DOI: https://doi.org/10.54393/pbmj.v8i12.1308

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 12 (December 2025)

Original Article

OPEN ACCESS

Pattern and Causes of Hearing Loss Among Patients Visiting the GMT Clinic in Rawalpindi

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ARTICLE INFO

Keywords:
Pattern, Hearing Loss, Causes, Types, Degree, Sensorineural Hearing Loss

How to Cite:
Farhan, M., Munawar, H., Rasheed, M., Kaleem, S., Sanaullah, ., Zohaibullah, ., & Umer, Y. (2025). Pattern and Causes of Hearing Loss Among Patients Visiting the GMT Clinic in Rawalpindi: Pattern and Causes of Hearing Loss at GMT Clinic. Pakistan BioMedical Journal, 8(12), 24-28. https://doi.org/10.54393/pbmj.v8i12.1308

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Received Date: 16th October, 2025
Revised Date: 2nd December, 2025
Acceptance Date: 17th December, 2025
Published Date:31st December, 2025

ABSTRACT

An estimated 430 million individuals in the world, with 34 million children, need to have their disabling hearing loss rehabilitated. **Objectives:** To identify the nature, extent, and etiology of hearing impairments among patients visiting the Global Management Team (GMT) Clinic in Rawalpindi, Pakistan. **Methods:** The cross-sectional study was a quantitative observational study that was carried out between February, 2025 and May, 2025, involving 383 patients having hearing loss. A purposive sampling was used, which was non-probability. The data were gathered with the help of a self-administered questionnaire that was validated with a study involving ten respondents and regular audiological tests, such as pure-tone audiometry and tympanometry, conducted by a qualified audiologist. SPSS version 25.0 was used to conduct the data analysis through cross-tabulations and descriptive statistics. **Results:** Sensorineural hearing loss ranked highest (71.8%), conductive (14.7%), and mixed hearing loss (10.4%). The majority of patients were severely and profoundly impaired in hearing. The top causes were disease-related conditions (41.2) and presbycusis (31.8), and genetic factors, trauma, and noise exposure were less common. Bilateral and acquired hearing loss was predominant. **Conclusions:** The clinic is mostly affected by presbycusis and disease-related conditions, which are the major causes of severe to profound sensorineural hearing loss. The findings highlight the need to diagnose early, screen hearing regularly, and carry out public awareness to enhance prevention and treatment measures.

INTRODUCTION

Hearing impairment, which can be explained as the reduction of hearing ability, is a common chronic disorder that affects both children and adults [1, 2]. It affects more than a billion individuals around the world, with a number of adults and children abnormally reached (332 and 34 million, respectively) [3]. Approximately 700 million people, or 1 in 10 people, will suffer hearing impairment by the year 2050 [4]. It has a global burden that is equal to that of the other chronic diseases, including diabetes, arthritis, and hypertension [2, 3]. South Asia has the highest prevalence rate, followed by the Asia Pacific and Sub-Saharan Africa [5]. Almost 80 percent of disabling hearing impairment people reside in low-and-middle income countries (LMICs), so it is a silent and invisible illness [6]. The World Report on Hearing states that no individual is to lose hearing as a result of avoidable factors, and the hearing-impaired persons should receive rehabilitative and supportive treatment. Unattended hearing loss may have a considerable effect on language development, quality of life, education, economic independence, and mental well-being, which leads to an annual expenditure of more than USD 980 billion [7]. It is attributed to depression, cognitive impairment, and diminished social functioning [8, 9]. It has an impact on speech, learning, and development, resulting in poor academic results and social isolation [10, 11]. Patterns of hearing loss (HL) denote the way people

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perceive hearing impairment [3]. The hearing loss may be classified as conductive, sensorineural, or mixed. Conductive hearing loss involves the inability to transmit sound to the inner ear via the outer or the middle ear and is usually curable. Sensorineural deafness is caused by the destruction of the cochlea, auditory nerve, or the auditory pathways to the brain, whereas mixed deafness is caused by conductive and sensorineural aspects [2]. The loss of hearing may also be graded depending on the severity: mild (26-40 dB), moderate (41-55 dB), moderately severe (56-70 dB), severe (71-90 dB), and profound (91 dB) [12]. It is also categorized as congenital and acquired, but the latter is more widespread in the developing world. Genetic or maternal infections, birth complications, and exposure to medications are the congenital causes. Causes that are acquired are infections like meningitis, measles, mumps, chronic ear infections, ototoxic drugs, noise, and aging [13]. The recent research in the South Asian region has pointed to the high diversity in the causes and trends of hearing loss. A study on Frontier Medical College, Abbottabad, had reported conductive hearing loss as the most prevalent type, and chronic suppurative otitis media (CSOM) as the most common cause, especially in younger, rural, and socioeconomically disadvantaged groups [14]. In another study, sensorineural hearing loss was observed to be more common among adults with age, presbycusis, and noise exposure as the major factors, and chronic otitis media (COM) as a secondary cause [15]. Correspondingly, a massive retrospective study based in India documented sensorineural hearing loss in 78% of the cases, with presbycusis and ototoxicity being the most common causes, and most of the cases were also characterized by bilateral, mild to moderate hearing loss [1]. Such results show that regional variations exist and are dependent on age, environmental factors, and access to healthcare services in regard to the nature and causes of hearing impairment.

This study aimed to evaluate the nature, the degree, and the etiology of hearing loss in patients receiving tertiary care in an effort to facilitate early detection and raise awareness and specific interventions in the face of scarce local data.

METHODS

The study was carried out in the Global Management Team Rehab Centre on the Main Saidpur Road, opposite the Al Hameed Wedding Hall, at Kali Tanki Stop, and within the year, four months, starting in February through May, 2025. There was a total of 383 patients with hearing loss who were under the clinic during this period. The size of the sample was calculated by expected attendance at clinics and prevalence of hearing loss cases according to the regional studies to be sufficiently powerful. Non-probability purposive sampling technique was used to recruit the study participants that were on the inclusion criteria, that is, patients of any age and gender, and were willing to give verbal consent after being diagnosed with hearing loss. Patients who had a history of incomplete audiological data that was not complete, those who had ear surgery within the past six months, or had comorbid conditions, which might have affected their hearing. A self-designed questionnaire was used to gather the data, and the data were displayed in accordance with the study objectives and the aim to collect demographic data, history-related suspected causes of hearing loss, and audiological findings. A pilot study would be used to validate the questionnaire by taking ten respondents, to ascertain its clarity, relevancy and dependability. As a routine procedure, a certified audiologist administered audiological assessments, which comprised pure-tone audiometry and tympanometry, to determine the level of acuity of the condition. Potential confounders, which included age, sex, and previous contact with ototoxic drugs or noise, were captured and included in the analysis of data. SPSS version 25.0 was used to analyze the data. The data were summarized by descriptive statistics data including frequencies, percentages, and graphical tools, including bar charts, pie charts, and histograms. Cross-tabulations were used to investigate the relationship between important variables, and statistical methods were chosen based on the nature of the data, which was categorical.

RESULTS

The study sample consisted of 383 (211 men, 172 women), which was slightly male-dominated, and could be explained by occupational noise exposures, higher rates of health behavior seeking medical assistance, or cultural norms (16-18). Most of the respondents were 010 years, and secondly, 3160 years. Hearing difficulty in isolation or (a bit less often) in combination with other complaints was the most common to report; ear fullness and blockage were much less common (possibly because of middle ear pathology or because of cerumen impaction). The cases of Tinnitus and muffled hearing were relatively rare. Hearing loss was acquired in 277 participants (72.3%) and 106 participants (27.7%), respectively. Out of the people who had acquired loss, 50.9% were experiencing the loss for more than a year (1-5years), 24.9% less than six months (0-6years), 19.1% six to ten years (6-10 years), and a small fraction (more than 10 years). Another characteristic was bilateral hearing loss (93.7% versus unilateral hearing loss - 6.3%), with very little difference between the left and the right ear (54.2 and 45.8, respectively). Sensorineural hearing loss (SNHL) was the predominant type across all age groups, particularly in participants aged 0–10 years (97 cases) and 71–80 years (35 cases)(Figure 1).

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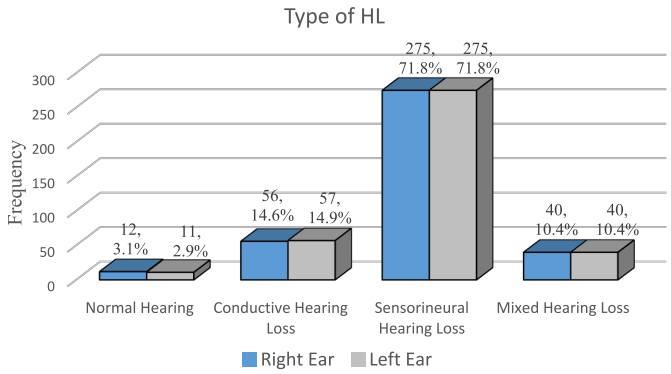

Figure 1: Type of Hearing Loss

Conductive hearing loss occurred more frequently among individuals aged 0–40 years, whereas mixed loss was primarily observed in the 11–50-year age group. Only 12 participants demonstrated normal hearing, predominantly younger individuals. SNHL was mostly severe (176 cases) or profound (70 cases), while conductive loss was typically mild (33 cases) or moderate (19 cases), and mixed loss was moderately severe (17 cases) or severe (21 cases). The most frequent disorders that were linked to SNHL were presbycusis (122 cases), perinatal complications (39 cases), genetic factors (29 cases), and meningitis (27 cases). In the conductive loss, it was found that the cause was mostly in otitis media (32 cases) and wax impaction (18 cases), whereas in mixed loss, the causes were mostly in otitis media (26 cases) and perinatal factors (3 cases) (Figure 2).

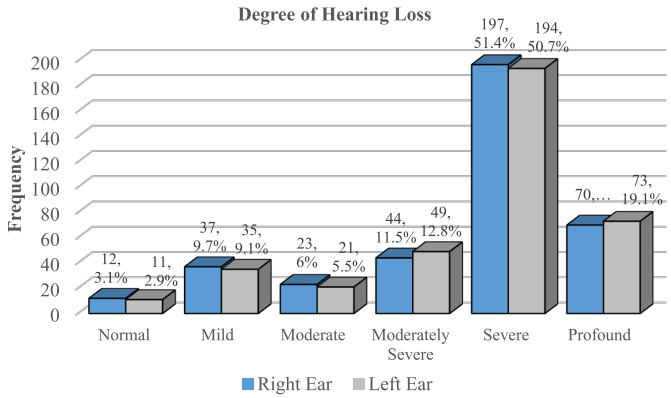

Figure 2: Degree of Hearing Loss

Pattern age-specific revealed that congenital hearing loss was found to be most within the age group of 0-10-year (94 out of 116 cases), which was mainly caused by perinatal complications (42 cases), genetic factors (27 cases) and meningitis (22 cases), compared to the participants above the age of 30; pre-eminence was in presbycusis (125 cases), otitis media (66 cases), and wax impaction (21 cases). Conditions known to result in the commonest causes of hearing loss such as otitis media, perinatal complications, and meningitis, and less frequent causes such as infections, perforation, allergies, brain tumors, high blood pressure, and infrequent causes such as cerebral palsy and ear discharge. Other causes 6.6% of cases consisted of ototoxicity, preterm birth, NICU hospitalization, foreign body, Eustachian tube dysfunction, and tinnitus (Figure 3).

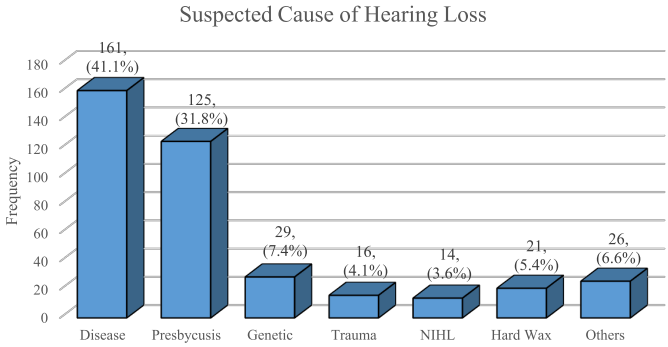

Figure 3: Suspected Cause of Hearing Loss

The overall results suggest that hearing impairment in this age group has two modes of age distributions: firstly, the congenital and disease-induced cases are most frequent among children, and secondly, age-related sensorineural losses occur among adults. Bidirectional participation and severe-to-profound SNHL were common, which underscores the importance of early diagnosis, positive preventive measures to reversible conditions such as otitis media and wax blockage, and attempts to intervene in the irreversible etiology, such as presbycusis and perinatal diseases.

DISCUSSION

This cross-sectional study, which used a quantitative design, was done during a period of three months in the GMT Clinic, Rawalpindi, and associated hearing loss in 383 study participants. There was very little difference between males and females (55.1%), which is in line with the trend of occupational exposure and health-seeking behavior [16, 17]. As stated in the introduction, hearing loss can significantly affect social well-being, work, psych emotional state, and academic success [18]. The sensorineural hearing loss (71.8%) was the most common type, and that is also correlated with the findings by Rwanda (72%) [19]. Conversely, nevertheless, 94.7% conductive loss was found by Al-Ani *et al.* indicating regional differences in etiology [4]. The majority of patients in our study experienced severe to profound bilateral loss, which is also observed in Rwanda (24% profound), while Ethiopia reported only 4% profound cases, possibly due to earlier intervention [19, 20]. The most common cause was disease-related (41.2%). Likewise, chronic suppurative otitis media was found to be common (29.5%) by Al-Balasi *et al.* [3]. On the other hand, Shuaibu *et al.* found higher rates of ototoxicity (9.7%) and presbycusis (16.7%) [2]. According to our data, presbycusis was the second most common cause (31.8%), which is consistent

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with the findings of Abraham *et al.* who discovered it in 52.8% of cases [13]. However, secretory otitis media (35.1%) was identified as the primary factor in the Iraqi study [4]. Our data's genetic factors (7.4%) were comparable to Gupta *et al.* 10% congenital or prenatal causes [1]. Similar to Rwanda (6.5%), trauma accounted for 4.1% of the cases, whereas noise-induced hearing loss (3.6%) was less common than in India's 8% [1, 19]. Additionally, ototoxicity was less common (2%) than in the Indian sample (10%), where aminoglycosides played a significant role [1]. In accordance with Nigerian data (63.2%), bilateral loss predominated (93.7%), in contrast to the higher unilateral rate (50.76%) in Iraq [2, 4]. 7.8% of respondents reported family history, which is comparable to the 13.5% reported by Khanal *et al.* in India [21]. SNHL was frequently associated with meningitis, perinatal problems, and presbycusis in our study. However, otitis media continued to be the leading cause in Yemen, resulting in primarily conductive loss [3]. Presbycusis predominated in older age groups, but genetic and perinatal factors were more prevalent in children under ten. In Rwanda, the majority of losses were caused by infection and ageing [19]. whereas Al-Ani *et al.* reported secretory otitis media across age groups [4].

CONCLUSIONS

Sensorineural hearing loss was identified as the most prevalent among patients, followed by conductive hearing loss, while mixed hearing loss was found to be the least prevalent. In terms of severity, the majority of participants were found to have a severe degree of hearing loss, followed by profound, moderately severe, moderate, and mild degrees in the respective order. Among the possible causes, disease-related conditions emerged as the most frequently reported factor, with age-related hearing loss (presbycusis) being the second most common cause observed in this population. Other contributors included genetic causes, trauma, noise exposure, and ototoxic medication use. The study showed that acquired hearing loss was significantly more common than congenital hearing loss. A high rate of bilateral hearing loss as compared to unilateral hearing loss was observed.

Authors Contribution

Conceptualization: MF, Z, YU
Methodology: MR, S
Formal analysis: HM
Writing and drafting: SK, S
Review and editing: MF, HM, MR, SK, S, Z, YU

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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