Research Square

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Age-Associated Psychological Distress in Tinnitus Patients With Middle Ear Stiffness Disorders: An Audiological and Clinical Evaluation

Mayank Mehra[1]

mayankmehra4560@gmail.com

Shree Guru Gobind Singh Tricentenary University

Vivek Kumar Jha[2]

Shree Guru Gobind Singh Tricentenary University

Research Article

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Abstract

Background

Conductive hearing loss due to middle ear stiffness disorders (otosclerosis, cholesteatoma, tympanosclerosis) is often accompanied by tinnitus. These can interfere with sound transmission and cause hearing impairment and psychological distress.

Objective

To assess the audiometric and psychometric status in tinnitus patients with stiffness-induced conductive hearing loss, focusing on age-related effects.

Methods

Fifty patients (aged 18–60 years) with tinnitus and conductive hearing loss from stiffness-related middle ear disorders were enrolled in this cross-sectional study. Pure tone audiometry (PTA) and impedance audiometry was used to assess hearing. The Tinnitus Handicap Inventory (THI), Tinnitus Functional Index (TFI) and Hospital Anxiety and Depression Scale (HADS) were used to quantify tinnitus and level of distress respectively. Data were analysed using SPSS version 25, with $p < 0.05$ considered significant.

Results

The prevalence of mild, moderate and moderately severe hearing loss was 50%, 30% and 20%, respectively. Distress was found in 75% of participants. The highest prevalence of distress was in those aged > 45 years (85%). TFI and THI scores showed a moderate-to-severe tinnitus severity. A statistically significant correlation was found between age and psychological distress ($p = 0.028$). Moreover, there was a high positive correlation between tinnitus severity and psychological distress ($r = 0.62$, $p = 0.001$).

Conclusion

Tinnitus has a negative impact on psychological function, especially in the elderly. Our results show the need for multifaceted audiological and psychological treatment strategies

Introduction

Tinnitus is the experience of hearing a sound when there is no external source of stimulation, often described as a ringing, buzzing or hissing sound. It may be caused by hearing loss and can lower quality of life. Stiffness of the middle ear, such as otosclerosis, cholesteatoma and tympanosclerosis, play a role in conductive hearing loss by restricting the movement of the ossicular chain and its ability to conduct sound. Such auditory deprivation can affect central auditory function and result in tinnitus. Tinnitus is also strongly associated with psychological distress, such as anxiety, depression, and social isolation. The level of distress can be influenced by age, tinnitus duration and coping strategies. The

purpose of this study is to assess the audiological features and the psychological impact in tinnitus patients with middle ear stiffness disorders and to investigate the impact of age on the level of distress.

Materials and Methods

Study Design

Cross-sectional study

Participants -

50 patients (18-60 years old) with tinnitus and conductive hearing loss due to stiffness.

Inclusion Criteria -

1. Stiffness-related conductive hearing loss -
2. Presence of tinnitus

Exclusion Criteria -

1. Sensori-neural hearing loss
2. Neurological and psychiatric history

Assessment Tools -

1. Pure Tone Audiometry (PTA)
2. Impedance Audiometry
3. Tinnitus Handicap Inventory (THI)
4. Tinnitus Functional Index (TFI)
5. Hospital Anxiety and Depression Scale (HADS)

Statistical Analysis

SPSS version 25 was used to analyse the data. A p-value < 0.05 was considered statistically significant.

Results

Table 1: Distribution of Hearing Loss

Degree of Hearing Loss	Number (n)	Percentage (%)
Mild	25	50
Moderate	15	30
Moderately Severe	10	20

The most common hearing loss severity was mild loss.

Table 2: Age-wise Distribution of Psychological Distress

Age Group (Years)	Total (n)	Distress (n)	Percentage (%)
18–30	12	7	58
31–45	18	13	72
45–60	20	17	85

Psychological distress was found to increase with age.

Tinnitus Severity (THI and TFI)-

Participants showed moderate to severe tinnitus severity. THI scores showed considerable emotional and functional distress, and TFI scores showed considerable interference with everyday activities and quality of life.

Psychological Status (HADS)-

Around 75% of people had clinically relevant levels of anxiety and depression. Older participants tended to have greater levels of distress.

Statistical Findings

- Chi-square statistical test: p = 0.028 (significant)
- Association between tinnitus severity and psychological distress: r = 0.62, p = **0.001**

Discussion

This study shows a significant relationship between tinnitus and psychological distress for patients with stiffness-related conductive hearing loss. Many patients reported anxiety and depression symptoms, suggesting that tinnitus not only affects hearing but also has a profound psychological impact. Distress

was more prevalent in older patients, likely due to the longer duration of symptoms and diminished ability to cope, as well as greater communication difficulties. These results are consistent with previous studies highlighting the multimodal effects of tinnitus. The application of validated instruments like THI, TFI and HADS provides more accurate results and highlights the need for holistic assessment in the management of tinnitus.

Conclusion

Psychological well-being is greatly affected by middle ear stiffness-related tinnitus, especially in the elderly. Early detection and a multifaceted approach is key. Multidisciplinary assessment and treatment by audiologists, otolaryngologists and psychologists is suggested to optimise clinical outcomes and quality of life.

Declarations

Conflicts of Interest

The authors have no conflicts of interest.

Ethics Statement

Human Ethics

Institutional Ethics Committee of Shree Guru Gobind Singh Tricentenary University approved this study.

Consent

All participants gave written consent for inclusion.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Author Contribution

Mayank Mehra: Conceptualisation, data collection, audiological evaluation, data analysis, writing manuscript •Vivek Kumar Jha: Methodology, supervision, manuscript review and editing

Acknowledgement

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Data Availability

Ethics StatementHuman EthicsInstitutional Ethics Committee of Shree Guru Gobind Singh Tricentenary University approved this study.ConsentAll participants gave written consent for inclusion.

References

1. Baguley D, McFerran D, Hall D. Tinnitus. *Lancet*. 2013;382(9904):1600–1607.
2. Langguth B. Treatment of tinnitus. *Curr Opin Otolaryngol Head Neck Surg*. 2015;23(5):361–368.
3. Henry JA, Dennis KC, Schechter MA. General review of tinnitus: prevalence, mechanisms, effects, and management. *J Speech Lang Hear Res*. 2005;48(5):1204–1235.
4. McKenna L, Handscomb L, Hoare DJ, Hall DA. A scientific cognitive-behavioral model of tinnitus: novel conceptualizations of tinnitus distress. *Trends Cogn Sci*. 2014;18(8):433–442.
5. Jastreboff PJ. Phantom auditory perception (tinnitus): mechanisms of generation and perception. *Neurosci Res*. 1990;8(4):221–254.
6. Newman CW, Jacobson GP, Spitzer JB. Development of the Tinnitus Handicap Inventory. *Arch Otolaryngol Head Neck Surg*. 1996;122(2):143–148.
7. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385–396.
8. Møller AR. Pathophysiology of tinnitus. *Ann Otol Rhinol Laryngol*. 1984;93(1 Pt 1):39–44.
9. Eggermont JJ, Roberts LE. The neuroscience of tinnitus. *Trends Neurosci*. 2004;27(11):676–682.
10. Axelsson A, Ringdahl A. Tinnitus—a study of its prevalence and characteristics. *Br J Audiol*. 1989;23(1):53–62.
11. Lockwood AH, Salvi RJ, Burkard RF. Tinnitus. *N Engl J Med*. 2002;347(12):904–910.
12. Shargorodsky J, Curhan GC, Farwell WR. Prevalence and characteristics of tinnitus among US adults. *Am J Med*. 2010;123(8):711–718.
13. Dobie RA. Depression and tinnitus. *Otolaryngol Clin North Am*. 1999;32(2):393–400.
14. Hesser H, Weise C, Westin VZ, Andersson G. A systematic review and meta-analysis of randomized controlled trials of cognitive behavioral therapy for tinnitus distress. *Psychol Psychother*. 2011;84(2):187–201.

Figures

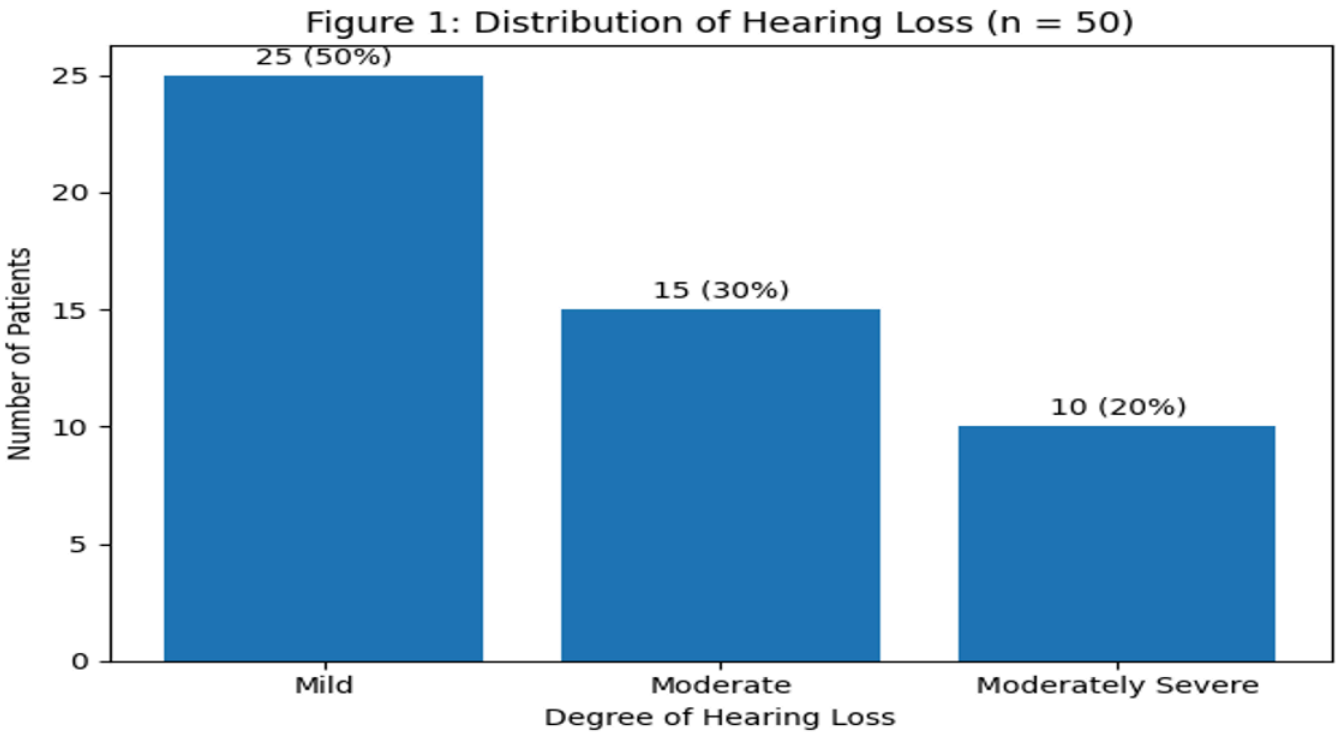


Figure 1

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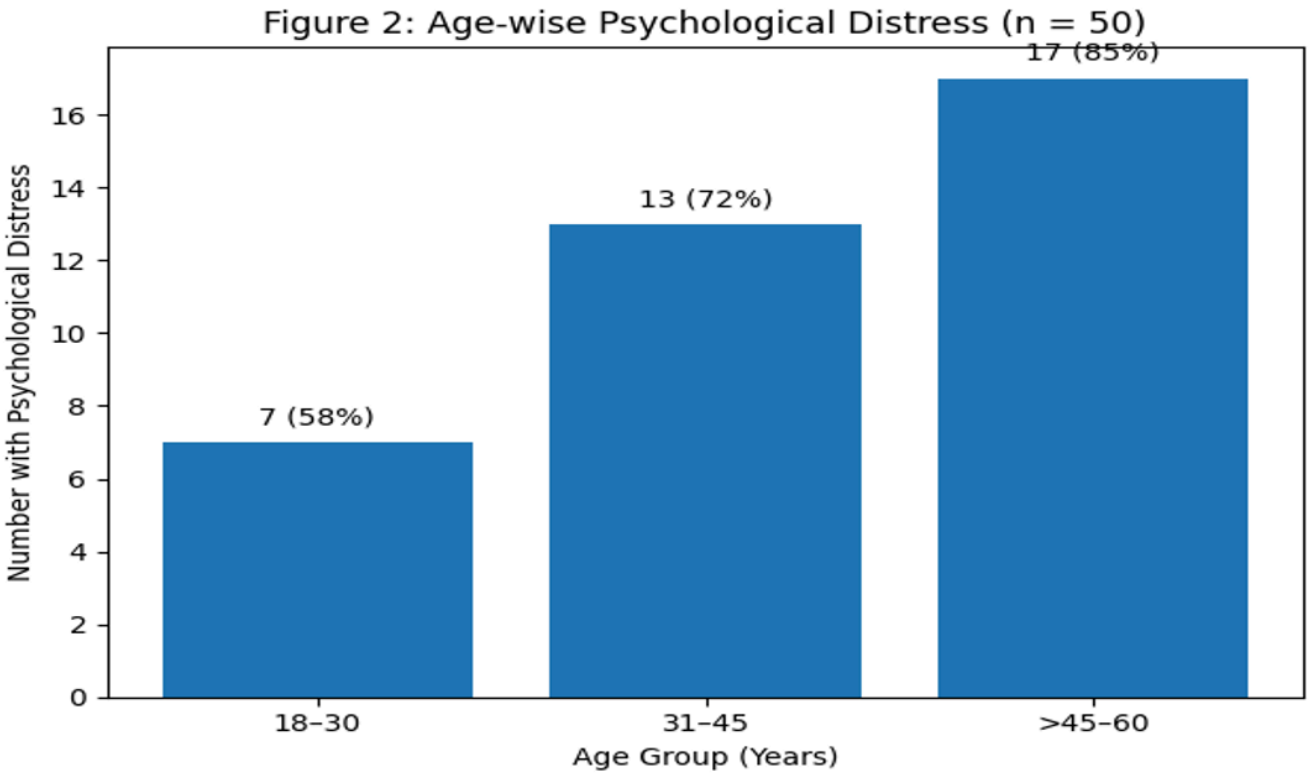


Figure 2

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