

Research

How I manage patient with tinnitus?

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ABSTRACT

Background: Tinnitus is believed to cause significant psychological distress leading to impairment in quality of life (QOL). **Purpose:** To assess the negative impact of tinnitus on patient's QOL and discuss the management approach of tinnitus patient. **Method:** A cross-sectional study was conducted within one year duration on 88 patients who experienced tinnitus. Patients from Otorhinolaryngology clinic, Universiti Kebangsaan Malaysia Medical Centre (UKMMC) were evaluated based on socio-demographic data, clinical data and QOL. QOL was assessed using Tinnitus Handicap Inventory (THI), a self-report questionnaire measuring 3 domains of QOL: functional, emotional and catastrophic scales. **Result:** Respondents consisted of 35 males (39.8%) and 53 females (60.2%), with mean age of 57.9±13.9 years old. Pure tone audiometry should be done at least once during the follow up period. Patients with persistent tinnitus had significantly higher mean THI total scores ($p=0.042$) and emotional subscale score ($p=0.037$) compared to patients with intermittent tinnitus. However, there were no significant associations between gender, duration of tinnitus and laterality of tinnitus with patient's THI score. **Discussion:** All patients should have good history taking, proper physical examination and investigation. Those without the primary cause of tinnitus would be given tinnitus activity treatment by good counselling on tinnitus. Patient with vascular disorder would be given conservative treatment. **Conclusion:** Magnetic resonance imaging was indicated in asymmetrical hearing loss with tinnitus. Computed tomography scan with contrast was indicated when there is pulsatile tinnitus with/without abnormal ear finding. Patients with high grades THI questionnaire would be referred to psychiatrist for further assessment.

Keywords: tinnitus, quality of life, tinnitus handicap inventory, magnetic resonance imaging, computed tomography

ABSTRAK

Latar belakang: Tinitus diyakini dapat menyebabkan stress psikologi yang signifikan sehingga mengakibatkan penurunan kualitas hidup seseorang (Quality of Life / QOL). **Tujuan:** Menilai dampak negatif tinitus pada kualitas hidup penderita dan merencanakan penatalaksanaannya. **Metode:** Penelitian ini merupakan studi potong lintang pada 88 penderita tinitus selama satu tahun. Penderita yang datang ke unit rawat jalan Telinga Hidung Tenggorok Bedah Kepala dan Leher (THT-KL), Universiti Kebangsaan Malaysia Medical Centre (UKMMC) dilakukan evaluasi berdasarkan data demografi, data klinis dan QOL. Quality of life dinilai menggunakan Tinnitus Handicap Inventory

(THI), kuesioner tentang penderita yang mengukur 3 domain QOL: skala fungsional, emosional dan katastrofik. **Hasil:** Responden terdiri dari 35 laki-laki (39,8%) dan 53 perempuan (60,2%), dengan rerata usia 57.9 ± 13.9 tahun. Audiometri nada murni perlu dilakukan minimal satu kali selama periode penelitian. Penderita dengan tinitus persisten secara signifikan memiliki nilai rata-rata THI yang lebih tinggi ($p=0.042$) dan nilai emotional subscale ($p=0.037$) dibandingkan dengan penderita tinitus intermiten. Tidak ada hubungan yang signifikan antara jenis kelamin, durasi tinitus dan lateralisasi tinitus dengan nilai THI penderita. **Diskusi:** Semua penderita diperlukan anamnesis yang baik dan pemeriksaan fisik yang menyeluruh. Penderita tanpa penyebab primer dari tinitusnya akan diberikan terapi konseling tinitus yang baik. Penderita dengan gangguan pembuluh darah akan diberikan pengobatan konservatif. **Kesimpulan:** Magnetic resonance imaging perlu dilakukan pada gangguan pendengaran satu sisi dengan tinitus. Computed tomography scan dengan kontras dilakukan pada tinitus pulsatil dengan atau tanpa kelainan pada telinga. Pada penderita dengan nilai kuesioner THI yang tinggi akan dirujuk ke psikiater untuk penilaian lebih lanjut.

Kata kunci: tinitus, quality of life, tinnitus handicap inventory, magnetic resonance imaging, computed tomography

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INTRODUCTION

Tinnitus is one of the common medical symptoms that can be debilitating. The term tinnitus describes the conscious perception of an auditory sensation in the absence of a corresponding external stimulus. It is a medical condition where patient is complaining of ringing sound in the ear. The characteristic feature is that the origin of this sound is within the patient. Tinnitus can be either constant or intermittent. The onset of tinnitus can be abrupt, but it is insidious in most cases. Usually, it is unilateral but may also affect both ears. It may vary in pitch and loudness and has been variously described by the patient as roaring, hissing, swishing, rustling or clicking type of noise. Risk factors possibly contributing to tinnitus include hearing loss, ototoxic medication, and head injury and others. Tinnitus is more annoying in quiet surroundings. It may cause a significant distress to patient as it will lead to sleep disturbance. Prevalence studies of tinnitus had mostly been done in Western Europe or the USA, and had methodological drawbacks. Consequently, the scatter of

prevalence estimates was wide, although most study results had shown rates of between 10% and 15% of the adult population. The largest and most scientifically reliable study was undertaken as part of the National Study of Hearing in England ($n=48313$). The results of the study showed a prevalence of 10.1% among adults.¹

There is no effective drug available for tinnitus treatment, even many studies are underway into mechanisms and possible treatments. Surgical intervention for any otological pathology associated with tinnitus might be effective for that condition, but the tinnitus can persist. Available treatments include hearing aids when hearing loss is identified (even mild or unilateral), wide-band sound therapy, and counseling. The severity of tinnitus had been found to correlate with a number of health problems. Among them are distress symptoms such as headache, dizziness and insomnia.² Many patients with tinnitus reported that their quality of life (QOL) were impaired by symptoms such as frustration, annoyance, irritation, anxiety and depression. In comparison with normal

samples, tinnitus sufferers had shown higher mean levels of anxiety,^{3,4} and more negative mood states and depressive tendencies.^{3,5} The quality of life affected may differ between individuals but the commonest were psychological or emotional effects, impact on lifestyle, sleep disturbance, auditory and health effects.⁶

In another retrospective study conducted in Saudi Arabia by Alsanosi,⁷ in order to assess the impact of tinnitus on the quality of life in his subjects, he used the Tinnitus Handicap Inventory (THI) questionnaire. The results showed 64% respondents were found to be in severe handicap grade 4 or catastrophic handicap grade 5 in which male respondents had higher prevalence than females. A long duration of complaints was also associated with significantly higher mean levels of the emotional and catastrophic subscales total scores in comparison with shorter duration of complaints with p value of 0.069. The catastrophic scores were also found to be positively associated with the hearing loss with the p value of 0.021. Therefore, there was strong evidence showing that QOL was reduced in patients suffering severe distress due to their tinnitus symptoms.

The purpose of our study was to assess the negative impact of tinnitus on patient's QOL and discuss the management approach of tinnitus patient.

METHOD

This was a prospective non-randomized, cross sectional study to evaluate socio-demographic data, clinical data and QOL at the Otorhinolaryngology clinic, UKM Medical Centre within 1 year period. The QOL was assessed using Tinnitus Handicap Inventory (THI), a self-report questionnaire measuring 3 domains of QOL: functional, emotional and catastrophic scales. This study was approved by UKM medical ethics committees.

The subject sample were taken from outpatients with a primary complaint of tinnitus who visited the Otolaryngology, Head and Neck Surgery, UKM Medical Centre. All the participants agreed on research participation. Patients were excluded if they had neurologic diseases or a history of vertigo/dizziness or if they could not fill in the subjective questionnaires completely.

RESULTS

The study included 88 tinnitus patients; 35 males (39.8%) and 53 females (60.2%) participated in one year study. Of the 88 patients, 1 (1.1%) were aged 18–20 years, 10 (11.4%) were aged 21–40 years, 38 (43.2%) were aged 41–60 years and the remaining 39 (44.3%) patients were more than 60 years of age. The racial distribution was 43 Malays (48.9%), 36 Chinese (40.9%), 5 Indians (5.7%) and 4 others (4.5%). The mean age of the patients was 57.9 ± 13.9 years. There were 62 (70.5%) patients with tinnitus onset more than 12 months while 26 patients (29.5%) less than 12 months.

On the other hand, 62 patients (70.5%) had unilateral tinnitus, while the rest 26 (29.5%) had bilateral tinnitus. Associated hearing impairment occurred in 50 patients (56.8%) whereas 38 patients (43.2%) did not have hearing impairment. Meanwhile 47 patients (53.4%) experienced persistent tinnitus while the rest (46.6%) experienced tinnitus intermittently.

Table 1 showed the comparison of the THI, and subscale total scores by gender, duration of tinnitus, associated hearing impairment, laterality and persistency of tinnitus.

With regard to persistency of tinnitus, patients with persistent tinnitus had a significantly higher scoring for the emotional total subscale scores ($p=0.037$) and THI total score ($p=0.042$) compared with those with

intermittent tinnitus. However, there were no significant associations between gender, associated hearing impairment duration and laterality of tinnitus with patient's THI total score, functional, emotional and catastrophic total subscale score.

THI scoring is categorized into 5 grades. Our result showed 33 patients (37.5%) fell under slight handicap grade 1, 24 patients (27.3%) under mild handicap grade 2, 16 patients (18.2%) under moderate handicap

grade 3, 11 patients (12.5%) under severe handicap grade 4 and 4 patients (4.5%) under catastrophic handicap grade 5.

Table 2 showed the relative risks associated with experiencing a catastrophic score of 58-76 (grade 4) or 78-100 (grade 5) with respect to gender, duration of tinnitus, associated hearing impairment, laterality and nature of tinnitus. Result showed that the relative risk was not significant for all 5 variables.

Table 1. Comparisons of the total scores of the THI, emotional, functional, and catastrophic subscales by gender, presence of hearing loss, laterality, duration of tinnitus and persistency of tinnitus among the patients.

Variables	THI total score (Mean± SD)	Emotional total subscale score (Mean± SD)	Functional total subscale score (Mean± SD)	Catastrophic total subscale score (Mean± SD)
Gender				
Male (n=35)	30.11±25.303	9.31±10.243	16.29±11.52	4.46±5.802
Female (n=53)	31.81±23.482	10.72±10.008	16.30±11.131	4.79±5.369
P-value	0.996	0.278	0.995	0.337
Duration of tinnitus				
< 12 months (n=26)	32.38±19.968	9.46±8.247	18.54±10.667	4.38±4.001
≥12 months (n=62)	30.61±25.760	10.45±10.788	15.35±11.887	4.77±6.064
P-value	0.173	0.655	0.227	0.174
Hearing impairment/loss				
Yes (n=50)	31.16±25.456	9.84±10.651	16.56±10.805	4.72±5.976
No (n=38)	31.11±22.511	10.58±9.368	15.95±11.887	4.58±4.919
P-value	0.697	0.166	0.801	0.717
Laterality				
Unilateral (n=62)	29.94±22.467	9.45±9.291	15.97±10.486	4.52±5.121
Bilateral (n=26)	34.00±27.863	11.85±11.743	17.08±13.001	5.00±6.456
P-value	0.578	0.298	0.675	0.324
Persistency				
Persistent (n=47)	36.64±25.896	12.43±10.954	17.74±11.719	6.43±6.071
Intermittent (n=41)	24.83±20.371	7.56±8.337	14.63±10.521	2.63±3.986
P-value	0.042	0.037	0.196	0.362

Table 2. Prevalence of severe or catastrophic THI total scores in relation to gender, laterality, hearing loss, and duration of symptoms among tinnitus patients.

Variables	THI severe (58-76) or catastrophic (78-100) score	Odd ratio	95% confidence interval
Gender			
Male	6 (17,14%)	0.989	0.318-3.074
Female	9 (16.98%)		
P-value	0.984		

Duration of tinnitus			
< 12 months (n=26)	32.38±19.968	9.46±8.247	18.54±10.667
≥12 months (n=62)	30.61±25.760	10.45±10.788	15.35±11.887
P-value	0.173	0.655	0.227
Hearing impairment/ loss			
Yes (n=50)	31.16±25.456	9.84±10.651	16.56±10.805
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DISCUSSION

Patients experiencing tinnitus might present with variable impact on QOL according to previous researches done in Brazil,⁸ and Saudi Arabia.⁷ Studies had been conducted on important variables (age, gender, associated hearing loss, laterality and duration of symptoms) in association with QOL among tinnitus patients. However, there scarcely any research had been done in Malaysia on these variables. Since there was lack of literature review regarding the relationship between nature of tinnitus and quality of life, we had included the nature of tinnitus as one of the variables in our current research.

The aims of investigation after complete history and physical examination in the management of patient with tinnitus was to exclude organic cause of vertigo. The most appropriate radiological imaging option for investigating the middle ear and bony inner ear structures is temporal bone Computed Tomography (CT) scan.^{9,10} Evidence had suggested an association between sensory neural hearing loss and narrowed inner ear structure.¹⁰ For the evaluation of osseous pathology of the temporal bone, a limited

scanning range of thin sliced (one-millimeter) CT is sufficient.⁹ Various vascular anomalies and variants can be detected more frequently on the pulsatile tinnitus side using contrast CT scan of venous pulsatile tinnitus patients.¹¹

For screening of the underlying pathology and for the evaluation of a possible soft tissue mass or intracranial pathology, initial evaluation with Magnetic Resonance Imaging (MRI) and MR Angiography (MRA) is recommended with reported high diagnostic accuracy. In patients with unilateral no pulsatile tinnitus, the most important pathology to exclude is a retro cochlear lesion. Contrast enhanced MRI is the most appropriate workup to be performed. MRI has also been used in the evaluation of pulsatile tinnitus.¹²

Acoustic or sound therapy is using external sounds to provide relief from tinnitus. Regardless of which devices are used, the rationale for acoustic therapy remains the same; to increase the level of external sounds in the patient's environment, and to decrease the patient's perception of tinnitus. Sound therapy has the positive action of weakening the tinnitus signal by decreasing the difference between the tinnitus signal

and background neuronal activity. Amplitude of the tinnitus-signal has not changed; background sound has been increased to make tinnitus less noticeable. Some of acoustic therapy strategies are: environmental enrichment (patient add sounds like rain, wind, waterfall, ocean waves and summer night from cassette, CDs, table top to avoid the quiet environment), in the ear devices, hearing aids or combination instruments.¹³

The process of habituation is affected by the levels of sound selected for use in sound therapy. When the sound level is close to the threshold of hearing, this signal can actually enhance tinnitus through stochastic resonance, the enhancement of this tinnitus signal by addition of low-level random noise.¹¹

From our study, the mean age of 88 patients was 57.9 ± 13.9 years in which the respondents were predominantly from the age of 40 years old and above, which made up a percentage of 87.5%. This was an expected result as tinnitus sufferers were mostly in elderly age group. This was similar with the result of a study conducted in Brazil by Pinto et al.⁸ in year 2010, in which the result showed that the mean age among females was 61 years and the mean age among males was 57 years. Another study carried out in Singapore showed the mean age was 48.9 ± 13.4 years and 76.5% patients were more than 40 years old.¹⁴

The result of studies on gender related to the prevalence of tinnitus was controversial. A study done in Saudi Arabia showed a slight predominance in males.⁷ However, females predominated in studies conducted by Pinto et al.⁸ and by Lim et al.¹⁴ in 2010. Another study found the prevalence of tinnitus to be similar in both genders.¹⁵ Our study showed a predominance of tinnitus in females.

The racial distribution in our study was 43 Malays (48.9%), 36 Chinese (40.9%), 5 Indians (5.7%) and 4 others (4.5%). Another

study conducted in Singapore showed that 80.7% patients were Chinese, 10.4% were Malay, 4.0% were Indian and 4.9% belonged to other ethnic groups.⁹ The difference was due to different distribution of races in both countries.

Our study showed female patients had a slightly higher mean total THI score and all three subscale scores. However, these differences were not statistically significant which was concurred with previous studies.^{8,14} However, in the study by Alsanosi,⁷ the male patients had worse THI total scores, emotional, and functional total subscale scores.

Based on the subscale scores and total THI score, we found no significant difference between the presence of hearing loss in tinnitus patient and QOL. Similarly, other studies which applied THI questionnaire showed no significant differences in the handicap scores in their study between those with normal hearing and those with hearing loss with regard to the degree of handicap severity.^{8,14}

Among the respondents, 70.5% were suffering from prolonged tinnitus which was more than 12 months. The result revealed that there was no significant association between the duration of tinnitus and Tinnitus Handicap Inventory (THI) score. Alsanosi,⁷ concluded that a long duration of tinnitus significantly affected the QOL, which was different from our findings.

There had been no finding regarding the association between persistency of tinnitus and QOL. Our result showed that patients with persistent tinnitus had poor QOL, as shown by the higher mean THI total scores ($p=0.042$) and emotional scale total score ($p=0.037$) compared to patients with intermittent tinnitus. These differences were statistically significant, and were therefore clinically significant.

The majority (83%) of patients in our study were THI grade 1, 2 or 3, which indicated slight to moderate handicap. A previous study by Lim JJ et al.¹⁴ showed a similar finding in which 81% patients were in THI grade 1, 2 or 3. However, the study conducted by Alsanosi,⁷ had shown that the majority of tinnitus patients had severe or catastrophic handicap, and that males had a 3.15 times higher risk of experiencing catastrophic (grade 4 or 5) tinnitus than females. The result of our study was in accord with the above study that the relative risks associated with experiencing a grade 4 or 5 tinnitus correlated with hearing loss, laterality, and duration of symptoms were not statistically significant.

The difference of the overall THI and subscale scores between the patients with unilateral and bilateral tinnitus was not statistically significant. CT scan and MRI had an important role in the management of unilateral and bilateral tinnitus.

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