

PREVALENCE OF HEARING IMPAIRMENT AMONG GOUT PATIENTS

Minahil Shanawar¹, Syeda Asfara Badar², Mehwish¹, Muzamal Jabbar¹, Amna Cheema¹, Saria Shahzadi¹, Aoun Muhammad¹, Tehreem Tariq³

1. Department of rehabilitation sciences, The university of Lahore
2. Chester medical School, University of Chester, United Kingdom
3. Audiologist, Shaikh Zayed Hospital, Lahore

ARTICLE INFO

Key words:

Gout, Hearing Impairment, Pure tone audiometry, Prevalence

Corresponding author:

Syeda Asfara Badar

Email: 2329802@chester.ac.uk

Vol 02 Issue 01
JAN-MAR 2024

ISSN Online: 2960-2599

ISSN Print: 2960-2580

Copyright 2023:

Pioneer Journal of Biostatistics and Medical Research (PJBMR) publishes under the policy of Creative Commons license.

ORIGINAL ARTICLE

ABSTRACT

Background:

The accumulation of uric acid crystals in the joints, which causes inflammation and discomfort, results in gout, a kind of arthritis. A limited amount of research suggests that systemic inflammation and some gout treatments may cause hearing impairment indirectly as a result of gout.

Objective: To find the prevalence of Hearing Impairment among gout patients. **Methodology:** A descriptive cross-sectional study was conducted at Mayo Hospital Lahore. Duration of the study was 6 months (April 2022 to September 2022). Sample size was 117. Non-probability (purposive) sampling technique was used. Patients of both gender (male and female) ages 35 to 50 years were included. Gout patients with other co-morbid factors, hearing impairment before onset of gout, history of ear discharge, middle ear surgery, family history of hearing impairment, sudden onset of hearing impairment, and family history of head trauma were excluded. For hearing evaluation, pure tone audiometry and record-keeping performa were used. SPSS version 23.0 package was used to

analyze data. Results: Out of 117 patients, majority of the patients were in the age groups 46-50 years 58 (49.6%). There were 44 (37.6%) male patients and 73 (62.4%) female patients. 50 (42.7%) patients experienced hearing impairment. The most frequent hearing impairment was sensorineural in 44 (37.6%) and majority of them 41 (35.0%) experienced hearing impairment of a mild to moderate degree. **Conclusion:** The study demonstrates a significant prevalence of hearing impairment in gout. The most frequent hearing impairment was sensorineural and mostly experienced hearing impairment of a mild to moderate degree.

INTRODUCTION

Gout is a common inflammatory disease characterized by an increase in the degradation of both endogenous and exogenous purines, resulting in an increase in uric acid production. It affects 8.3 million people in the United States (men 6.3 million and female 2.2 million).¹ The precise frequency of Gout in Pakistan is unclear, however a local research found that males in their late 40s had the largest incidence of gout, with a men to women 3:1 ratio.² The phrase 'rheumatic

disorders' refers to around 200 ailments that affect the ligaments, joints, tendons, bones and muscles, with arthritis indicating inflammatory disorders that are primarily restricted to the joints. Gout, osteoarthritis and rheumatoid arthritis are the most well-known rheumatic disorders.³

Gout treatment focuses on avoiding future outbreaks and controlling acute bouts. This could encompass inflammation and pain medications such as colchicine, nonsteroidal anti-inflammatory drugs (NSAIDs) and

corticosteroids, changes in lifestyle (such as weight management and eating habits), and uric acid-lowering medications (such as uricosuric medications or xanthine oxidase inhibitors). The long-term therapy is essential for avoiding problems associated with chronic gout, including as joint deterioration and the production of tophi (uric acid crystal deposits beneath the skin).⁴

The most frequently mentioned locations in the ears, where it shows as a hard yellowish subcutaneous lump on helical rim. Other sites of infection include the larynx (cartilage tissue, hyoid bone and false voice cords), the temporomandibular joint, the dorsal nasal septum, and the middle ear. Middle ear precipitations induce conductive type hearing impairment with frequent otoscopic abnormalities and challenging imaging diagnosis.⁵

Though the cause of disease is yet unknown, it has been reported that the mechanism of inner ear involvement can differ amongst rheumatological diseases. Cochlin-related autoimmune hearing impairment, autoantibodies, the development of granuloma, and vasculitis, all have been linked to a similar inflammatory response that destroys tissues.⁶ Gout-related persistent inflammation and oxidative damages may also contribute to the development of cochlear dysfunction.⁷ Gout patients were shown to have higher reactive oxygen species (ROS) and lower antioxidant enzyme concentrations. An overabundance of free radicals in the spiral ganglion neurons, cochlear sensory epithelium, and stria vascularis cells is well recognized as a major element in the cause of cell destruction in the inner ear, that may end up in a progression of sensorineural type hearing impairment.⁸ Corticosteroids and NSAIDs are two examples of gout medications that may have adverse effects that might

impact hearing. For instance, excessive doses of nonsteroidal anti-inflammatory drugs have occasionally been linked to tinnitus or temporary hearing impairment. Continuous and high-dose use of corticosteroids may potentially cause a rare adverse effect called auditory problems.⁹

There is no system of surveillance for rheumatic disorders in Pakistan, primarily due to ignorance of the condition. Prior to the introduction of various public health initiatives at both the state and non-state levels, infectious diseases accounted for the majority of deaths and morbidities. However, their incidence has since sharply decreased.¹⁰ On the prevalence of hearing impairment in gout patients at the national level, researchers have only found limited information. This subject gives the opportunity to explore the possible effects of persistent gout on auditory health, concentrating on hearing impairment.

MATERIAL AND METHODS

Study Design: it was cross-sectional descriptive study.

Sampling Techniques: Non-probability (purposive) sampling technique.

Setting: The study was performed at Mayo Hospital Lahore.

Duration: Duration was 6 months (April 2022 to September 2023).

Sample size: Sample size was 117 patients. Sample size was calculated on the basis of Hearing Impairment 44% by using 95% confidence level and 5% confidence interval.¹¹

Sample selection criteria

Inclusion criteria:

Patients of both gender (male and female) with ages 35 to 50 years were included in the study.

Exclusion criteria

Gout patients with other co-morbid factors, hearing impairment before onset of gout, history of ear discharge, middle ear surgery, family history of hearing impairment, sudden onset of hearing impairment, and family history of head trauma were excluded.

Data collection procedure

After taking the written consent from the patients, their hearing was assessed through pure tone audiometry (PTA) and record-keeping performa. First confirmation of the Gout patients through proper history. Otoscopy and PTA procedures were performed on patients who were brought to the Audiology OPD. Otoscopy procedures were carried out to see the tympanic membrane and the external ear canal. The rules of the PTA were explained to the patient. Headphones were first positioned on the ears. The examiner instructed the patient to hit the button when you hear a sound through the headphones. The process was repeated until true thresholds were attained

Data analysis

Data was analyzed through SPSS version 23.0 package. Data was analyzed through frequency and percentage.

RESULTS

According to Table 1, the majority of the 117 patients are in the age groups 46-50 years are 58 (49.6%). There are 44 (37.6%) male patients and 73 (62.4%) female patients. There are 41 (35.0%) lower-class patients, 69 (59.0%) middle-class patients and 7 (6.0%) upper-class patients.

According to the Table 2 majority of the patients 31 (26.5%) who have gout belongs to duration of 11 to 15 years. 46 (39.3%) patients experiences hearing impairment. 37 (31.6%) patients experiences bilateral hearing impairment and 9 (7.7%) experiences unilateral hearing impairment. The majority of patients 26 (4.3%) have hearing impairment between group 2 to 3 years. 42 (35.9%) patients have tinnitus and 37 (31.6%) patients have tinnitus in both ears

According to the Table 3, the most frequent hearing impairment is sensorineural 44 (37.6%), hearing impairment of conductive type is 4 (3.4%) and mixed type is 2 (1.7%). Most of them experience hearing impairment of a mild to moderate degree 41 (35.0%).

Table 1: Demographics:

Variables	Sub- Variables	Frequency (f) Percentage (%)
Age	36-40	27 (23.1%)
	41-45	32 (27.4%)
	46-50	58 (49.6%)
Gender	Male	44 (37.6%)
	Female	73 (62.4%)
Socioeconomic Status	Lower class	41 (35.0%)
	Middle class	69 (59.0%)
	Upper class	7 (6.0%)

Table 2: Patient's Perspective:

Variables	Sub- Variables	Frequency (f) Percentage (%)
Duration of Gout	0 to 5 years	65 (55.6%)
	6 to 10 years	21 (17.9%)
	11 to 15 years	31 (26.5%)
Do you feel hearing impairment?	Yes	46 (39.3%)
	No	71 (60.7%)
Do you feel hearing impairment in both ears?	Bilateral	37 (31.6%)
	Unilateral	9 (7.7%)
	None	71 (60.7%)
Duration of hearing impairment?	less than 1 year	9 (7.7%)
	1 to 2 years	11 (9.4%)
	2 to 3 years	26 (4.3%)
	None	71 (22.2%)
Do you have tinnitus?	Yes	42 (35.9%)
	No	75 (64.1%)
Do you have tinnitus in both ears?	Yes	37 (31.6%)
	No	80 (68.4%)

Table 3: Patient distribution based on type and degree of hearing impairment:

Variables	Categories	Frequency (%)
Degree of hearing impairment	Normal	67 (57.3%)
	Mild to Moderate	41 (35.0%)
	Moderate to Severe	8 (6.8%)
	Severe to Profound	1 (0.9%)
Type of hearing impairment	Normal Hearing	67 (57.3%)
	Conductive Hearing Impairment	4 (3.4%)
	Sensorineural Hearing Impairment	44 (37.6%)
	Mixed Hearing Impairment	2 (1.7%)

DISCUSSION

Present study shows that 50 (42.7%) patients experienced hearing impairment. In contrast a previous study conducted by Jasvinder A Singh to evaluate hearing impairment in gout patients. The findings revealed that hearing impairment is 44% more likely to develop in those with gout.¹² Another study conducted by

Wenhan Huang, to evaluate connection between gout and hearing loss. Results showed that gout had negative impact on hearing also showed that patient with gout had elevated thresholds of high frequencies.¹⁵ Another study conducted by Sherifa A Hamed, found that individuals with hyperuricemia exhibited lower transient evoked otoacoustic emissions

response levels, particularly at higher frequencies, in an otoacoustic emission investigation. According to their data, the time after gout diagnosis was substantially correlated with the lower transient evoked otoacoustic emissions.¹⁴ Another study conducted by Il Joon Moon found a substantial link between blood uric acid and the development of hearing loss in persons who are older than 40 years.¹⁵ Current study shows that majority of the patients 31 (26.5%) who have gout belongs to duration of 11 to 15 years which is more than 10 years of disease duration. A previous study conducted by Noha M. Abdelkader, to determine how severe gout affects hearing. Their study also revealed that people with disease that had been present for more than ten years were substantially more likely to have hearing impairment. In contrast a study conducted by Abitter Yücel. According to their results their mean duration of disease was 4 years. There was no relationship between disease duration and hearing levels due to the short disease duration.¹⁶

According to the result of current study the most frequent hearing impairment is sensorineural 44 (37.6%) with mild to moderate degree 41 (35.0%). In contrast a study conducted by Noha M. Abdelkader, to assess the effect of chronic gout on hearing. According to their findings, people with chronic gout had a noticeably greater risk of high frequency sensorineural hearing impairment.¹⁷ According to the present study, hearing impairment of conductive type is 4 (3.4%) and mixed type is 2 (1.7%). A previous study conducted by Stéphane Gargula. Their results showed that gout causes conductive hearing loss.¹⁸ Another study conducted by Joe Saliba in their research patients with gout showed mixed hearing loss.¹⁹ Another study conducted by Braun, urate crystals deposits in the middle

ear were the cause of conductive hearing impairment, according to a case study.²⁰

CONCLUSION

The study demonstrates a significant prevalence of hearing impairment in gout. The most frequent hearing impairment was sensorineural and mostly experienced hearing impairment of a mild to moderate degree.

LIMITATION

The main reason for the low patient ratio in such locations was the lack of or limited availability of audiological equipment in outlying areas.

RECOMMENDATION

- Further research is needed to better understand the nature and extent of this relationship
- Gout assessments should include audiometric tests to identify and treat any hearing impairment brought on by the condition or by treatment.

AUTHORS CONTRIBUTION

MS: Main author, **SAB:** Data analysis, **M:** Data collection,
MJ: Data collection,
AC: Literature review and final write up, **SS:** Data collection,
AM: Data interpretation, **TT:** Data interpretation

REFERENCES

1. Shah MS, Sajjad MM, Khan S, Khan ZU. Comorbidities in Patients Presenting with Gout at Tertiary Care Hospital Peshawar, A Cross Sectional Study, 2021 Pakistan. *Pak J Med Res.* 2022;61(4):150-153.
2. Shaikh AA, Altaf A. Prevalence of hyperuricemia in Sukkur; Pakistan: A cross sectional survey. *The Professional Medical Jour-*

- nal. 2019;26(09):1567-1569.
3. Mohsin Z, Asghar AA, Faiq A, et al. Prevalence of rheumatic diseases in a tertiary care hospital of Karachi. *Cureus*. 2018; 10(6)
 4. Olah ME. Anti-Inflammatory and Antipyretic Analgesics and Drugs Used in Gout. Side Effects of Drugs Annual. Elsevier; 2018:141-153.
 5. Reineke U, Ebmeyer J, Schütte F, Upile T, Sudhoff HH. Tophaceous gout of the middle ear. *OtolNeurotol*. 2009;30(1):127-128.
 6. Tsirves GK, Voulgari PV, Pelechas E, Asimakpoulos AD, Drosos AA. Cochlear involvement in patients with systemic autoimmune rheumatic diseases: a clinical and laboratory comparative study. *Eur Arch Otorhinolaryngol*. 2019;276:2419-2426.
 7. Prasad KN. Oxidative stress and pro-inflammatory cytokines may act as one of the signals for regulating microRNAs expression in Alzheimer's disease. *Mech Ageing Dev*. 2017;162:63-71.
 8. Kishimoto-Urata M, Urata S, Fujimoto C, Yamasoba T. Role of oxidative stress and antioxidants in acquired inner ear disorders. *Antioxidants*. 2022;11(8):1469.
 9. Ragab G, Elshahaly M, Bardin T. Gout: An old disease in new perspective—A review. *Journal of advanced research*. 2017;8(5): 495-511.
 10. HUSSAIN B, HUSSAIN A, YAQOUB Y, USMAN M, JAVED F, ANJUM MA. Study to Determine the Incidence of Rheumatic Diseases Among Rural Population of Pakistan. *Spine*. 5(14.3):111.
 11. sample size calculator. 24 june, 2022. Updated 24.5.2022. Accessed 24 june, 2022. <https://bmjopen.bmj.com/content/8/8/e022854.abstract>
 12. Singh JA, Cleveland JD. Gout and hearing impairment in the elderly: a retrospective cohort study using the US Medicare claims data. *BMJ open*. 2018;8(8):e022854.
 13. Huang W, Wang Y, Shen M. Gout with hearing loss. *Rheumatology and Immunology Research*. 2021;2(2):127-129.
 14. Hamed SA, El-Attar AM. Cochlear dysfunction in hyperuricemia: otoacoustic emission analysis. *Am J Otolaryngol*. 2010;31(3):154-161.
 15. Moon IJ, Byun H, Woo S-y, et al. Factors associated with age-related hearing impairment: A retrospective cohort study. *Medicine*. 2015;94(43)
 16. Yücel A, Yücel H, Aydemir F, et al. Determination of hearing levels in gout patients and factors affecting hearing levels such as the dislipidemia, hemoglobin levels and hyperuricemia. *Am J Otolaryngol*. 2020;41(5):102565.
 17. Abdelkader NM, El-Sebaie A, Mohamed EF. Effect of chronic gout on hearing: A prospective study. *Am J Med Medical Sci*. 2019;9(12):493-498.
 18. Gargula S, Poillon G, Daval M, et al. Tophaceous gout of the middle ear. *Journal of Otolaryngology*. 2019;14(4):155-157.