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Original Article

Disability Assessment in Chronic Tinnitus Suffers: A Cross-Sectional Study Using the ''Tinnitus Handicap Inventory''

Évaluation du Handicap des Patients Souffrant d'Acouphènes Chroniques : Une Étude Transversale à l'Aide du ''Tinnitus Handicap Inventory''

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Key words: Chronic tinnitus, disability, quality of life, assessment, Tinnitus Handicap Inventory, Yaounde.

ABSTRACT

Introduction. Patients suffering from chronic tinnitus experience a handicap whose degree influences their quality of life. The assessment of this handicap is widely documented throughout the world. This study aimed to assess the disability and quality of life of patients suffering from chronic tinnitus in Yaoundé using a reliable and validated tool: The Tinnitus Handicap Inventory (THI). **Patients and methods.** This was a cross-sectional study conducted in Yaoundé over seven months, including consenting adults with chronic tinnitus. THI scores, sociodemographic, clinical, audiometric and quality of life data were collected and analysed using SPSS software. **Results**. The sample comprised 60 participants, 38 (63.3%) women and 22 (36.7%) men. The median age was 47.50 years (Q1=34.2, Q3=61.7) and the median duration of tinnitus was 30 months (Q1=12, Q3=60). The tinnitus was unilateral in 31 participants (51.7%), permanent as whistling in 36 (60%), had been evolving for 24 to 47 months in 21 (35%), and was associated with deafness in 49 cases (81.7%). The median of THI score was 48 (Q1=28.5, Q3=62). Disability was moderate in 21 participants (35%). There was a significant association between the degree of disability and permanent tinnitus (p = 0.02), degree of disability and sensorineural hearing loss (p = 0.04). Concentration difficulties were claimed by 31 participants (51.7%), and 33 (55.5%) had trouble coping with their tinnitus. **Conclusion**. Chronic tinnitus caused a moderate handicap that negatively impacted this study's participants' quality of life.

RÉSUMÉ

Introduction. Les patients souffrant d'acouphènes chroniques ressentent un handicap dont le degré influence leur qualité de vie. L'évaluation de ce handicap est largement documentée dans le monde. La présente étude visait à évaluer le handicap et la qualité de vie des patients souffrant d'acouphènes chroniques à Yaoundé à l'aide d'un outil fiable et validé : le ''Tinnitus Handicap Inventory'' (THI). **Patients and méthodes.** Il s'agissait d'une étude transversale menée à Yaoundé pendant sept mois, incluant les adultes consentant, souffrant d'acouphènes chroniques. Les scores THI, données sociodémographiques, cliniques, audiométriques et éléments de qualité vie affectés ont été collectés et analysées à l'aide du logiciel SPSS. **Résultats**. L'échantillon comptait 60 participants, 38 (63,3%) femmes et 22 (36,7%) hommes. La médiane d'âge était de 47,50 ans (Q1=34,2, Q3=61,7) et celle de la durée d'évolution des acouphènes de 30 mois (Q1=12, Q3=60). Les acouphènes étaient unilatéraux chez 31 participants (51,7%), permanents à type de sifflement pour 36 participants (60%), évoluaient depuis 24 à 47 mois pour 21 (35%) participants, associés à une surdité dans 49 cas (81,7%). La médiane du score THI était de 48 (Q1=28,5, Q3=62). Le handicap était modéré chez 21 participants (35%). Il y avait une association significative entre : degré de handicap et acouphènes permanents (p = 0,02), degré de handicap et surdité de perception (p = 0,04). Des difficultés de concentration étaient alléguées par 31 participants (51,7%) et 33 (55,5%) avaient de la peine à faire face à leurs acouphènes. **Conclusion**. Les acouphènes chroniques entrainaient un handicap modéré impactant négativement la qualité de vie des participants de la présente étude.

FOR READERS IN A HURRY

What is already known on this topic

Patients with tinnitus are likely to experience sleep disturbance and concentration difficulty, as well as behavioural problems such as irritability, anxiety, depression and even suicidal tendencies.

What question this study addressed

Disability levels, using THI, and quality of life in a group of Cameroonian patients suffering from chronic tinnitus.

Key findings of this study

1. The median age was 47.50 years (Q1=34.2, Q3=61.7) and the median duration of tinnitus was 30 months.
2. The tinnitus was unilateral in 51.7% of cases, permanent as whistling 60% of cases, had been evolving for 24 to 47 months in 35% of cases, and was associated with deafness in 81.7% of cases.
3. The median of THI score was 48 (Q1=28.5, Q3=62). Disability was moderate in 21 participants (35%).
4. Concentration difficulties were claimed by 51.7% of patients while 55.5% had trouble coping with tinnitus.
5. There was a significant association between the degree of disability and permanent tinnitus (p = 0.02), degree of disability and sensorineural hearing loss (p = 0.04).

INTRODUCTION

Tinnitus is the perception of sounds in the absence of an acoustic stimulus. As a common symptom in ear, nose and throat (ENT) consultations, it affects more than 600 million people worldwide [1,2]. Patients suffering from chronic tinnitus will describe it as noises of various tones, ranging from buzzing to the sound of a waterfall, whistling or insect noises. Chronic, therefore, is a disabling symptom that can adversely affect the quality of life of sufferers [3,4]. They are likely to experience sleep disturbance and difficulty concentrating, as well as behavioural problems such as irritability, anxiety, depression and even suicidal tendencies. The measurement of disability experienced by patients suffering from chronic tinnitus has been the subject of numerous studies worldwide. Numerous questionnaires have been used to determine levels of disability and the impact of chronic tinnitus in Caucasian populations [4,9]. There are few studies on this topic in Cameroon [10-12]. The aim of the present study was to assess disability levels, using THI, and quality of life in a group of Cameroonian patients suffering from chronic tinnitus.

PATIENTS AND METHODS

Study design

This was a cross-sectional study conducted in the ENT departments of three university hospitals in Yaoundé: Yaoundé Central Hospital (HCY), Yaoundé University Hospital Centre (CHUY) and Yaoundé General Hospital (HGY). The study was conducted from December 2021 to August 2022. The approval of the Institutional Research Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (Ref: N° 434/UY1/FMSB/VDRC/DAASR/CSD) and the administrative authorisations in each hospital were obtained.

Study population

In consecutive, non-random sampling, we included patients over 18 years of age who had been consulted for chronic tinnitus and agreed to participate in the study. We exclude patients with cognitive impairment and pathology of the external ear. Chronic tinnitus was defined as tinnitus that had existed permanently or recurrently for at least three months before the consultation.

Date of interest

Data of interest were age and sex; clinical characteristics of the tinnitus, such as duration, topography, periodicity and associated signs; audiometric data, such as type, laterality, degree of deafness, THI score and quality of life aspects (sleep and concentration problems, anxiety, irritability, depression) affected as reported by the participants. After obtaining informed consent from each patient, socio-demographic data, tinnitus characteristics, and medical history were collected on an anonymous survey form. At the end of this phase, the study participants were enrolled.

Disability assessment tool

The principal investigator administered the THI to each participant, and the quality of life elements affected were sought (difficulty in coping with their tinnitus, concentration problems, insomnia, irritability and anxiety). The results of the THI were used to calculate the perceived disability score (THI score). The THI is a questionnaire used to assess the impact of tinnitus on patients. It was developed by Newman et al. in 1996 and standardised worldwide [13]. Imerta has validated its French translation in Marseille [14].

It consists of 25 questions divided into three categories, each assessing one component of the impact of tinnitus on the patient. The functional component comprises 11 questions ; It ass. It assesses mental discomfort (difficulty concentrating or reading), social discomfort (enjoyment of social activities) and physical pain (interference with sleep and. The emotional component comprises nine questions and measures emotional reactions such as frustration, anger and irritability. The catastrophic component is made up of five questions designed to assess the level of distress and inability to resolve the problems posed by the tinnitus. Each question has three answers: "yes", "sometimes" and "no", rated at 4, 2 and 0 points respectively. The sum gives a total score ranging from 0, corresponding to no disability, to 100 representing extreme disability. The THI score distinguishes five levels of disability [13]: 0 to 16 points: no disability or mild disability (mild I), 18 to 36 points: mild disability (mild II), 38 to 56 points: moderate disability (moderate), 58 to 76 points: severe disability (severe), 78 to 100 points: catastrophic disability (catastrophic).

Pure tone audiometry

Participants complaining of hearing loss underwent baseline pure-tone audiometry. The aim was to determine the degree and type of hearing loss. The audiometry was performed using an InterAcoustics AD629 audiometer in a soundproof booth with air and bone conduction. Mean hearing losses were calculated according to the recommendations of the Bureau International d'AudioPhonologie (BIAP) [15].

Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences, version 23.0 (SPSS, Inc., an IBM Company, Chicago, Illinois). Qualitative data were presented in numbers and percentages; quantitative data were presented as medians with their interquartile ranges. Kruskal-Wallis and Wilcoxon tests were used to compare mean THI scores between groups of participants. The Pearson correlation test was used to assess correlation between the degree of disability and other variables. A p-value of less than 0.05 was statistically significant.

RESULTS

Study population characteristics

A total of 60 patients were enrolled; 38 (63.3%) were female and 22 (36.7%) male, giving a sex ratio of 1.72. Age ranged from 19 to 77 years, with a median age of 47.50 (Q1=34.2, Q3=61.7). The median duration of tinnitus was 30 months (Q1=12, Q3=60). Tinnitus was bilateral in 28 (46.7%) cases. It was unilateral in 31 (51.7%) participants, 16 (26.7%) of whom had it in the right ear and 15 (25%) in the left.

Table I: Distribution of THI scores according to participant characteristics.

	N (%)	THI Scores Med(Q1, Q3)	P value
Age (years)			
Less than 20	1 (1.7)	100(100,100)	0.10
20 to 39	21 (35)	50 (32, 72)	
40 to 59	18 (30)	39 (13, 56)	
More than 60	20 (33.3)	39 (13, 56)	
Sex			
Men	22 (36.7)	47 (37, 63)	> 0.9
Women	38 (63.3)	48 (25, 61)	
Tinnitus side			
Bilateral	28 (46.7)	47 (27, 64)	0.04
Left ear	31 (51.7)	52 (45, 65)	
Right ear		33 (14, 51)	
Undetermined	1 (1.7)	50 (50, 50)	
Tinnitus tone			
Whistling	36 (60)	-	
Buzzing	30 (50)	-	-
Pulse	6 (10)	-	
Cricket sound	3 (5)	-	
Tinnitus duration (months)			
Less than 12	13 (21.7)	48 (42, 57)	0.4
12 to 23	5 (8.3)	55 (51, 61)	
24 to 47	21 (35)	52 (32, 74)	
48 to 95	7 (11.7)	32 (24, 48)	
More than 96	14 (23.3)	48 (22, 58)	
Tinnitus frequency			
Permanent	36 (60)	49 (40, 63)	0.5
Intermittent	24 (40)	40 (24, 59)	
Hearing loss associated			
Yes	49 (81.7)	50 (38, 64)	0.019
No	11 (18.3)	30 (23, 40)	
Hearing loss laterality			
Bilateral	29 (48.3)	52 (42, 64)	0.5
Unilateral	21 (51.7)	48 (37, 65)	
Hearing loss type			
Conductive	25 (41.7)	-	-
Sensorineural	13 (26.7)	-	
Mixed	11 (25)	-	
Hearing loss degree			
Mild	26 (55)	-	-
Moderate	16 (31.7)	-	
Severe	2 (5)	-	
Profund	1(3.3)	-	
Total	4 (6.7)	-	

In one case (1.7%), the tinnitus was undetermined. Hearing impairment was claimed by 42 participants (70%). Tinnitus was permanent for 36 (60%) participants and intermittent or fluctuating for the remaining 24 (40%). Tinnitus was of the whistling type in 36 (60%) participants, described as ringing in the ears in 30 (50%) cases, pulsatile in six (10%) cases, and locust-like in three (5%) cases. Forty-nine (81.7%) participants were deaf. It was bilateral in 29 (48.3%) of them. Conductive hearing loss was found in 25 participants (41.7%). The hearing loss was mild in 33 (55%) of the participants. These results are shown in Table I.

THI score

Participants' THI scores ranged from 4 to 100, with a median of 48.0 (Q1=28.5, Q3=62.0). Figure 1 shows that tinnitus-related disability was moderate in 21 (35%) participants and severe in 13 (21.7%).

Table I shows no difference in THI scores between men and women ($p > 0.9$). The mean THI score between age groups did not differ significantly ($p = 0.10$). Unilateral tinnitus was observed in 31 (51.7%) participants, while bilateral tinnitus was observed in 28 (46.7%). One participant (1.7%) felt the tinnitus in his head. The mean THI score was 47 (27.64%) in the 28 participants with bilateral tinnitus, while the THI participants with unilateral tinnitus were 52 (45.65%) in the left ear and 33 (14.51%) in the right ear. The THI score of participants with unilateral centric or left-sided tinnitus was statistically worse than the THI scores of participants with bilateral tinnitus ($p = 0.4$). The THI score of participants with hearing impairment was statistically worse than the THI score of participants without hearing impairment ($p = 0.19$)

Levels of disability

Table II shows that the degree of tinnitus-related disability did not correlate with age ($r = -0.19$, $n = 60$, $p = 0.13$) or gender ($p = 0.53$). There was no significant association between the degree of disability and the duration of the tinnitus ($p = 0.85$), the topography of the tinnitus ($p = 0.06$), the tone of the tinnitus ($p = 0.39$) or the presence of an associated otological symptom ($p = 0.39$). A significant association was found between the permanent nature of the tinnitus and the degree of disability ($p = 0.02$).

There was no significant association between the degree of disability and the presence of a hearing loss ($p = 0.06$) or the laterality of the hearing loss ($p = 0.31$). However, we did find a significant association between the type of hearing loss and tinnitus-related disability, with the association with sensorineural hearing loss being more disabling ($p = 0.04$). The Pearson correlation test showed a significant correlation between the degree of hearing loss and disability ($r = 0.4$, $n = 60$, $p = 0.00$).

Quality of life aspects affected.

Of the tinnitus sufferers, 31 (51.7%) reported problems concentrating, 29 (48.3%) reported insomnia and 27 (45%) reported that their tinnitus made them irritable. Twenty-six (43.3%) of the tinnitus sufferers in this study reported that their tinnitus made them anxious, while 10 (16.7%) felt depressed.

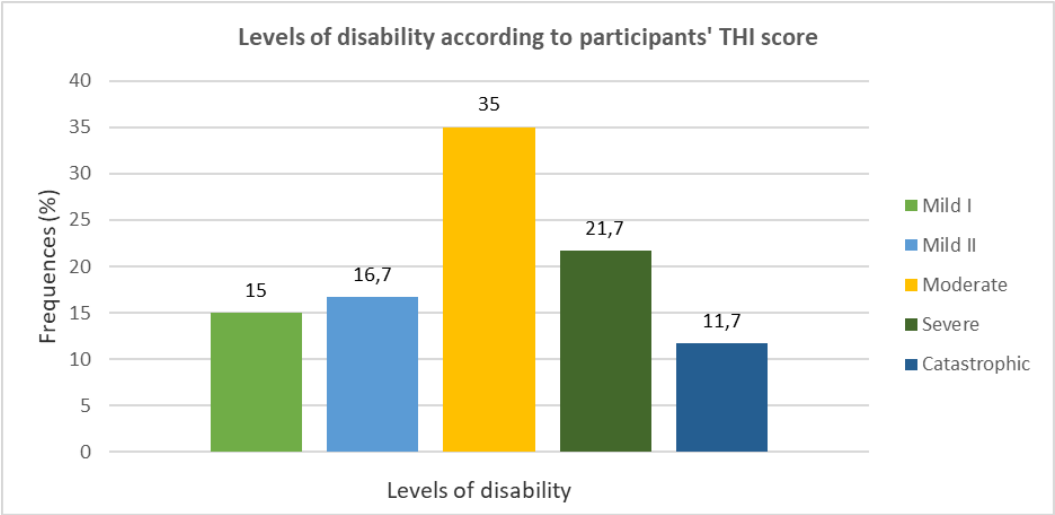

Figure 1: Distribution of levels of disability in the study population.

Table II: Distribution of levels of disability by gender and age of participants

	Levels of disability according to THI score					
	Mild I n (%)	Mild II n (%)	Moderate n (%)	Severe n (%)	Catastrophic n (%)	Total n (%)
Age (years)						
Less than 20	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	1 (100)
20 to 39	2 (9.5)	5 (23.8)	6 (28.6)	4 (19)	4 (19)	21 (100)
40 to 59	6 (33.3)	2 (11.1)	5 (27.8)	4 (22.2)	1 (5.6)	18 (100)
More than 60	1 (5)	3 (15)	10 (50)	5 (25)	1 (5)	20 (100)
Total	9 (15)	10 (16.7)	21 (35)	13 (21.7)	7 (11.7)	60 (100)
Sex						
Men	3 (13.6)	3 (13.6)	8 (36.4)	7 (31.8)	1 (4.5)	22 (100)
Women	6 (15.8)	7 (18.4)	13 (34.2)	6 (15.8)	6 (15.8)	38 (100)
Total	9 (15)	10 (16.7)	21 (35)	13 (21.7)	7 (11.7)	60 (100)

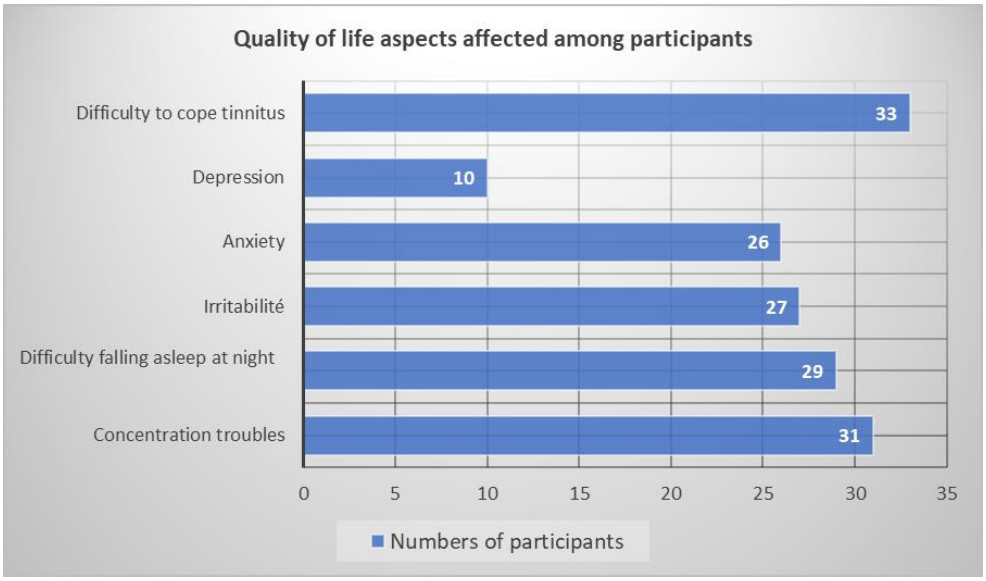

Figure 2: Distribution of quality of life elements affected in participants.

Thirty-three (55.5%) of the tinnitus sufferers felt that they could no longer cope with their tinnitus (Figure 2).

DISCUSSION

Study population

In the present study, subjects aged 40 and over-represented 63.3% of the population. This result is not far from that of Abenkou [12], who found a proportion of 57.2% of subjects aged 40 and over, while Ukaegbe et al. found 46.0% of subjects aged 45 and over. Older age has been identified as a risk factor for tinnitus [17] due to sensory ageing of the auditory organ, which begins early, and also due to pathologies in older people that can interfere with tinnitus. Women represented 63.3% of the sample in the present study, with a statistical difference ($p < 0.9$). They accounted for 68.6% of the survey by

Abenkou et al. [12] and 68.3% of the study by Ukaegbe et al. [10], without explanation.

Tinnitus characteristics

Chronic tinnitus was unilateral in 51.7% of cases in the present study. This unilateral form of the phenomenon was also reported by Ukaegbe et al. [10], although, in the series by Abenkou et al., the bilateral form was predominant [12]. The frequent association between tinnitus and middle ear damage could explain these differences. In the present study, tinnitus sounded like whistling in 60% of cases and buzzing in 50%. The perception of tinnitus as whistling or ringing seems to be shared by the participants in the studies consulted and in comparable proportions [10,12]. These two tones predominate in the different series because they are more accessible for the participants to recognise and describe. As in our study, Abenkou [12] and Ukaegbe et al. [10] found a preponderance of permanent tinnitus in more than 60% of cases.

We found that chronic tinnitus was associated with a hearing problem in 81.7% of cases. This association was present in 60% of cases for Abenkou et al. and 46% for Ukaegbe et al. Briwas et al. attributed these disparities to anomalies located at different levels of the anterior and posterior vestibule [16]. Our study's high frequency of middle ear pathologies could explain the predominance of conductive hearing loss (41.7%). Abenkou found a predominance of sensorineural hearing loss, probably because his research did not include patients with middle ear pathology. Mild hearing loss was the most common (55%), as was the case in Abenkou (42.9%) and Ukaegbe et al (41%). This result in the last two studies cited would suggest a correlation between the degree of deafness and disability due to chronic tinnitus.

Disability features

The participants in our study experienced varying degrees of disability, which was a source of discomfort in their daily lives. This finding is shared by previous studies [10,11]. While 35% of the participants in the present study had a moderate disability, 41.3% of those in the study by Ukaegbe et al [10] had a mild II disability, while Abenkou et al [12] reported a mild I disability in 57.1% of cases. These discrepancies could be explained by the subjectivity of the THI questionnaire on the one hand, and by the disparities observed in the sampling in the various studies on the other.

Ukaegbe et al. and Monzani et al. also found no association between gender and the level of disability estimated by the THI in our study. The lack of association between gender and the level of disability estimated by the THI in our study was also found by Ukaegbe et al. and Monzani et al. The lack of association between gender and the level of disability estimated by the THI in our study was also found by Ukaegbe et al. and Monzani et al.The lack of association between gender and the level of disability estimated by the THI in our study was also found by Ukaegbe et al and Monzani et al [18]. This was not the case for Granjeiro et al. [19] and Malakouti et al. [20], who found a significantly higher level of disability in female subjects. This discrepancy shows that, in general, gender has no significant influence on the quality of life of people suffering from chronic tinnitus. The degree of disability measured by the THI score between the different age groups was not significantly different. Ukaegbet al. and Monzani et al.al [18] made the same observation. There is no association between age and the degree of disability associated with tinnitus.

In the present study, tinnitus durations were not correlated with the THI score, as it was for Ukaegbe et al. and Granjeiro et al. [19]. However, unlike these authors, we found a significant association between whether or not the tinnitus was permanent and the THI score. It is easy to understand that tinnitus perceived all day long is more annoying than tinnitus perceived intermittently. The topography of our participants' chronic tinnitus was not associated with the degree of disability. This surprising finding, as one would expect bilateral chronic tinnitus to be more disabling, was shared by Granjeiro et al [19].

In accordance with Waechter et al. 's research [21], we found a significant correlation between average hearing loss and THI score. Thus the degree of hearing loss would influence the level of disability; patients suffering from chronic tinnitus associated with a high average hearing loss would experience a high level of disability.

Quality of life aspects affected by tinnitus

The patients in this study identified quality of life issues affecting them. In most cases, these were difficulty in coping with their tinnitus (55.5%), concentration problems (51.7%), insomnia (48.3%), irritability (45%), and anxiety (43.3%). These adverse effects of chronic tinnitus have also been observed by Ukaegbe et al. [10]. Chronic tinnitus, therefore, has a considerable impact on the psychology of patients, who should benefit from a psychological assessment to identify those experiencing real difficulty in coping with their tinnitus.

CONCLUSION

The results of this study showed that chronic tinnitus has a negative impact on the quality of life of sufferers. The degree of disability associated with chronic tinnitus in our series was moderate. The THI should be a popular instrument in our daily practice in order to better understand all aspects of the management of patients suffering from chronic tinnitus.

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