

Background

Subjective tinnitus is a common symptom in the general population, and there is often an underlying otological cause. Tinnitus is a frequent complaint in patients with chronic otitis media (COM) alongside hearing loss and ear discharge [1]. The epidemiology of tinnitus in patients with COM, including the prevalence of severe tinnitus and associated risk factors, remains unclear.

Over the last two decades, disease-specific patient-reported instruments have facilitated standardization of symptom reporting in COM, complementing traditional markers of disease activity such as clinical assessment and audiometry. Such tools capture the overall burden of disease from the patients' perspective and provide a comparable measure of health-related quality-of-life (HRQoL). In 2018-19, a multinational collaborative project was performed, utilizing the Chronic Otitis Media Questionnaire-12 (COMQ-12) to assess patient-reported HRQoL in nine otology centres across eight countries [2]. Based on this dataset, this study investigated the degree of tinnitus-related annoyance in patients with COM and analyzed whether associations with tinnitus severity exist.

Methods

- Adult patients (16 years and older) with a diagnosis of COM in outpatient settings
- Tinnitus severity was assessed using participant responses to item 7 of a native version of the COMQ-12
- Audiometric data and otoscopic assessment (discharging; perforated TM; cholesteatoma) were recorded
- The following variables were considered as potential risk factors for tinnitus severity: (a) age, (b) overall hearing disability, (c) worse-ear hearing, (d) ear discharge, (e) cholesteatoma, (f) disease-specific HRQoL, and (g) geographical region
- An ordinal logistic regression model was used to study the association between the defined variables and tinnitus severity
- Gender was not recorded for UK study participants and therefore has not been adjusted for in the present analysis
- To model a geographic effect, we used the following region classifiers: Europe (France, Italy, Turkey, UK) and Asia (China, Japan, Korea)

Tables

Table 1. Distribution of tinnitus severity and associated participant characteristics (n=478)

Severity of tinnitus [†]	n (%)	Mean Age (SD)	Mean Hearing [‡] (dB, SD)	Overall HRQoL [§] (SD)
0	114 (23.8)	52.8 (19.7)	33.4 (18.5)	16.6 (9.8)
1	83 (17.4)	47.9 (19.1)	33.0 (18.8)	17.4 (9.0)
2	74 (15.5)	46.0 (17.7)	29.0 (15.8)	22.6 (11.3)
3	72 (15.1)	48.7 (17.3)	31.3 (17.2)	24.4 (9.8)
4	71 (14.9)	48.3 (18.1)	31.7 (17.1)	28.6 (9.6)
5	64 (13.4)	43.0 (15.4)	35.1 (22.4)	34.1 (10.9)

[†]Tinnitus severity was determined by participant responses to item 7 in the Chronic Otitis Media Questionnaire-12 (COMQ-12). Answers were presented using a 6-point Likert scale (0 = no inconvenience, 1 = minor inconvenience, 2 = moderate inconvenience, 3 = major inconvenience but can cope, 4 = major inconvenience and difficulty coping, 5 = worst thing ever affected life).

[‡]Overall hearing disability as calculated according to the Department of Health and Social Security (DHSS) formula: [(4 x better hearing ear) + (worse hearing ear)]/5.

[§]Mean total COMQ-12 score excluding item 7.

Abbreviations: dB, decibels; HRQoL, health-related quality-of-life; SD, standard deviation.

Table 2. Ordinal logistic regression analysis of factors associated with severity of tinnitus in patients with chronic otitis media (n=478)

Factors	Unadjusted OR (95% CI)	p	Adjusted OR (95% CI)	p
Age	0.99 (0.98, 1.00)	0.0033	0.99 (0.98, 1.00)	0.1092
Overall hearing disability [†]	1.00 (0.99, 1.01)	0.9770	1.00 (0.99, 1.02)	0.8472
Worse-ear hearing	1.00 (0.99, 1.01)	0.6876	1.00 (0.99, 1.01)	0.6809
Ear discharge (absent vs. present)	1.23 (0.80, 1.91)	0.3499	1.78 (1.10, 2.86)	0.0182
Cholesteatoma (absent vs. present)	1.96 (1.26, 3.05)	0.0028	1.77 (1.12, 2.82)	0.0155
Disease-specific HRQoL [‡]	1.09 (1.08, 1.11)	<0.0001	1.09 (1.07, 1.11)	<0.0001
European countries vs. Asian countries	1.49 (1.06, 2.10)	0.0206	1.20 (0.83, 1.71)	0.3330
European countries vs. Colombia	0.29 (0.17, 0.50)	<0.0001	0.65 (0.36, 1.18)	0.1540
Colombia vs. Asian countries	5.15 (2.91, 9.12)	<0.0001	1.85 (0.97, 3.52)	0.0628

[†]Overall hearing disability as calculated according to the Department of Health and Social Security (DHSS) formula: [(4 x better hearing ear) + (worse hearing ear)]/5.

[‡]Total Chronic Otitis Media Questionnaire-12 (COMQ-12) score excluding item 7.

Significant p values are highlighted in bold.

Abbreviations: CI, confidence interval; HRQoL, health-related quality-of-life; OR, odds ratio.

Key Results

1. In our multinational cohort of 478 patients with COM, 58.9% reported suffering from tinnitus of at least moderate severity
2. Three variables were found to be significantly associated with increasing tinnitus severity: absence of ear discharge, absence of cholesteatoma, and poorer disease-specific HRQoL
3. Age, overall hearing disability, worse-ear hearing, and geographical region showed no association with severity of tinnitus in the adjusted analyses

Conclusion

- Both ear discharge and cholesteatoma appear to be inversely associated with perceived tinnitus severity
- It is possible that when patients with COM have a discharging ear, cholesteatoma, or both, there is an expectation that the disease and any associated symptoms are treatable
- We propose that such expectations prior to definitive treatment may influence patients' perception of the disease and reduce the burden of individual symptoms such as tinnitus
- In contrast, patients presenting with tinnitus as their primary otological complaint are more likely to be annoyed or distressed by it
- Further studies are necessary to validate these associations and better understand the psychopathology of this common symptom in COM.

References

1. Kim D-K, Park S-N, Kim MJ, Lee SY, Park K-H, Yeo SW. Tinnitus in patients with chronic otitis media before and after middle ear surgery. *Eur Arch Otorhinolaryngol.* 2011;268(10):1443-1448. doi:10.1007/s00405-011-1519-9
2. Phillips JS, Yung MW, Nunney I, et al (2020) Multinational Appraisal of the Chronic Otitis Media Questionnaire 12 (COMQ-12). *Otol Neurotol.* <https://doi.org/10.1097/MAO.0000000000002845>