e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 188-191

Original Research Article

Hearing Loss in Diabetes/ Hypertension Patients

Md Imran Khan[1], Sweta Kumari[2], Shambhu Sharan[3]

[1]Senior Resident, Department of ENT, DMCH, Laheriasarai, Darbhanga, Bihar, India
[2]Senior Resident, Department of ENT, DMCH, Laheriasarai, Darbhanga, Bihar, India
[3]Associate Professor, Department of ENT, DMCH, Laheriasarai, Darbhanga, Bihar, India

Received: 03-12-2025 / Revised: 02-01-2026 / Accepted: 04-02-2026
Corresponding Author: Dr. Sweta Kumari
Conflict of interest: Nil

Abstract:

Background: Hearing loss is increasingly recognized as a common but underdiagnosed complication in patients with diabetes mellitus and hypertension. Both conditions contribute to microvascular damage, oxidative stress, and neuropathic changes that can impair cochlear function and auditory nerve pathways. This abstract reviews the association between diabetes, hypertension, and hearing impairment, highlighting possible mechanisms, clinical patterns, and the importance of early screening. Evidence suggests that individuals with diabetes have a higher prevalence of sensorineural hearing loss, often affecting high-frequency thresholds, while hypertension may worsen cochlear blood flow and accelerate age-related auditory decline. The coexistence of diabetes and hypertension appears to increase the risk and severity of hearing impairment compared to either condition alone. Early identification through routine audiological evaluation, along with strict glycemic and blood pressure control, may help reduce progression and improve quality of life. Integrating hearing assessment into chronic disease management can support timely intervention, including counseling, hearing aids, and preventive strategies.

Conclusion: Hearing loss is a frequent and often overlooked complication in patients with diabetes and hypertension, mainly presenting as sensorineural hearing loss. The combined effect of poor glycemic control and elevated blood pressure can worsen cochlear microvascular damage and neuropathy, increasing both the risk and severity of auditory impairment. Routine hearing screening, early diagnosis, and strict control of blood sugar and blood pressure are essential to prevent progression and improve overall quality of life in these patients.

Keywords: Diabetes Mellitus; Hypertension; Hearing Loss; Sensorineural Hearing Loss; Cochlea; Microvascular Complications; Neuropathy; Audiometry; High-Frequency Hearing Loss; Chronic Disease.

DOI: 10.25258/ijcpr.18.2.31

Introduction

Diabetes mellitus and hypertension are two of the most common chronic diseases worldwide and are major contributors to long-term vascular and neurological complications. While complications such as retinopathy, nephropathy, and cardiovascular disease are well recognized, hearing impairment is an emerging and often neglected health issue in these patients. Hearing loss can significantly affect communication, social interaction, work performance, and overall quality of life, especially when it remains undiagnosed for long periods.

The inner ear is highly sensitive to changes in blood supply and metabolic disturbances. In diabetes, chronic hyperglycemia can lead to microangiopathy, oxidative stress, and neuropathic damage, which may affect the cochlea and auditory nerve pathways. Similarly, hypertension can reduce cochlear blood flow and contribute to vascular insufficiency, further impairing auditory function. When diabetes and hypertension coexist, the combined effects may accelerate cochlear degeneration and increase the risk of sensorineural hearing loss.

Despite increasing evidence linking these conditions to hearing impairment, routine audiological screening is not commonly included in the clinical management of diabetic and hypertensive patients. Therefore, understanding the relationship between diabetes, hypertension, and hearing loss is important for early detection, prevention, and timely intervention. This study aims to highlight the prevalence and pattern of hearing loss among patients with diabetes and hypertension and emphasizes the need for integrating hearing assessment into chronic disease care.

Materials and Methods

This study was conducted on a total of 76 patients diagnosed with diabetes mellitus and/or hypertension. Department of ENT at Darbhanga Medical College and Hospital Laheriasarai Darbhanga. Study duration is one years. All

participants were selected from the outpatient/inpatient department of the hospital during the study period. A detailed clinical history was taken, including duration of diabetes and hypertension, medication use, and symptoms related to hearing impairment. General physical examination and systemic examination were performed for all patients. Blood pressure and blood sugar levels were recorded to assess disease status.

All patients underwent ear, nose, and throat (ENT) examination to rule out external or middle ear pathology. Hearing assessment was carried out using pure tone audiometry (PTA) in a sound-treated room to determine the type and degree of hearing loss. Hearing thresholds were measured at standard frequencies, and hearing loss was categorized based on audiometric findings. Patients with known causes of hearing loss such as chronic otitis media, history of ear surgery, prolonged noise exposure, ototoxic drug intake, or congenital hearing loss were excluded from the study.

The collected data were compiled and analyzed to evaluate the prevalence and pattern of hearing loss among diabetic and hypertensive patients.

Results

Out of the total 76 patients included in the study, a significant number showed evidence of hearing impairment on pure tone audiometry. The most common type of hearing loss observed was sensorineural hearing loss, predominantly affecting the high-frequency range. Hearing loss was more frequently seen in patients with a longer duration of diabetes and hypertension and in those with poor glycemic and blood pressure control. Patients having both diabetes and hypertension demonstrated a higher prevalence and greater severity of hearing loss compared to those with either condition alone. Overall, the findings suggest a strong association between chronic metabolic and vascular disorders and progressive auditory dysfunction.

Table 1: Distribution of Patients by Age Group (n = 76)

Age Group (years)	Number of Patients	Percentage (%)
30–40	10	13.2
41–50	18	23.7
51–60	26	34.2
61–70	16	21.1
>70	6	7.9
Total	76	100

Table 2: Gender Distribution (n = 76)

Gender	Number of Patients	Percentage (%)
Male	42	55.3
Female	34	44.7
Total	76	100

Table 3: Distribution Based on Diagnosis (n = 76)

Condition	Number of Patients	Percentage (%)
Diabetes mellitus only	22	28.9
Hypertension only	20	26.3
Both DM + HTN	34	44.7
Total	76	100

Table 4: Prevalence of Hearing Loss in Study Participants (n = 76)

Hearing Status	Number of Patients	Percentage (%)
Normal hearing	24	31.6
Hearing loss present	52	68.4
Total	76	100

Table 5: Type of Hearing Loss (n = 52)

Type of Hearing Loss	Number of Patients	Percentage (%)
Sensorineural hearing loss (SNHL)	44	84.6
Conductive hearing loss (CHL)	5	9.6
Mixed hearing loss	3	5.8
Total	52	100

Table 6: Degree of Hearing Loss (n = 52)

Degree of Hearing Loss	Number of Patients	Percentage (%)
Mild (26–40 dB)	18	34.6
Moderate (41–55 dB)	20	38.5
Moderately severe (56–70 dB)	10	19.2
Severe (>70 dB)	4	7.7
Total	52	100

Table 7: Hearing Loss in Relation to Diagnosis (n = 76)

Diagnosis	Total Patients	Hearing Loss Present	Percentage (%)
Diabetes only	22	12	54.5
Hypertension only	20	11	55.0
DM + HTN	34	29	85.3
Total	76	52	68.4

Discussion

Hearing loss is an important but often overlooked complication in patients with diabetes mellitus (DM) and hypertension (HTN). In the present study of 76 patients, a considerable proportion showed hearing impairment on pure tone audiometry, with sensorineural hearing loss (SNHL) being the most common type. This supports the view that chronic metabolic and vascular disorders can adversely affect cochlear function and auditory pathways.

The predominance of SNHL, particularly involving high-frequency hearing thresholds, can be explained by the vulnerability of the cochlea to reduced blood supply and metabolic stress. In diabetic patients, prolonged hyperglycemia is known to cause microangiopathy, thickening of the basement membrane, and reduced oxygen delivery to the inner ear structures. In addition, diabetic neuropathy may involve the auditory nerve, contributing to progressive hearing impairment. Similarly, hypertension can lead to vascular insufficiency, reduced cochlear perfusion, and ischemic changes, further worsening auditory function.

Another significant finding is that patients with both diabetes and hypertension had a higher prevalence and greater severity of hearing loss compared to those with either condition alone. This suggests a possible synergistic effect of both diseases on cochlear microcirculation. Long duration of illness and poor control of blood sugar and blood pressure were also associated with increased hearing loss, indicating that chronic exposure to these risk factors accelerates cochlear degeneration.

The findings highlight the need for routine hearing screening in diabetic and hypertensive patients, especially those with long-standing disease. Early detection can allow timely interventions such as counseling, hearing aids, and improved metabolic and blood pressure control to prevent further deterioration and enhance quality of life.

Overall, the study emphasizes that hearing loss should be considered a significant complication of diabetes and hypertension, and audiological assessment should be integrated into regular follow-up and management protocols.

Conclusion

Hearing loss is a frequent and often overlooked complication in patients with diabetes and hypertension, mainly presenting as sensorineural hearing loss. The combined effect of poor glycemic control and elevated blood pressure can worsen cochlear microvascular damage and neuropathy, increasing both the risk and severity of auditory impairment. Routine hearing screening, early diagnosis, and strict control of blood sugar and blood pressure are essential to prevent progression and improve overall quality of life in these patients.

References

1. Bainbridge KE, Hoffman HJ, Cowie CC. Diabetes and hearing impairment in the United States: audiometric evidence from the National Health and Nutrition Examination Survey, 1999–2004. Ann Intern Med. 2008;149(1):1–10.
2. Kakarlapudi V, Sawyer R, Staecker H. The effect of diabetes on sensorineural hearing loss. Otol Neurotol. 2003;24(3):382–386.
3. Frisina ST, Mapes F, Kim S, Frisina DR, Frisina RD. Characterization of hearing loss in older adults with type 2 diabetes. Hearing Research. 2006;211(1–2):103–113.
4. Akinpelu OV, Mujica-Mota M, Daniel SJ. Is type 2 diabetes mellitus associated with alterations in hearing? A systematic review and meta-analysis. Laryngoscope. 2014;124(3):767–776.
5. Horikawa C, Kodama S, Tanaka S, et al. Diabetes and risk of hearing impairment in adults: a meta-analysis. J Clin Endocrinol Metab. 2013;98(1):51–58.
6. Agrawal Y, Platz EA, Niparko JK. Prevalence of hearing loss and differences by demographic characteristics among US adults: data from

NHANES 1999–2004. Arch Intern Med. 2008;168(14):1522–1530.
7. Gates GA, Cobb JL, D'Agostino RB, Wolf PA. The relation of hearing in the elderly to the presence of cardiovascular disease and cardiovascular risk factors. Arch Otolaryngol Head Neck Surg. 1993;119(2):156–161.
8. Rosenhall U, Sundh V. Age-related hearing loss and blood pressure. Noise Health. 2006;8(31):88–94.
9. Brant LJ, Gordon-Salant S, Pearson JD, et al. Risk factors related to age-associated hearing loss in the speech frequencies. J Am Acad Audiol. 1996;7(3):152–160.
10. Cruickshanks KJ, Klein R, Klein BEK, et al. Cigarette smoking and hearing loss: the epidemiology of hearing loss study. JAMA. 1998;279(21):1715–1719.