⁴. Hearing loss

has a negative impact on the individual, which may result into poor general health, poor academic performance, higher risk of unemployment and depression³. 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 life⁷.

In this study, pure tone audiograms of 840 patients who presented to ENT outpatient department with the complaint of hearing loss were analyzed. Among 840 patients, 80 patients had normal hearing on both ears. So, a total of 760 patients had hearing loss on either one or both ears. In this study, hearing loss was highest in 21 to 30 years age group and it was 147(19.34%). The next order was seen in age group of 41-50 and it was 134(17.63%), followed by 50-60 years which was 106 (13.94%). Lowest incidence was seen in age group of above 80 years which was 5(0.65%). These results are different from the study by Browning et al¹¹ which showed that the hearing loss was highest in 61 to 80 years age group (45.3%) followed by 41 to 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 Bangladesh.

In present study, maximum number of hearing loss was seen in 21-30 years followed by 41-50 years. This may be due to higher level exposure to risk factors among these age groups as 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 760 patients with hearing loss, 428 (56.31%) were male and 332 (43.68%) were female. The male to female ratio was 1.28:1. The study performed by Uju¹⁰ also found the higher prevalence of hearing loss in male as compared to female. Similar results have been shown by other studies^{11,12}. 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 health care services compared to females.

In present study bilateral hearing loss was seen in 571 (75.15%) cases and 189 (24.85%) had unilateral involvement. These results are similar to the studies by Rabbani et al⁸ and Varshney et al¹³ which have shown that bilateral hearing loss more common and similar distribution of right and left ear involvement.

In present study, conductive hearing loss was the most common 663 (43.61%), followed by mixed 381(25.06%) and sensorineural 127(8.35%) hearing losses respectively. In right ear 332 (43.7%) was conductive, 192(25.3%) cases were mixed and 52(6.84%) was sensorineural. Similarly, in left ear, 331(43.55%) was conductive, 189(24.86%) was mixed and 75(9.86%) was sensorineural. These results are similar to the findings of studies by Louw et al¹⁴, Shuaibu et al¹⁵ and Ichels et al⁹. In those study, Mild hearing loss was seen in 604 ears (39.73%), moderate in 316 (20.78%), severe in 125 (8.22%) and profound in 64 (4.21%). These findings are similar to the results of other studies^{9,12,14,15}.

Regarding Causes of hearing loss, most common cause was Chronic Suppurative Otitis Media 314(41.30%) followed by otitis media with effusion 136(17.89%), presbycusis 86 (11.31%), SSNHL 51(6.71%), otosclerosis 49(6.40%), congenital hearing loss 36(4.73%), NIHL 24 (3.15%), ET Tube dysfunction 23 (3.02%) & others.

Different series showed different most common etiology for hearing loss. One survey showed 24% cause of hearing loss due to genetic factor, while other survey showed otitis media with effusion was the most common (30.7%) cause followed by presbycusis (22.7%)^{16,17}. In this series chronic suppurative otitis media was found most (41.30%) common cause followed by otitis media with effusion (17.89%), presbycusis (11.31%). Pure tone audiometry is a simple and accurate and cheap conventional method for the diagnosis of hearing impairment.

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

Majority patients of hearing impairment belong to the working age group. Hence early identification with timely intervention can reduce the morbidity of deafness in this age group, which in turn helps to improve the productivity of the nation. Hearing impairment leads to social isolation in elderly persons as they become unable to participate in interaction. Childhood hearing impairment will undoubtedly play a role in education. In spite of, in Bangladesh context, the diagnosis is usually delayed until certain degree of hearing loss occurs. An early and adequate diagnosis has an important role in adapting sound amplification devices and rehabilitation procedures for auditory function in elderly. In pediatric age groups, cochlear implant is possible if deafness is identified in the early stage. This in turn helps to improve their language, social interaction and personal skills. Deafness prevention can be done only by mutual cooperation of both medical and nonmedical personnel. Improvement in health care delivery system and awareness programs can help in early diagnosis, treatment and rehabilitation of hearing impairment.

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