International Journal of Community Medicine and Public Health
Khan DA et al. Int J Community Med Public Health. 2022 Jan;9(1):145-148
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20214837

Original Research Article

Hearing impairment and associated socio-demographic characteristics in patients with tinnitus

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Received: 27 November 2021
Revised: 04 December 2021
Accepted: 06 December 2021

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ABSTRACT

Background: Tinnitus is a common ear problem and causes various somatic and psychological effects that has a bearing on the quality of life. Considerably high prevalence, distressing nature of the problem and the fact that it is associated with hearing impairment warrants an early recognition and appropriate timely intervention.
Methods: A total of 120 patients (60 with tinnitus and 60 without tinnitus) were included in the study. Data of putative socio-demographic factors and clinical examination findings were collected on a semi-structured questionnaire.
Results: The mean age of patients with tinnitus was 38.12±13.39 while that of patients without tinnitus was 40.85±15.26 (p=0.299). Around two-thirds (63.33%, 95% CI, 51.3–75.7%) of patients with tinnitus were males and the other one-third (36.67%, 95% CI, 24.3–48.7%) were females. Two-thirds (66.7%, 95% CI, 54.6–76.7%) of patients with tinnitus belonged to urban locality and the remaining one-third (33.3%, 95% CI, 23.3–45.4%) were from rural areas. On pure tone audiometry (PTA), hearing impairment was detected in 32 (53.3%, 95% CI, 42.0–68.3%) patients with tinnitus as compared to 13 (21.7%, 95% CI, 9.3–35.4%) patients without tinnitus.
Conclusions: Tinnitus was associated with hearing loss in considerable proportion irrespective of patients' own awareness of hearing loss. Therefore, patients should be educated regarding importance of seeking early healthcare. Although the benefits of available treatments are small, and the perception of tinnitus does not wane completely, it improves quality of life and reduces distress resulting from tinnitus.

Keywords: Tinnitus, Hearing impairment, Socio-demographic, Pure tone audiometry

INTRODUCTION

Tinnitus is the perception of sound when no actual external noise is present. While it is commonly referred to as "ringing in the ears," tinnitus can manifest many different perceptions of sound, including buzzing, hissing, whistling, swooshing, and clicking. In some rare cases, tinnitus patients report hearing music. Tinnitus can be both an acute (temporary) condition and a chronic (ongoing) health malady.[1]

Tinnitus is a common and troubling ear problem. It causes various somatic and psychological effects that has a bearing on the quality of life.[2] In a population based study the prevalence of tinnitus in older adults aged 48-92 years was found to be 8.2%.[3] In a systematic review, prevalence in children and adolescents ranged from 6% to 41.9%.[4] However, children seem less likely to be distressed by the perception of tinnitus.[5] Population based studies conducted across nations have found a similar prevalence of tinnitus, ranging from 4.6% to 30%.[6-10]

Tinnitus can have many different and diverse causes. It most commonly results from otologic disorders, with the most common cause believed to be noise-induced hearing loss.[11]

Other risk factors include obesity, smoking, alcohol consumption, previous head injuries, history of arthritis, and hypertension.[12-13]

Various drugs can trigger tinnitus, including salicylates, quinine, aminoglycoside antibiotics, and some of the antineoplastic agents, particularly the platinum-based drugs.[14] The condition can occur in association with many ear diseases, including otosclerosis, Ménière's disease, and vestibular schwannoma (acoustic neuroma).

Considerably high prevalence, distressing nature of the problem and the fact that it is associated with hearing impairment in significant proportion of patients warrants an early recognition and appropriate timely intervention.

The present study was designed to study the prevalence of hearing impairment and other associated risk factors in patients with tinnitus in our study population.

METHODS

Study area

This study was done in the department of otorhinolaryngology, Jawaharlal Nehru Medical College, Aligarh Muslim University (A.M.U.), Aligarh.

Study duration

The duration of the study was from November 2017 to September 2019**.**

Study design

The study was a comparative cross-sectional study.

Study population

A total of 120 subjects were studied including 60 patients presenting to ear nose throat outpatient department (ENT OPD) with tinnitus and another 60 without tinnitus presenting to ENT OPD with minor non-otological complaints.

Inclusion criteria

For patients with tinnitus: bilateral tinnitus, and patients with clinically normal ears with an intact tympanic membrane were included.

For patients without tinnitus: patients with no subjective or objective tinnitus, and patients with clinically normal ears with an intact tympanic membrane were included.

Exclusion criteria

For patients with tinnitus: any active rhinological or laryngological disease, and patients with objective tinnitus were excluded.

For patients without tinnitus: patients with major non-otological complaints or disease, and patients with any otological complaints were excluded.

Ethical approval

Ethical clearance was obtained from institutional ethics committee, Jawahar Lal Nehru Medical College, AMU, Aligarh.

Sampling

For cases, patients with bilateral tinnitus presenting to ENT OPD during study duration after due consideration of inclusion and exclusion criteria.

For controls, patients with minor non-otological complaints presenting to ENT OPD during study duration after due consideration of inclusion and exclusion criteria.

Data collection

A total of 120 patients presenting to the ENT OPD during the study duration were included in the study after due consideration of inclusion and exclusion criteria. Informed consent was obtained from all the participants. Data of putative socio-demographic factors and clinical examination findings were collected on a semi-structured questionnaire.

Hearing impairment assessment was done by pure tone audiometry (PTA) without masking. Distortion product otoacoustic emissions (DPOAE) values were recorded from both ears of each patient using duet, intelligent hearing system (IHS) in a sound proof room.

Data analysis

The data so collected was analyzed and presented as frequencies, percentages and 95% confidence intervals.

Appropriate tests of significance were applied where required.

RESULTS

A total of 60 patients with bilateral tinnitus and another 60 patients without tinnitus were studied. Socio-demographic characteristics of the two groups is presented in Table 1. The mean age of patients with tinnitus was 38.12±13.39 while that of patients without tinnitus was 40.85±15.26 (p=0.299, independent sample t test). Close to two-thirds

(63.33%, 95% CI, 51.3–75.7%) of patients with tinnitus were males and the other one-third (36.67%, 95% CI, 24.3–48.7%) were females while in the control group 55% (95% CI, 42.7–66.7%) patients were males and 45% (95% CI, 33.3–57.3%) were females.

Two-thirds (66.7%, 95% CI, 54.6–76.7%) of patients with tinnitus belonged to urban locality and the remaining one-third (33.3%, 95% CI, 23.3–45.4%) were from rural areas. On the other hand, 60% (95% CI, 46.7–71.3%) of patients in the control group were from urban areas and 40% (95% CI, 28.7–53.3%) belonged to rural locality. Both the groups were similar in baseline socio-demographic characteristics (p>0.05) (Table 1).

Table 1: Socio-demographic characteristics of patients.

Variable	Tinnitus group (%)	No tinnitus group (%)	Significance
Age-group (in years)			
0-20	5 (8.3)	8 (13.3)	P=0.155 χ^2=5.244 df=3
21-40	32 (53.3)	20 (33.3)	
41-60	20 (33.3)	26 (43.3)	
>60	3 (5)	6 (10)	
Gender			
Male	38 (63.3)	33 (59.2)	P=0.353 χ^2=0.862, df=1
Female	22 (36.7)	27 (45)	
Residence			
Rural	20 (33.3)	24 (40)	P=0.449 χ^2=0.574, df=1
Urban	40 (66.7)	36 (60)	

Table 2: Association of gender and locality with tinnitus.

Variable	Frequency (%)	Significance
Gender		
Male	38 (63.3)	P=0.039 One sample binomial test
Female	22 (36.7)	
Residence		
Rural	20 (33.3)	P=0.014 One sample binomial test
Urban	40 (66.7)	

Among the patients with tinnitus, 16 (26.6%, 15.5–37.8%) subjectively complained of having some degree of hearing loss. However, on PTA, hearing impairment was detected in 32 (53.3%, 95% CI, 42.0–68.3%) patients with tinnitus as compared to 13 (21.7%, 95% CI, 9.3–35.4%) patients without tinnitus (p=0.010, χ^2=12.836, df=1). On further evaluation with DPOAE audiogram to assess the function of outer hair cells in cochlea, significant decrease in amplitude was noted in 49 (81.7%, 95% CI, 71.8–91.5%) patients of tinnitus group and 24 (40%, 95% CI, 27.6–52.4%) patients of non-tinnitus group (p<0.001, χ^2=21.677, df=1).

Table 3: Assessment of hearing and outer hair cell (cochlear) function.

Variable	Tinnitus group (%)	No tinnitus group (%)	Significance
Hearing impairment (assessed with pure tone audiometry)			
Present	32 (53.3)	13 (21.7)	P=0.010, χ^2=12.836, df=1
Absent	28 (46.7)	47 (78.3)	
Outer hair cell function (assessed with DPOAE)			
Significant decrease in amplitude	49 (81.7)	24 (40)	P<0.001, χ^2=21.677, df=1
Within normal limits	11 (18.3)	36 (60)	

DISCUSSION

Tinnitus is a distressing symptom in itself but it's also troublesome because of its association with hearing loss. In our study 26.6% patients reported of having subjective hearing loss. This is close to 32.5% reported by Al-Swiahb et al.[15] On objective evaluation with PTA audiogram, 53.3% of were found to have hearing loss. On further evaluation with DPOAE cochlear outer hair cell dysfunction was noted in 81.7% of patients with tinnitus. This underscores the importance of thorough evaluation of all patients with tinnitus irrespective of subjective perception of hearing loss.

Increasing prevalence of tinnitus with age has been reported by Xu et al.[16] Particularly higher prevalence in adults above 50 years has been reported by Moller and Shargorodsky et al.[17,18]

However, our study population of tinnitus group predominantly consisted of younger patients with mean age of 38.12 years which may be attributed to selective attendance of younger patients at our tertiary centre. We found a higher proportion of male tinnitus patients as compared to their female counterparts (63.33% versus 36.67%) (Table 2). In our opinion this may be due to higher exposure of males (who are primarily working members of the family and spend a greater time outside) to noise. Work related exposure to noise has been reported to be associated with tinnitus by Quaranta et al and Sindhusake et al.[19,20]

We also found a higher proportion of patients from urban areas as compared to rural areas (66.7% versus 33.3%) (Table 2). This again may be a result of higher exposure to noise in urban localities.

Limitations

This was a hospital based study at a tertiary care centre and therefore it is subject to selection bias.

CONCLUSION

In the present study, tinnitus was associated with hearing loss in considerable proportion irrespective of patients' own awareness of hearing loss. Therefore, patients should be educated regarding tinnitus and importance of seeking early healthcare. Although the benefits of available treatments are small, and the perception of tinnitus does not stop completely, it improves quality of life and reduces awareness and distress resulting from tinnitus. Exposures to cytotoxic drugs, ototoxic antibiotics, and noise have been recognized as risk factors for tinnitus. Public awareness should also be created regarding these factors.

ACKNOWLEDGEMENTS

Authors would like to thank the patients for their participation and co-operation in this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Khan DA, Varshney PK, Zubair MY, Anas M. Hearing impairment and associated socio-demographic characteristics in patients with tinnitus. Int J Community Med Public Health 2022;9:145-8.