Quality of Life in Individuals with Tinnitus

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ABSTRACT

Background

Tinnitus, the perception of sound without an external acoustic stimulus, significantly impacts quality of life (QoL) and is often associated with hearing loss. Despite its prevalence, the psychosocial burden of tinnitus remains understudied in many populations.

Objective

This study evaluates tinnitus-related handicap and its association with emotional and social well-being in order to enhance treatment approaches.

Method

A descriptive cross-sectional study was conducted among 114 patients presenting with tinnitus at Dhulikhel Hospital, Nepal. The Tinnitus Handicap Inventory (THI) was used to assess severity, categorized as slight, mild, moderate, severe, or catastrophic. Audiometric evaluations classified hearing loss as conductive or sensorineural. Pearson's chi-square test was performed using SPSS version 21, with significance set at $p < 0.05$.

Result

The median age of participants was 40 years (IQR: 20.25), with a female predominance (60.5%). Hearing loss was present in 50% of participants, predominantly sensorineural (82.8%) and bilateral (62.1%). Tinnitus Handicap Inventory scores indicated moderate handicap in 37.5%, severe in 15.8%, and catastrophic in 5.0%. No significant association was found between Tinnitus Handicap Inventory severity and age, sex, or hearing loss type. However, participants with hearing loss had nearly three times higher likelihood of being severe-to-catastrophic handicap [COR: 2.74, 95% CI: 1.25 – 5.99] (p-value = 0.011).

Conclusion

Tinnitus imposes a substantial psychosocial burden, particularly in individuals with concurrent hearing loss. The findings highlight the need for early psychological intervention and multidisciplinary management to mitigate tinnitus-related distress and improve quality of life.

KEY WORDS

Hearing loss, Psychosocial impact, Quality of life, Tinnitus, Tinnitus handicap inventory

INTRODUCTION

Tinnitus is characterized as the conscious auditory perception of sound in the absence of an external acoustic stimulus, originating endogenously within the auditory system or perceived as emanating from within the cranial vault.[1,2] It is frequently classified as an auditory phantom phenomenon, analogous to neuropathic pain, wherein aberrant neural activity in the auditory pathways gives rise to a perceptual anomaly. Clinically significant tinnitus, which severely impacts quality of life (QoL), affects approximately 2% of the population.[3] Although the precise pathophysiological mechanisms underlying tinnitus remain incompletely elucidated, a well-established association exists between tinnitus and sensorineural hearing loss, implicating maladaptive neuroplasticity in the central auditory system.[4,5] Epidemiological studies have further delineated an age-related increase in tinnitus prevalence, with a substantial proportion of affected individuals refraining from seeking medical consultation despite the pervasive burden of their symptoms.[6,7]

As a common yet therapeutically challenging complaint in otorhinolaryngology outpatient departments (ENT OPDs) tinnitus often persists despite intervention due to its often-refractory nature, contributing to chronic distress and maladaptive cognitive and emotional responses that perpetuate a cycle of suffering. Given its impact, early psychological counseling may help mitigate its effects on QoL.[8,9] This study aims to systematically evaluate the quality of life among individuals presenting with tinnitus, elucidating the interplay between auditory dysfunction and its broader psychosocial consequences to improve therapeutic strategies.

METHODS

A descriptive cross-sectional study was conducted within the Department of Otorhinolaryngology and Head & Neck Surgery at Dhulikhel Hospital, Kathmandu University Hospital, Kavre. Prior to initiation, ethical approval was procured from the Institutional Review Committee of Kathmandu University School of Medical Sciences, Dhulikhel Hospital (Approval No. 262/2021). Informed consent was obtained from all participants, and in cases where subjects were below 18 years of age, assent was secured from their legal guardians.

The study encompassed all individuals presenting to the ENT OPD of Dhulikhel Hospital between June 2021 and September 2022 with a chief complaint of tinnitus, who were subsequently scheduled for audiological evaluation. Exclusion criteria included individuals unfit for audiometric assessment or those who declined participation. The final study cohort comprised 114 participants.

Given the utility of self-reported instruments in quantifying tinnitus severity, data collection was facilitated using the Tinnitus Handicap Inventory (THI), originally devised by Newman et al. in 1996. This validated assessment tool is widely utilized in clinical and research settings to systematically gauge the impact of tinnitus on daily functioning. The THI consists of 25 structured items, with responses categorized on a three-point Likert scale: “No” (0 points), “Sometimes” (2 points), and “Always” (4 points). The cumulative THI score, derived from summing individual item scores, stratifies patients into five tinnitus severity classifications: slight or no handicap (0–16), mild handicap (18–36), moderate handicap (38–56), severe handicap (58–76), and catastrophic impairment (78–100). Additionally, the questionnaire delineates three subscales-Emotional, Functional, and Catastrophic to assess the multidimensional impact of tinnitus on an individual’s psychological and daily well-being.

Comprehensive clinical evaluations were performed for all participants. A meticulous medical history was obtained, followed by a thorough otolaryngological examination in the OPD. Audiometric assessment was conducted using pure-tone audiometry (PTA) in a sound-attenuated chamber to determine both air conduction (AC) and bone conduction (BC) thresholds at octave frequencies of 250, 500, 1000, 2000, 4000, and 8000 Hz. This facilitated the classification of hearing status into normal auditory function or hearing impairment, which was further categorized as conductive hearing loss (CHL) or sensorineural hearing loss (SNHL).

Data were systematically curated and entered into Microsoft Excel, followed by statistical analysis using the Statistical Package for Social Sciences (SPSS), version 21. Descriptive statistics, including frequency distributions, percentages, medians, interquartile ranges (IQRs), as well as tabular and graphical representations, were employed to illustrate findings. Bivariate analysis was conducted using Pearson’s chi-square test to examine associations between independent and dependent variables. Statistical significance was established at a p-value threshold of < 0.05, with variables meeting this criterion considered to have a significant correlation with tinnitus severity.

RESULTS

A total of 114 participants were recruited for this study, comprising 69 females (60.5%) and 45 males (39.5%). The age distribution ranged from 15 to 85 years, with a median age of 40 years and an interquartile range (IQR) of 20.25 years. Majority of the participants were observed in the 25-39 year age group (42 individuals, 36.8%), followed by the 40-54 year age group (32 individuals, 28.1%) (Table 1).

Further clinical profiling included an assessment of the duration of tinnitus symptomatology and concurrent audiological evaluation. The majority of participants reported a symptom duration of less than 12 months, and half of them exhibited some degree of hearing impairment (Table 2).

Table 1. THI grading with number of participants with respect to the age and sex (n=114).

Variables	THI Score					Total	p-value*
	No handicap	Mild handicap	Moderate handicap	Severe handicap	Catastrophic		
Age (years)							
< 25	3	5	2	2	0	12	0.87
25 - 39	7	9	16	7	3	42	
40 - 54	4	9	15	3	1	32	
55 - 69	5	5	8	5	2	25	
≥ 70	1	0	1	1	0	3	
Sex							
Male	12	10	17	5	1	45	0.19
Female	8	18	25	13	5	69	

*Pearson's Chi-square test

Table 2. Duration of illness, presence of hearing loss among the participants (n=114)

Variable	N	%
Duration of illness		
Less than 6 months	49	43.0
6 - 12 months	31	27.2
13 months to 5 years	27	23.7
More than 5 years	7	6.1
Presence of hearing loss		
No	56	49.1
Yes	58	50.9
Total	**114**	**100**

Among those diagnosed with hearing loss, the predominant etiology was sensorineural hearing loss (SNHL), accounting for 82.8% of cases, with a bilateral presentation in nearly two-thirds (62.1%) of affected individuals (Table 3).

Table 3. Type and side of hearing loss among the participants who had hearing loss (n=58).

Variable	N	%
Type of hearing loss		
Conductive	10	17.2
Sensory Neural	48	82.8
Side of hearing loss		
Bilateral	36	62.1
Unilateral	22	37.9
Total	**58**	**100**

According to the Tinnitus Handicap Inventory (THI) classification of symptom severity, 21 individuals (17.5%) were categorized as having no or slight handicap, while 29 (24.2%) exhibited mild handicap. A considerable proportion, 45 individuals (37.5%), fell within the moderate handicap classification, whereas 19 (15.8%) demonstrated severe handicap, and 6 (5.0%) were classified as having a catastrophic handicap (Fig. 1).

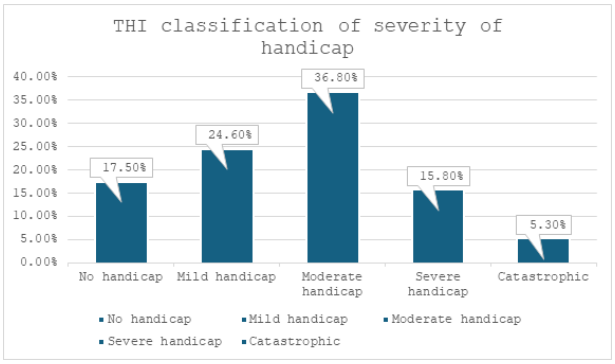

Figure 1. THI classification of severity among the participants (n=114).

Bivariate analysis was conducted to identify variables influencing THI scores. No statistically significant association was observed between THI severity and demographic factors such as age and sex (p-value = 0.87 for THI grading and age, and p-value =0.19 for THI grading and gender) (Table 1). Likewise, there was no any significant association between THI scores and the type of hearing impairment, whether conductive or sensorineural, unilateral or bilateral.

However, participants with documented hearing loss demonstrated significantly higher odds of experiencing a greater degree of tinnitus-related disability, as indicated by THI scores in the severe-to-catastrophic handicap range. Notably, individuals with hearing impairment had nearly three times higher odds of presenting with severe to catastrophic tinnitus handicap [Crude Odds Ratio (COR): 2.74; 95% Confidence Interval [CI]: 1.25-5.99; p-value= 0.011] a finding that was found statistically significant (Table 4).

Table 4. Showing the association between presence of hearing loss and THI scoring (n=108).

Hearing loss	THI score			COR [95% CI] (p-value)*
	Mild to moderate	Severe to catastrophic	Total	
Yes	31	24	55	2.74 [1.25 – 5.99] (0.011**)
No	17	36	53	1 (Ref)

*Crude Odds ratio at 95% Confidence Interval
** statistically significant

Overall, the majority of individuals either exhibited normal audiological function or were diagnosed with bilateral sensorineural hearing loss (Fig. 2).

DISCUSSIONS

The findings of this study underscore the profound impact of tinnitus on the quality of life (QoL) of affected individuals, aligning with existing literature that highlights the multifaceted nature of this condition.[5,10] Tinnitus, as a subjective auditory phenomenon, is not merely a sensory experience but also a significant source of psychological and emotional distress. The results demonstrate a clear association between tinnitus severity and diminished QoL, particularly in degree of tinnitus-related disability. This relationship is consistent with previous studies that have identified tinnitus as a chronic stressor capable of eliciting maladaptive psychological responses, including anxiety, depression, and reduced life satisfaction.[9,11-13]

One of the key observations in this study is elucidating the intricate relationship between tinnitus and its impact on quality of life (QoL), as well as the utility of the Tinnitus Handicap Inventory (THI) in categorizing the severity of tinnitus-related handicap.[14] The results highlight that tinnitus is not merely an auditory phenomenon but a complex condition with far-reaching consequences that extend into emotional well-being, daily functioning, and catastrophic thinking. Consistent with the framework presented in a review by Baguley et al., these results confirm the condition's multidimensional burden that disrupt various aspects of an individual's life.[7]

Emotionally, tinnitus was associated with heightened susceptibility to major depressive disorder, anxiety and significant deterioration in subjective well-being, particularly among those with severe or catastrophic THI scores.[15] Pre-existing psychological conditions, such as depression or anxiety, exacerbated the perceived severity of tinnitus, emphasizing the need to address emotional well-being in management strategies. Functionally, tinnitus disrupted daily activities, including concentration, work performance, and social interactions, with moderate to severe THI scores reflecting greater limitations.[16] Interventions like sound therapy or auditory training are crucial to mitigating these functional challenges.[17] Catastrophically, individuals in the catastrophic THI category exhibited maladaptive thought patterns, such as hopelessness and helplessness, which intensified their distress and perpetuated a cycle of suffering.

The disproportionate burden observed among females, characterized by higher rates of sleep disturbances, pain sensitivity, and depressive symptoms, further emphasizes the need for gender-sensitive approaches in tinnitus management.[18] Research suggests these gender differences may stem from variations in stress response and coping mechanisms between males and females. Evidence indicates women tend to demonstrate greater vulnerability to chronic stress exposure compared to men which may contribute to women's more intensive perception and reporting of tinnitus-related comorbidities.[18-20]

The absence of a definitive cure for tinnitus necessitates a focus on symptom management and coping strategies. Early intervention, particularly through structured psychological counseling, emerges as a critical component in mitigating the long-term impact of tinnitus on QoL.[10] Cognitive-behavioral therapy (CBT) and tinnitus retraining therapy (TRT) have shown promise in reducing tinnitus-related distress and improving emotional resilience, underscoring the importance of holistic, multidisciplinary approach to tinnitus management, tailored to the severity of the handicap as measured by the THI.[21]

Limitations of this study include its reliance on self-reported measures, which may introduce bias, and the cross-sectional design, which precludes causal inferences. Future research should employ longitudinal designs to explore the temporal dynamics of tinnitus and its impact on QoL, as well as investigate the efficacy of multidisciplinary interventions that combine audiological, psychological, and pharmacological approaches.

CONCLUSION

This study reinforces the significant relationship between tinnitus and reduced QoL, driven by both auditory and psychological factors. The findings advocate for early identification and comprehensive management strategies that address the emotional and cognitive aspects of tinnitus, aiming to alleviate distress and enhance the overall well-being of affected individuals. By adopting a patient-centered approach that integrates psychological support with audiological care, healthcare providers can better address the complex needs of individuals living with tinnitus and improve their quality of life.

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REFERENCES

1. Jastreboff PJ. Phantom auditory perception (tinnitus): mechanisms of generation and perception. *Neurosci Res.* 1990;8(4):221-54.
2. Tunkel DE, Bauer CA, Sun GH, Rosenfeld RM, Chandrasekhar SS, Cunningham ER, et al. Clinical practice guideline: tinnitus. *Otolaryngol Head Neck Surg*. 2014;151(2 Suppl):S1-S40.
3. Martines F, Bentivegna D, Martines E, Sciacca V, Martinciglio G. Characteristics of tinnitus with or without hearing loss: clinical observations in Sicilian tinnitus patients. *Auris Nasus Larynx.* 2010;37(6):685-93.
4. Henry JA, Dennis KC, Schechter MA. General review of tinnitus: prevalence, mechanisms, effects, and management. *J Speech Lang Hear Res.* 2005;48(5):1204-35.

5. Langguth B, Kreuzer PM, Kleinjung T, De Ridder D. Tinnitus: causes and clinical management. *Lancet Neurol.* 2013;12(9):920-30.

6. Krog NH, Engdahl B, Tambs K. The association between tinnitus and mental health in a general population sample: results from the HUNT Study. *J Psychosom Res.* 2010;69(3):289-98.

7. Baguley D, McFerran D, Hall D. Tinnitus. *Lancet.* 2013;382(9904):1600-7.

8. Martinez-Devesa P, Perera R, Theodoulou M, Waddell A. Cognitive behavioural therapy for tinnitus. *Cochrane Database Syst Rev.* 2010(9):CD005233.

9. 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. *Clin Psychol Rev.* 2011;31(4):545-53.

10. Cima RF, Maes IH, Joore MA, Scheyen DJ, El Refaie A, Baguley DM, et al. Specialised treatment based on cognitive behaviour therapy versus usual care for tinnitus: a randomised controlled trial. *Lancet*. 2012;379(9830):1951-9.

11. Westin V, Hayes SC, Andersson G. Is it the sound or your relationship to it? The role of acceptance in predicting tinnitus impact. *Behav Res Ther*. 2008;46(12):1259-65.

12. Halford JB, Anderson SD. Anxiety and depression in tinnitus sufferers. *J Psychosom Res*. 1991;35(4-5):383-90.

13. Alhazmi F KT, Mackenzie I, Graham K, Slumping V. An Investigation of the Impact of Tinnitus Perception on the Quality of Life. *J Phonet Audiol*. 2016;2.

14. Newman CW, Jacobson GP, Spitzer JB. Development of the Tinnitus Handicap Inventory. *Arch Otolaryngol Head Neck Surg*. 1996;122(2):143-8.

15. Holmes S, Padgham ND. Review paper: more than ringing in the ears: a review of tinnitus and its psychosocial impact. *J Clin Nurs.* 2009;18(21):2927-37.

16. Henry JL, Wilson PH, editors. The psychological management of chronic tinnitus : a cognitive-behavioral approach2001.

17. Jastreboff PJ. Tinnitus retraining therapy. *Prog Brain Res*. 2007;166:415-23.

18. Seydel C, Haupt H, Olze H, Szczepek AJ, Mazurek B. Gender and chronic tinnitus: differences in tinnitus-related distress depend on age and duration of tinnitus. *Ear Hear.* 2013;34(5):661-72.

19. McLean CP, Anderson ER. Brave men and timid women? A review of the gender differences in fear and anxiety. *Clin Psychol Rev*. 2009;29(6):496-505.

20. Kajantie E, Phillips DI. The effects of sex and hormonal status on the physiological response to acute psychosocial stress. *Psychoneuroendocrinology.* 2006;31(2):151-78.

21. Phillips JS, McFerran D. Tinnitus Retraining Therapy (TRT) for tinnitus. *Cochrane Database Syst Rev.* 2010;2010(3):CD007330.