

The impact of tinnitus on adult Nigerians: health related Quality of Life assessment of sufferers using the Hospital Anxiety and Depression Scale (HADS) and the RAND-36 item health survey 1.0 questionnaire

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Abstract

Background: Tinnitus is a distressing ailment with limited options for therapy and affecting the quality of life of sufferers. This study aims to investigate the impact of tinnitus on the health related quality of life, the psychological and emotional wellbeing of patients in our environment. **Patients and Methods:** Consecutive patients with tinnitus presenting to the Otorhinolaryngology outpatient clinic of the Jos University Teaching Hospital and The Ear, Nose and Throat Clinic, Jos were assessed and administered the Hospital Anxiety and Depression Scale (HADS) and the RAND-36 item health survey 1.0 questionnaires. **Results:** We studied 49 patients, age range 22- 79 years (mean = 36.8; median = 35.5; SD = \pm 12.7) consisting of 22 (44.9%) males and 27 (55.1%) females, male to female ratio of 1:1.2. Patients in the age range 31 to 40 were in the majority (n = 20; 40.4%). Depressive symptoms were recorded in 14 (28.6%) female patients and 11 (22.4%) male patients. Anxiety symptoms were recorded in 18 (36.7%) female patients and 16 (32.6%) male patients. 34 (69.4%) of our patients scored low on all QoL domains except pain levels irrespective of age or gender with statistically significant positive correlations between all the QoL domains studied for all patients (P-value 0.5). Univariate analysis shows statistically significant inverse correlation between emotional distress (anxiety and depression) scores and each of emotional wellbeing scores. **Conclusions:** Our study demonstrates high prevalence of tinnitus amongst the younger population in our region especially females with significant reduction in their HRQoL. This should help in raising the awareness of the impact of tinnitus on the QoL, psychological and emotional wellbeing of patients in our region with a view to improving outcome for tinnitus sufferers. We recommend a further study on a larger sample population to determine the socioeconomic impact of tinnitus on the Nigerian population.

Keywords: anxiety, depression; quality of life, questionnaires.

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Paper submitted to the RBCMS-SGP (Publishing Management System) on July 9, 2015;

and accepted on July 16, 2015. cod. 203

INTRODUCTION

Health related Quality of life (HRQoL) has been defined as a broad range of human experiences related to an individual's overall wellbeing¹. It encompasses the impact of impairment on the psychological, psychosocial, emotional and health effects of an individual². This definition is still evolving, however, HRQoL assessment has become an important and required part of healthcare evaluation providing a meaningful way for assessing healthcare outcomes^{3,4}.

Tinnitus, which is the auditory perception of sound in the absence of an external acoustic stimulus is a very distressing disease and is known to have multidirectional impacts on sufferers and unfavorably influencing their HRQoL and psychology⁵. This multidirectional impact could vary from severe impairment of daily life functions to suicidal tendencies⁶.

Studies report that 5-15% of the western populations experience a form of tinnitus requiring medical intervention with 1-2% experiencing significant impairments in their quality of life (QoL)⁷.

Researchers have suggested that the quality of life of patients is reduced as a result of the severe distress of tinnitus^{8,9} with depression and anxiety being reported to be the commonest psychological comorbidities suffered by these patients^{10,11}. The relationship between tinnitus and these comorbidities is complex and poorly understood and the lack of coping capabilities can play a critical role in the clinical history of severe tinnitus sufferers¹². Results available suggest that cortical plasticity is likely responsible for the chronic progression of tinnitus¹³. However, the relationship between tinnitus and emotional distress has been researched to involve a complex connection between inner ear sensitivity and neuroendocrinological, immune and toxic variations that are linked to the activation of emotional stress¹⁴.

There are three specific ways tinnitus has been known to impact on the quality of life of patients and they are the experience of tinnitus specific handicaps, emotional comorbidities like anxiety and depression and the deterioration of general wellbeing^{2,15,16}. Studies from Nigeria reporting the impact tinnitus has on the psychological and emotional well being of sufferers and the effect this has on their daily HRQoL are scarce. Literature review details studies done amongst the elderly population with others investigating the characterization of tinnitus and the experience of tinnitus from the use of ototoxic drugs¹⁷⁻¹⁹. Therefore this study aims to achieve this using the Hospital Anxiety and Depression (HADS) and the RAND-36 item health survey questionnaires.

PATIENTS AND METHODS

Study design

This is a 22 months (November 2012 to August 2014) prospective cross-sectional study of patients presenting with tinnitus to the otolaryngology outpatient clinics of the Jos University Teaching Hospital and the Ear, Nose and Throat Clinic (a private Otorhinolaryngology clinic), Jos, Plateau State, Nigeria.

Approval for this study was obtained from the Ethical Clearance Committee of the Jos University Teaching Hospital.

Procedure

The inclusion criteria for this study were patients 18 years and older and presenting with tinnitus. Non-inclusion criteria were patients less than 18 years old, non-Nigerians, patients with established background psychiatric illnesses, patients with acute and chronic external and middle ear infections and improperly filled questionnaires.

Starting from November 2012, consecutive patients presenting with tinnitus were attended with comprehensive clinical histories taken from each patient in order to establish the cause and the characteristics of tinnitus and the presence of concomitant hearing loss.

Otologic examination and other physical examination of the patients were done and the patients were subjected to Pure Tone Audiometry and Impedance audiometry as required.

Assessment tools

To assess emotional wellbeing and health related quality of life, the patients were administered the HADS and RAND -36 item health survey 1.0 questionnaires and were fully informed about the purpose of the study. Their consent were obtained prior to filling the questionnaires and assured their responses and identity would remain confidential. These questionnaires were administered before any form of therapy was instituted.

The hospital Anxiety and Depression Scale (HADS) is a validated widely used 14-item self-assessment scale designed to measure anxiety, depression and emotional distress in non-psychiatric patients²⁰. It excludes somatic symptoms and avoids potential confounding by somatic symptoms. It consists of independent subscales for anxiety and depression with scores in each scale interpreted in ranges as normal (0-7), mild (8-10), moderate (11-14) and severe (15-21). The scoring system adopted by Snaith RP is used in this study in which a score of 11 or higher is regarded as mood disorder in anxiety and depression scales and a score of 8-10 being just suggestive of a disorder²¹.

The RAND-36 item health survey is a version of the Short Form-36 (SF-36) health survey designed by RAND as part of the medical outcomes study to explain variations in patient outcomes and it is widely used for routine monitoring and assessment of care outcomes in adult patients^{22,23}. It assesses 8 concepts: patient physical functions, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional wellbeing, social functioning, energy/fatigue and general health perceptions²⁴. Scoring the RAND involves 3 steps; scoring the questions, averaging items to form 8 scales and figuring the scores. All questions are scored on a scale of 0 to 100 so that the lowest and highest possible scores are set at 0 and 100 respectively. Aggregate scores are compiled as a percentage of the possible total points scored using the RAND scoring table. The scores from each scale are averaged together to create the final score within each of the 8 dimensions measured²⁵.

The RAND-36 item health survey was scored using the previously established national norms across all domains.

Statistical analysis

Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) software version 16.

Descriptive analysis of mean and standard deviation were used to summarize the collected data. To determine the relationship between age, depression scores, anxiety scores and HRQoL scores, the Pearson's moment correlation analysis was used to determine the relationship between emotional stress scores and the HRQoL assessment scores. All tests of statistical significance were two-tailed. A significance level of P -value < 0.05 was used.

The results are presented in simple descriptive forms.

RESULTS

A total of 49 patients from the 53 presenting with tinnitus were studied ranging in age from 22- 79 years (mean = 36.8; median = 35.5; SD = ± 12.7) consisting of 22 (44.9%) males and 27 (55.1%) females and giving a male to female ratio of 1:1.2.

Thirty-two (65.3%) patients presented with unilateral tinnitus and 26 (53.1%) patients with hearing loss- unilateral hearing loss ($n = 19$) and bilateral hearing loss ($n = 7$).

Patients in the age range 31 to 40 were in the majority ($n = 20$; 40.4%) as demonstrated on Table 1.

Mild depression scores were recorded in 13 (26.5%) patients and moderate scores in 12 (24.5%) patients. Anxiety scores recorded were mild in 21 (42.9%),

Table 1. Age and gender characteristics of patients with tinnitus.

Age group	Gender		Percentage
	Male	Female	
21- 30	8 (16.3)	9 (18.4)	34.7
31- 40	7 (14.3)	13 (26.5)	40.8
41- 50	3 (6.1)	3 (6.1)	12.2
51- 60	2 (4.0)	1 (2.1)	6.1
61- 70	1 (2.1)	0 (0)	2.1
71- 80	1 (2.1)	1 (2.1)	4.2
Total	22	27	100

moderate in 6 (12.2%) and severe in 7 (14.3%) patients. Patients in the age group 21 to 40 years presented more with mild ($n = 11$, 22.4%) and moderate ($n = 8$, 16.3%) depression scores. The same age group presented with the highest mild ($n = 17$, 34.7%), moderate and severe ($n = 11$, 22.4%) anxiety scores.

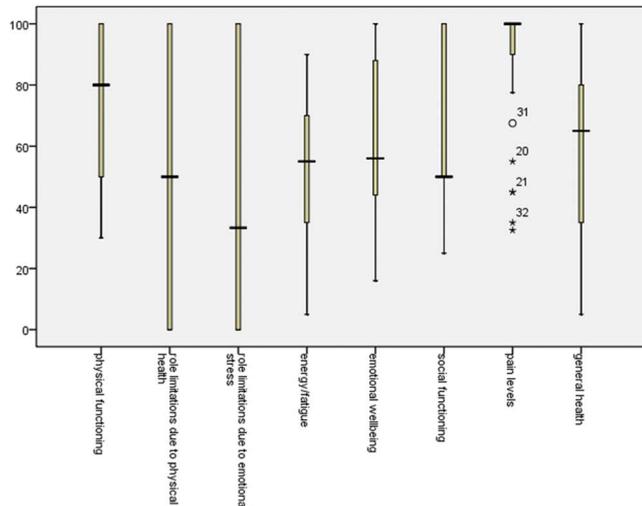
Depressive symptoms were recorded in 14 (28.6%) female patients (mild = 7, 14.3% and moderate = 7, 14.3%) and 11 (22.4%) male patients (mild = 6, 12.2% and moderate = 10.2%). Anxiety symptoms were recorded in 18 (36.7%) female patients (mild = 20.4%, moderate = 10.2% and severe = 6.1%) and 16 (32.6%) male patients (mild = 22.4%; moderate = 2.0% and severe = 8.2%). Table 2 presents the means and standard deviations of the age, anxiety and depression scores of the patients studied.

Table 2. Summary of means and standard deviations of the age, anxiety and depression scores.

		Age	Depression scores	Anxiety scores
N	Valid	49	49	49
	Missing	0	0	0
Mean		36.76	7.43	9.12
Std. Deviation		12.717	3.857	4.070

Compared with the established norms, 34 (69.4%) of our patients scored low on all QoL domains except pain levels irrespective of age or gender with statistically significant positive correlations between all the QoL domains studied for all patients (P -value < 0.001). The largest numbers of low scores were witnessed in the social functioning domain with more females ($n = 25$) than males ($n = 9$).

Twelve (41.4%) males and 17 (58.6%) females (male to female ratio 1:1.4) presented with low scores in the assessed QoL domains. The mean scores for some of the QoL dimensions are as follows; Limitations due to emotional stress = 50.8, SD = 44.8; emotional wellbeing = 63.8, SD = 24.2; social functioning = 64.8, SD = 25.2; general health = 58.2, SD = 27.2. Figure 1 shows the boxplot of the scores on all the QoL domains.



DISCUSSION

The prevalence rate of tinnitus associated mental distresses in this present report surpasses the rate recorded in a previous study conducted in our center but still indicates a predominance of females as in the previous study¹⁵. This finding is similar to the studies carried out separately by Erlandsson et al.⁹ and Seydel et al.²⁶ in large patient sample sizes, which they reported more females studied but at variance with the report from Salviati et al.¹².

Akin to other studies, ours also demonstrates a strong relationship between tinnitus and psychological comorbidities in both genders^{27,28} with the greatest differences in tinnitus comorbidities existing in the younger sufferers irrespective of gender. A reduction in the scores for all HRQoL domains is noted in this study like in a previously reported one²⁹.

The correlation between gender, age and tinnitus is a controversial research topic. Conflicting reports exist regarding their relationship from previous studies. Some authors report that tinnitus comorbidities are unrelated to age³⁰ and others report significant differences in gender regarding tinnitus annoyance and HRQoL of sufferers^{9,31}.

Female patients in our study scored higher in mental distress scales compared to the males irrespective of age. This can be speculated to be as a result of the differences between males and females in their abilities to cope with stress, habituation processes and vulnerability to repeated stress. Several studies have shown gender

Figure 1. Boxplot of RAND-36 item health survey scores showing adjusted mean scores.

There was no statistically significant correlation between the age of the patients and the QoL scores (P -value > 0.5)

A statistically significant inverse correlation was found between emotional distress (anxiety and depression) scores and each of emotional wellbeing scores ($r = -0.765$, P -value < 0.0001 / $r = -0.762$, P -value < 0.0001) and general health scores ($r = -0.748$, P -value < 0.0001 / $r = -0.757$, P -value < 0.0001) (Table 3).

Table 3. Correlation matrix between RAND-36, depression and anxiety score

		Role limitation (emotional stress)	Emotional wellbeing	General health	Depression scores	Anxiety scores
Role limitation (emotional stress)	Pearson Correlation	1	.811**	.865**	-.767**	-.641**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	49	49	49	49	49
Emotional Well-being	Pearson Correlation	.811**	1	.876**	-.765**	-.762**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	49	49	49	49	49
General Health	Pearson Correlation	.865**	.876**	1	-.748**	-.757**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	49	49	49	49	49
Depression scores	Pearson Correlation	-.767**	-.765**	-.748**	1	.619**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	49	49	49	49	49
Anxiety scores	Pearson Correlation	-.641**	-.762**	-.757**	.619**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	49	49	49	49	49

** Correlation is significant at the 0.01 level (2-tailed).

differences in coping with stress demonstrating that repeated exposure to stress causes women to be more vulnerable than men³², hence would mean that women assess their tinnitus related comorbidities more intensively than men. To buttress this, Vanneste et al.³³ using continuous scalp electroencephalographic (EEG) recordings and low-resolution electromyographic tomography (sLORETA) demonstrated differences in the activity of the prefrontal cortex between males and females in response to stress. They reported higher depression scores in women but did not find gender differences in tinnitus distress and tinnitus intensity.

Gender differences in brain locations involved in perception, subjective experience of emotion and regulation of emotion have been reported from various imaging studies demonstrating differences between both gender during emotional processing and regulation as a result of neural activity in the orbitofrontal and anterior cingulate cortices, the insula and amygdala³⁴⁻³⁷. These same brain areas also are responsible for the perception of tinnitus and tinnitus related comorbid distress^{7,38,39} i.e., the limbic system responsible for emotions processes the neural impulses it receives from the auditory system⁴⁰.

With an increased prevalence of tinnitus in the age group 21 to 40 years in our study (Table 1), which is a divergent finding to a previous study in which older age groups was recorded³⁸ signifies that individuals in their productive and reproductive ages are affected with debilitating tinnitus comorbidities and invariably signifies a negative impact on the economy of the country. A further study on a larger population is required to determine this socioeconomic effect on a national scale especially the effect of tinnitus on occupational performance of sufferers. This may signify the role tinnitus plays in the QoL of sufferers and give policy makers the guide to implementing strategies to prevent tinnitus and to improve treatment options for tinnitus sufferers, which are lacking in our region.

The negative impact of tinnitus on the HRQoL of sufferers is clearly documented in several research studies^{5,9,29,39} especially in patients presenting with decompensated tinnitus¹¹ because patients with compensated tinnitus easily get accustomed to the sound and are less bothered by it⁴⁰. In this study however, we did not set out to classify our patients into these two major groups.

The finding in this study of low scores in all but the pain level of QoL domains especially that of social functioning is consistent with the findings of Nondahl et al.²⁹ and El Refaie et al.⁴¹.

Statistically significant inverse correlation was recorded between emotional (anxiety and depression) scores and each of the QoL scores signifying that anxiety and depression suffered by patients with tinnitus has an enormous role in impairing their daily life functions.

It has been argued that the impact tinnitus has on HRQoL of patients is highly individualized because an individual's personality characteristics are more likely to influence the predisposition to experience tinnitus as a distressing symptom more than others. This however does not preclude tinnitus sufferers from experiencing significant limitations in daily life functions like many studies have described⁴².

Even though younger patients in this study scored lower on the QoL domains, there was no significant statistical correlation between these two variables. The relationship between age and the impact of tinnitus on HRQoL is not clearly studied. Some studies demonstrate that the QoL of younger sufferers is far more reduced than the elderly population^{5,26} while Pinto et al.⁴³ established no correlation between age and Tinnitus emotional comorbidities. In a large population study, older patients reported greater tinnitus related distress with the explanation that a decline in neuroplasticity with advancing age may be the underlying mechanism⁷.

We propose that the younger and more active population will report greater tinnitus related distress as seen in our study because of the recorded significant limitation in daily life functions as a result of tinnitus comorbidities. This highlights the need for counseling of our patients and the institution of stress management therapy for the younger patients who were more affected in our study population.

Other than prescribing medications for the causes of tinnitus and providing tinnitus maskers and hearing aids for patients with associated hearing loss, specific tinnitus management modalities are scarce in our environment. This study, though on a small sample of patients, further highlights the significance of the impact of tinnitus on the HRQoL of sufferers.

With the establishment of emotional distresses amongst our patients in this study, appropriate referral of these patients to the psychologist and/or psychiatrist will be effected for counseling and proper medications where necessary highlighting the importance of a multidisciplinary approach in the management of tinnitus patients.

CONCLUSIONS

This study has demonstrated a high prevalence of tinnitus amongst the younger population in our region with significant reduction in HRQoL of patients especially females.

This finding should help in raising the awareness of the impact of tinnitus on the QoL, psychological and emotional wellbeing of patients in our region with a view to improving outcome for tinnitus sufferers.

We recommend further studies on a larger sample population to determine the socioeconomic impact of tinnitus on the Nigerian population.

Conflict of interest

The authors declare no conflict of interest regarding this study.

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