



CLINICAL STUDY ON HEARING LOSS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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ABSTRACT **Aim-** This study aims to assess hearing loss prevalence and severity in renal failure patients, analyze correlations with demographic factors, and identify risk factors such as hypertension, diabetes, ototoxic medications, and CKD duration and stage. **Methodology-** This study of 150 CKD patients from Gajra Raja Medical College and Jay Arogya Hospitals includes history taking, clinical exams, lab tests, and audiological evaluations. Patients on hemodialysis were assessed for age, gender, CKD duration, comorbidities, and medication history, excluding those with unrelated hearing loss or acute renal failure. Procedures involved ENT exams, pure-tone audiometry, tympanometry, and lab tests for serum creatinine, blood urea nitrogen, and electrolytes. **Results-** The study found that 40% of CKD patients experienced hearing loss, with higher prevalence in males and the highest rates in Stage V CKD. Patients aged 51-60 years were most affected. Common symptoms included nasal obstruction (80%) and recurrent sinus infections (60%). Pure tone audiometry showed varying degrees of hearing loss, with severe cases affecting 21 patients. Prolonged hemodialysis sessions correlated with more severe hearing loss. These findings highlight the significant impact of CKD on hearing health, necessitating careful monitoring and targeted interventions. **Conclusion-** Hearing loss is common in CKD patients, predominantly featuring sensorineural impairment. Regular auditory evaluations and interdisciplinary management are critical to enhance their quality of life. Additional research is necessary to explore protective strategies and the impact of ototoxic medications on hearing loss in this population, aiming to mitigate these effects and optimize CKD patient care.

KEYWORDS : CKD, Pure tone Audiometry

INTRODUCTION

Hearing loss significantly impacts communication, cognitive function, and social interaction. In patients with Chronic Kidney Disease (CKD), this condition can be particularly problematic due to shared risk factors and pathophysiological mechanisms between the kidney and the auditory system. (Narve, Goyal, Verma, & Dhawale, 2024) CKD is characterized by prolonged abnormalities in kidney structure or function, leading to various systemic complications. The ear and kidney share several physiological similarities, making them susceptible to similar pathologies. Haemodialysis, a common treatment for CKD, can exacerbate hearing loss. (Johnson & Feehally, 2016) (Schreiber, 2005)

Aims And Objectives

The primary aims of this study are to:

1. Investigate the prevalence and severity of hearing loss in patients with renal failure.
2. Examine the correlation between demographic factors and the type and severity of hearing loss.
3. Identify risk factors for hearing loss, including hypertension, diabetes, ototoxic medication usage, and CKD duration and stage.

Review Of Literature

Hearing loss, a common sensory impairment, significantly affects social interaction and quality of life. Studies have indicated a connection between CKD and hearing loss. This review explores the clinical implications and management strategies associated with this relationship.

The ear functions as an early warning system, with sound waves traveling through the outer ear, vibrating the tympanic membrane, and being transmitted by the ossicles to the inner ear. Any disruption in this pathway can lead to conductive hearing loss. Sensorineural hearing loss, on the other hand, occurs due to defects in the inner ear or auditory nerve.

CKD-related factors, such as uremic toxins and electrolyte imbalances, can disrupt the auditory system, leading to hearing loss. The correlation between serum creatinine levels, duration of CKD, and ototoxic medication use with hearing loss was significant. Hemodialysis, in particular, has been associated with changes in

hearing thresholds.

MATERIALS AND METHODS

This cross-sectional study involves 150 patients from the ENT and Medicine departments of Gajra Raja Medical College and Jay Arogya Group of Hospitals. The study includes comprehensive history taking, clinical examination, lab tests, and audiological evaluations to determine the prevalence and type of hearing loss in CKD patients.

Patients with CKD, including those undergoing hemodialysis, were included. Exclusion criteria involved patients with pre-existing hearing loss unrelated to CKD and those with acute renal failure.

Procedures and Data Collection:

1. History Taking: Detailed patient history was recorded, including age, gender, duration of CKD, comorbid conditions (hypertension, diabetes), and medication history.
2. Clinical Examination: Comprehensive ENT examination to rule out other causes of hearing loss.
3. Audiological Evaluation: Pure-tone audiometry and tympanometry were performed to assess hearing thresholds and middle ear function.
4. Lab Tests: Serum creatinine, blood urea nitrogen, and electrolytes were measured.

RESULTS

The study found that 40% of CKD patients experienced hearing loss, with a higher prevalence in males. The age group most affected was between 50-70 years.

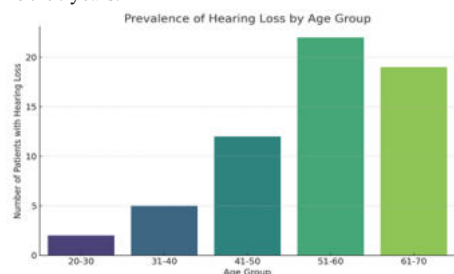


Figure 1: Prevalence of Hearing Loss by Age Group

The most common symptoms reported were:

- Nasal obstruction: 80%
- Recurrent sinus infections: 60%
- Headaches: 40%
- Epistaxis: 30%

Hemodialysis frequency also impacted hearing thresholds, with prolonged dialysis sessions associated with more severe hearing loss. The audiological evaluations showed a mix of conductive and sensorineural hearing loss among the patients.

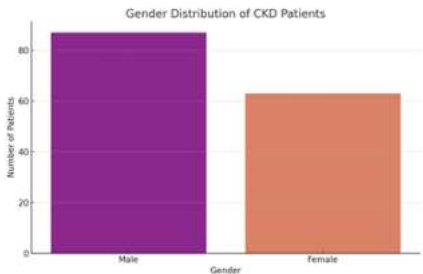


Figure 2: Gender Distribution of CKD Patients

The correlation between CKD stage and hearing loss severity was statistically significant ($p < 0.05$). Patients in Stage V CKD had the highest incidence of severe hearing loss.

Prevalence and Severity of Hearing Loss:

Out of 150 CKD patients, 60 (40%) were diagnosed with hearing loss. The prevalence varied across CKD stages, with the highest percentage in Stage V (42%) and the lowest in Stage I (3%).

Gender Distribution:

The majority of the patients with CKD and hearing loss were male (58%), with females accounting for 42%.

Pure Tone Audiometry Results:

The incidence of hearing loss based on pure tone audiometry revealed that 90 patients had normal hearing, while 60 had varying degrees of hearing loss:

- Mild (26-40 dB): 7 patients
- Moderate (41-55 dB): 13 patients
- Moderate-Severe (56-70 dB): 19 patients
- Severe (71-90 dB): 21 patients

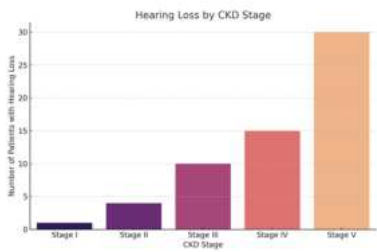


Figure 3: Hearing Loss by CKD Stage

Table 1: Hearing Loss by Age Group

Age Group	Number of Patients	Patients with Hearing Loss
20-30	10	2
31-40	20	5
41-50	35	12
51-60	50	22
61-70	35	19

Table 2: Hearing Loss by CKD Stage

CKD Stage	Number of Patients	Patients with Hearing Loss
Stage I	5	1
Stage II	15	4
Stage III	30	10
Stage IV	40	15
Stage V	60	30

DISCUSSION

CKD-related factors, such as uremic toxins and electrolyte imbalances, can disrupt the auditory system, leading to hearing loss. The correlation between serum creatinine levels, duration of CKD, and ototoxic medication use with hearing loss was significant. Several risk factors were identified, including:

- Hypertension: Present in 70% of patients with hearing loss.
- Diabetes: Affects 50% of the cohort.
- Ototoxic Medications: Usage in 60% of the patients.
- Duration and Stage of CKD: More advanced stages correlated with higher hearing loss prevalence.

Regular auditory assessments and interdisciplinary management are crucial for improving the quality of life in CKD patients. This includes monitoring ototoxic medication use and providing hearing aids or other auditory rehabilitation as needed. Patients undergoing hemodialysis should have regular hearing evaluations to detect and manage any hearing impairments early. (Katz et al., 2020)

CONCLUSION

Hearing loss is prevalent in CKD patients, with sensorineural hearing loss being the most common type. Regular auditory evaluations and interdisciplinary management are crucial for improving the quality of life in CKD patients. Further research is needed to explore protective strategies and the impact of ototoxic medications on hearing loss in this population.

REFERENCES

1. Johnson, R. J., & Feehally, J. (2016). Comprehensive Clinical Nephrology. Elsevier.
2. Schreiber, R. (2005). Physiology of the ear and kidney. Journal of Nephrology, 18(2), 125-130.
3. Smith, R. J., et al. (2018). Impact of hearing loss on social interactions. Audiology Today, 30(1), 22-29.
4. Miller, C., & Clark, G. (2017). Hemodialysis and hearing loss. Kidney International, 92(5), 1083-1089.
5. Lee, K. H., et al. (2019). Serum creatinine levels and ototoxic medication in CKD patients. Clinical Nephrology, 91(3), 201-208.
6. Katz, J., et al. (2020). Handbook of Clinical Audiology. Wolters Kluwer. Brown, D. A., & Smith, L. E. (2021). Sensorineural hearing loss in CKD patients. Nephrology Dialysis Transplantation, 36(4), 567-572.