

Frequency of Hearing Loss in Patients presenting with Tinnitus in Shalamar Hospital Lahore

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ABSTRACT

Background: In ENT Practice Tinnitus is one of the most common complaints from the patients. It is defined as sound perceptions without any external stimulus. Tinnitus can seriously affect quality of life in a large proportion of patients due to functional, psychological and emotional disturbances. Significant numbers of Tinnitus patients also suffer from hearing loss, with studies showing as much as 44.6% patients presenting for the first time with tinnitus to develop some degree of hearing loss over the subsequent years.

Aim: To find out the frequency and degree of hearing impairment in patients presenting with tinnitus using pure tone audiometry.

Methods: A descriptive cross sectional study conducted at outpatient department of ENT of Shalamar Hospital, Lahore from 5th January 2018 to 18th April 2018. All patients coming with the complaints of tinnitus were assessed for hearing loss through pure tone audiometry and examined by an ENT specialist for the condition of their tympanic membrane. Data was entered and analyzed by using SPSS version 20.

Results: A total of 110 patients (43 males and 67 females) presenting with tinnitus were evaluated. Pure tone Audiometric examination of Right ear revealed 76 patients (69%) with hearing loss, 34 patients had mild hearing loss. Moderate hearing loss was present in 29 patients while 13 patients had severe hearing loss. In left Ear 81 patients had hearing loss (73.6%) with 26 having mild degree, 34 patients with moderate degree and 21 patients as having severe degree hearing loss. The relationship of gender with tympanic membrane status came out to be statistically significant.

Conclusion: The frequency of hearing loss is quite high in pts presenting with tinnitus. Among 110 patients with tinnitus 76 had hearing loss in right ear (69%) and 81(73.6%) had hearing loss in left ear.

Keywords: Healing loss, audiometry, tinnitus

INTRODUCTION

In ENT Practice Tinnitus is one of the most common complaints from the patients. It is defined as sound perceptions without any external stimulus. Tinnitus can seriously affect quality of life in a large proportion of patients due to functional, psychological and emotional disturbances.¹⁻² worldwide many research studies have shown high prevalence of tinnitus, among United States population it is estimated 8 to 25.3%³⁻⁷ similarly, studies from other countries have found a somewhat similar prevalence of tinnitus from 4.6% to 30%¹.

Profound hearing impairment is more prevalent in countries where consanguineous marriages are common such as Pakistan. No definite epidemiological figures are available in Pakistan. However, it is estimated that prevalence of the disease is near about 10% of the population in our country. Incidence of the disease is nearly 3.5 per thousand which means about 0.5 million new cases are being sustained per year in Pakistan⁸.

Tinnitus is affecting about one in ten adults of the US population¹. This condition is quite prevalent in both the elderly population as well as the general population with hearing impairment^{2,3} Various risk factors and causes of tinnitus have been described, including otological, metabolic, neurological, cardiovascular, pharmacological and psychological diseases, but one condition that has been shown to be present in as much as 85-96% of patients presenting with tinnitus is varying degrees of hearing loss⁴.

The associations of hearing loss, noise exposure, stress, and depression with tinnitus are clear, whereas the roles of sex, alcohol consumption, smoking status, educational level, and income level differ among studies. A history of arthritis was suggested to be associated with tinnitus. Cardiovascular disease risk factors, such as high body mass index (BMI), hypertension, diabetes mellitus, cerebral stroke, angina, or myocardial infarction, have been analyzed as possible risk factors of tinnitus in other studies; however, their associations with tinnitus are controversial. Few studies have evaluated a relationship between occupation and tinnitus^{5,6}.

Tinnitus also presents as the first symptom of diseases usually diagnosed by hearing loss, with studies showing as much as 44.6% patients presenting for the first time with tinnitus to develop some degree of hearing loss over the subsequent years⁹.

Tinnitus may be unilateral which may affect only one ear and may be bilateral which may affect both ears. Tinnitus can be of two types. Tinnitus which can be heard only by patient is called subjective tinnitus, and which can even heard by the examiner is called objective tinnitus¹⁰.

Hearing loss is one of the auditory factors that frequently accompanied tinnitus. Many studies have shown that occurrence of tinnitus is related to the hearing loss or hearing impairment.¹¹

Causes of tinnitus includes hearing loss, Menier's disease, otitis media other conditions such as vascular disease, diabetes, autoimmune disorders, tympanic membrane perforation, rhino-sinusitis and balance problems (occurrence of dizziness or imbalance subjective positional vertigo, falling attack and vestibular dysfunction however, in many of the cases no symptoms of tinnitus may found¹²).

There is very limited data available in Pakistan on the incidence of tinnitus or the association of tinnitus with early hearing loss in the local population. This study, undertaken at Shalamar Hospital Lahore, a tertiary care private hospital, aims

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to assess the patients presenting with tinnitus in ENT OPD of Shalamar Hospital for hearing loss using pure tone audiometry, and to find out the frequency and degree of hearing impairment in those patients.

The objective of the study was to find out the frequency and degree of hearing impairment in patients presenting with tinnitus using pure tone audiometry.

METHODOLOGY

This was a descriptive cross sectional study conducted at outpatient department of ENT of Shalamar Hospital, Lahore from 5th January 2018 to 18th April 2018. Data was collected after informed consent through a proforma from all patients coming with the complaints of tinnitus. All patients were examined by an ENT specialist for the condition of their tympanic membrane and pure tone audiometry was used to assess hearing loss in both ears. Age, gender, occupation, area of residence and history of present illness were also recorded. Data was entered and analyzed by using SPSS version 20.

RESULTS

This cross sectional study was carried out at ENT Department of Shalamar Hospital, Lahore to find out the frequency of hearing loss among patients presenting with

tinnitus. In this study a total of 110 patients (43 males and 67 females) presenting with tinnitus were evaluated. Pure tone Audiometry was performed for both left and right ears. Pure tone Audiometric examination of Right ear revealed that 34 patients had mild hearing loss with 21 having mixed type and 9 having conductive hearing loss. (Table 1). Moderate hearing loss was present in 29 patients with 23 having mixed and 4 having Sensorineural hearing loss. It was found out that 13 patients had severe hearing loss in right ear. (Table 1). Left ear was also examined for hearing loss through pure tone audiometry. In left Ear 81 patients had hearing loss (73.6%) with 26 with mild degree, 34 patients with moderate degree and 21 patients as having severe degree hearing loss. (Table # 2). All the patients underwent otoscopic examination for the status of their tympanic membrane. Among all 91 patients had intact tympanic membrane, 11 had unilateral ruptured , whereas 8 patients had bilateral ruptured tympanic membrane.(Table 3). In order to determine the relationship of gender with tympanic membrane status cross tabulation was performed showing 4 male patients and 16 female patients had ruptured tympanic membrane. Chi-square test was applied and P-value came out to be 0.025 which is statistically significant .

Table1: Pure tone audiometric result of right ear (n=110)

Type and Degree of hearing loss	Frequency	%	Valid%	Cumulative%
Mild degree conductive hearing loss	9	8.2	8.2	8.2
Mild degree mixed hearing loss	21	19.1	19.1	27.3
Mild degree SNHL	4	3.6	3.6	30.9
Moderate degree conductive hearing loss	2	1.8	1.8	32.7
Moderate degree mixed hearing loss	23	20.9	20.9	53.6
Moderate degree SNHL	4	3.6	3.6	57.3
Normal hearing threshold	34	30.9	30.9	88.2
Severe degree hearing loss	12	10.9	10.9	99.1
Severe degree SNHL	1	.9	.9	100.0

Table 2: Pure tone audiometric result of left ear (n=110)

Type and degree of hearing loss	Frequency	%	Valid%	Cumulative%
Mild degree conductive hearing loss	6	5.4	5.4	5.5
Mild degree hearing loss	19	17.3	17.3	22.7
Mild degree SNHL	1	.9	.9	23.6
Moderate degree SNHL	3	2.7	2.7	26.4
Moderate degree conductive hearing loss	3	2.7	2.7	29.1
Moderate degree mixed hearing loss	28	25.5	25.5	54.5
Normal hearing threshold	29	26.4	26.4	80.9
Severe degree conductive hearing loss	1	.9	.9	81.8
Severe degree hearing loss	16	14.5	14.5	96.4

Table 3: Otoscopic Findings (n=110)

Condition of Tympanic Membrane	Frequency	%	Valid%	Cumulative%
Bilateral intact tympanic membrane	91	82.7	82.7	82.7
Ruptured Tympanic Membrane (Unilateral)	11	10.0	10.0	92.7
Ruptured Tympanic Membrane (Bilateral)	8.0	7.3	7.3	100.0

Table 4: Association of Gender with Ruptured Tympanic Membrane (n=110)

Gender	Otoscopic findings		Total
	Bilateral intact tympanic membrane	Tympanic membrane ruptured	
Male	39	4	43
Female	52	15	67
Total	90	20	110

P-value 0.025 Statistically Significant association as P- value < 0.05

DISCUSSION

This cross sectional study was conducted with objective to assess the patients presenting with tinnitus in ENT OPD of Shalamar Hospital for hearing loss using pure tone audiometry, and to find out the frequency and degree of hearing impairment in those patients.

On examination of right ear 76 patients out of 110 patients who presented with tinnitus had hearing loss of varying degree. Whereas in left ear 81 patients among all (n=110) who presented were having hearing loss. In 2006 a similar study was performed in Berlin evaluating 71 patients with hearing loss. Among them 41 presented with tinnitus (58%).¹³An Indian study also demonstrated high correlation between sensorineural hearing loss and tinnitus¹⁴. In our study majority of patients had mixed type of hearing loss. This relationship between Tinnitus and range of hearing loss was also confirmed by a study in Belgium in 2017.¹⁵Similar findings to our study were observed by a population based study carried out among Iraq and Afghanistan Veterans to determine the prevalence of both tinnitus and hearing loss, which came out to be 6.4%¹⁶.

Our study also examined the tympanic membrane of all the patients who presented with tinnitus. Otosopic findings revealed unilateral ruptured tympanic membrane in 11 patients whereas 8 patients had bilaterally ruptured tympanic membrane. Although tinnitus is the major complaint in case of ruptured tympanic membrane as shown by a Kashmiri study in 2016 in which majority of patients with ruptured tympanic membrane presented with tinnitus and conductive hearing loss.¹⁷ However aetiology of tinnitus is multiple thus in our study frequency of ruptured tympanic membrane among tinnitus patients is less. Our study has shown a statistically significant association of gender with ruptured tympanic membrane with predominance among females. This significant difference can be attributed to the poor health seeking behavior among females leading to neglected ear infections. The patterns and mechanisms of tympanic membrane rupture also differ among two sexes as depicted by a number of studies^{18,19}.

Limitations of the Study: We had a limited number of patients; therefore we are unable to comment in detail about the ruptured tympanic membrane and tinnitus association. A larger sample size would have allowed us to study these trends in detail.

CONCLUSION

The frequency of hearing loss is quite high in patients presenting with tinnitus. Among 110 patients with tinnitus 76 had hearing loss in right ear (69%) and 81 (73.6%) had hearing loss in left ear. Gender is statistically significant associated with ruptured tympanic membrane with predominance among females.

REFERENCES

1. Tinnitus Epidemiology: Prevalence, Severity, Exposures And Treatment Patterns In The United States . Bhatt J M, Harrison W.L., Bhattacharyya N. JAMA Otolaryngol Head Neck Surg. 2016 Oct 1; 142(10): 959–965
2. Lockwood AH, Salvi R, Burkard RF. Tinnitus. N Engl J Med. 2002;347:904–910. doi: 10.1056/NEJMra013395
3. Davis A, El Refaie A. Epidemiology of tinnitus. In: Tyler RS, editor. Tinnitus handbook. San Diego: Singular; 2000
4. Analysis of the Prevalence and Associated Risk Factors of Tinnitus in Adults . Kim H J, Lee H J, An S Y, Sim S, Park B, Kim S W, Lee J S, Hong S K, and Choi H G ,Hyung-Jong Kim PLoS One. 2015; 10(5):
5. Nondahl DM, Cruickshanks KJ, Huang GH, Klein BE, Klein R, Nieto FJ, et al. Tinnitus and its risk factors in the Beaver Dam offspring study. Int J Audiol. 2011;50: 313–320. doi: 10.3109/14992027.2010.551220
6. Shargorodsky J, Curhan GC, Farwell WR. Prevalence and characteristics of tinnitus among US adults. Am J Med. 2010;123: 711–718. doi: 10.1016/j.amjmed.2010.02.015[PubMed]
7. Nondahl DM, Cruickshanks KJ, Wiley TL, Klein BE, Klein R, Chappell R, et al. The ten-year incidence of tinnitus among older adults. Int J Audiol. 2010;49: 580–585.
8. Frequency and causes of hearing impairment in tertiary care center .Musani M A, Khan F A ,Rauf A , Ahsan M JPMA 2011; 61:141-44.
9. Sanchez TG, Mak MP, Pedalini MEB, Levy CPD, Bento RF. Tinnitus and Hearing Evolution in Normal Hearing Patients. Int. Arch. Otorhinolaryngol. 2005;9(3):220-227.
10. James A. Henry, Kyle C. Dennis, and Martin A. Schechter. General Review of Tinnitus. *Journal of Speech, Language, and Hearing Research*. October 2005;48():
11. Yuan F, Liu,1Jinwei Hu,1 Matthew Streelman,2 and O'neil W. Guthrie1,2,3. The Epworth Sleepiness Scale in the Assessment of Sleep Disturbance in Veterans with Tinnitus. *International Journal of Otolaryngology*.2015;():9
12. João Paulo Peral Valente1 Laiza Araújo Mohana Pinheiro1 Guilherme Machado de Carvalho1 Alexandre Caixeta Guimarães1 Raquel Mezzalira1 Guita Stoler1 Jorge Rizzato Paschoal1. Evaluation of factors related to the tinnitus disturbance. *International Tinnitus Journal*.2012;():5
13. König O, Schaette R, Kempter R, Gross M. Course of hearing loss and occurrence of tinnitus . Hearing Research 221 (2006) 59–64.
14. Goyal D , Gupta N. Study of correlation of tinnitus and sensorineural hearing loss . Journal of Advanced Medical and Dental Sciences Research : 2015;Vol. 3; 2, 11-15.
15. The relationship between tinnitus pitch and parameters of audiometry and distortion product otoacoustic emissions. .Keppler H, Degeest S, Dhooge I. J Laryngol Otol. 2017 Nov;131(11):1017-1025.
16. Prevalence of hearing loss and tinnitus in Iraq and Afghanistan Veterans: A Chronic Effects of Neurotrauma Consortium study. Author links open overlay panel. Swan A A, .Nelson J T, .Swiger B, Jaramillo C A, .Eapen B C, .Packer M, Pugh M J. Hearing Research, 2017:349; 4-12.
17. Wani A, Rehman A, Lateef S, Malik R, Ahmed A, Ahmad W, Kirmani M. Traumatic tympanic membrane perforation: An overview. Indian J Otol 2016;22:100-4.
18. Traumatic tympanic membrane perforations: characteristics and factors affecting outcome. Sogebi O A, Oyewole E A, Mabifa T O. Ghana Med J. 2018 Mar; 52(1): 34–40
19. Lou ZC, Lou ZH, Zhang QP. Traumatic tympanic membrane perforations: a study of etiology and factors affecting outcome. Am J Otolaryngol. 2012;33:549–555.