PERCEIVED SEVERITY OF TINNITUS IN A COMMUNITY SAMPLE: GENDER DIFFERENCES AND ASSOCIATED PSYCHOLOGICAL DISTRESS

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ABSTRACT

Background: *Tinnitus as a stressor has been evaluated among different populations with varying prevalence figures and gender preponderance. Its psychological impacts on the people have been enumerated. However, the effect of gender on the expression of emotional distress to tinnitus is still debatable.*

Aim: *To determine gender differences in the relationship between the severity of tinnitus and stress in the community*

Materials and Methods*: This was a cross-sectional, community-based study of adults with complaints of tinnitus of unknown cause. Participants were selected from both the urban and rural communities in Ibadan. They were interviewed with an already prepared questionnaire aimed at eliciting otological symptoms and general medical conditions. The severity of the tinnitus was determined using the visual analogue scale, and then the perceived stress questionnaire (PSQ) and the mini tinnitus questionnaire (mini-TQ) were administered.*

Results: *There were 327 respondents, 196 (59.9%), of whom were males, age range was between 19 and 80 years. The mean age of all the respondents was 51.88 (±15.11) years, and there was no significant difference between the mean age of male and female groups (t=-0.956, p=0.340). The education status, frequency of occurrence of tinnitus, affected ear and severity were also comparable in both groups and there was no significant difference in the mean scores of mini-TQ and PSQ-index scores between male and female groups. Only the worries subscale of the PSQ had a significantly higher mean score in the male group (t=2.301, p=0.022).*
The severity of tinnitus was associated with the inability to relax, poor sleep, and feeling low in both groups, but it did not show any significant relationship with concentration in both groups. Subjective severity of tinnitus showed a significant positive correlation with age and mini-TQ in both groups, although the correlation was stronger in the male group.
The mini-TQ correlated positively with age and severity of tinnitus in both groups. In addition, while it correlated with PSQ-index, harassment, lack of joy, fatigue, worries, and tension in the female group, only the lack of joy and worries subscale correlated with it in the male group.

Conclusion*: The males worry more about the severity of tinnitus, but the emotional distress expressed by females is more than that of males and may tend to affect the female's quality of life more.*

Keywords: *tinnitus, emotional stress, visual analogue scale, perceived stress questionnaire (PSQ), mini tinnitus questionnaire (mini-TQ)*

INTRODUCTION

Tinnitus is defined as the perception of sound in the absence of an external stimulus[1], and it affects a significant proportion of the population. Its prevalence estimates range from 5%-30% among adults, and it is more prevalent among the older population.[2-4] Although many authors reported higher prevalence among the male gender,[4,5] others reported no gender difference. Varieties of underlying pathological conditions are implicated with variable treatment outcomes,[2,6] Usually, it is transient but could be chronic [7,8] and extremely distressing with associated emotional and psychological disturbances. The significance of stress in its onset and progression including its ability to impact negatively on mental and emotional health has been highlighted.[9] It also impacts negatively on the quality of life[10,11] and sometimes results in significant disability. Sleep problems, irritability, poor concentration, depression, and anxiety are commonly found in those with tinnitus.[3, 12] The Severity of tinnitus is a significant determinant of emotional distress experienced, other factors that have been reported to have an association with this include the duration of tinnitus, age, and gender.[13] Treatment is usually focused on modifying the risk factors where such is present as well as using behavioural and psychological therapy to relieve symptoms and improve quality of life.[14]

Previous reports have shown that men and women responded differently to stressors evidenced by varying responses of the Hypothalamo-Pituitary-Adrenal (HPA) in men and women stressors in experimental studies.[15,16] There is however, controversial evidence regarding the role of gender in the level and expression of emotional distress in relation to tinnitus, while some studies found that females experienced greater distress[17] others found no such association. Given that tinnitus is mostly a subjective symptom[18] usually affected by emotion, there may be gender differences in emotional reactions to it. Research has shown that men and women differ in their emotional reactions and responses. While happiness, embarrassment, shame, fear, and guilt are believed to be more common in women; pride, anger and contempt were emotions more commonly associated with men.[19] Understanding the gender differences in emotional reactions to tinnitus will add to the body of knowledge which may inform policy and planning of services.

This study examined gender differences in the relationship between subjective severity of tinnitus and psychological distress in a community sample.

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MATERIALS AND METHODS

This was a cross-sectional study of the community-dwelling adult subjects above 18 years with the complaint of tinnitus of unknown cause. To have subjects from diverse educational and socioeconomic backgrounds, participants were selected from both the urban and rural communities in the Ibadan interior. The urban population consisted of participants drawn from the Centre for Aged, University College Hospital, Ibadan, while the rural population included Agodi, Mokola, Moniya and Basorun communities, already tagged to an out-reach programme organized for the detection and prevention of illnesses, specifically, these communities have been used for the study of hearing impairment among the elderly people in the past. All adult men and women above 18 years of age who have tinnitus without any known medical condition were included in the study while the exclusion criteria included those people with a history of diabetes, stroke, hypertension, ear diseases, exposure to noise, and ototoxic drugs such as aminoglycosides antibiotics, diuretics in the last 4 weeks; ear trauma or ear surgery.

PROCEDURE

Following approval of the study protocol by the University of Ibadan/University College Hospital Joint Ethical Review Committee consented participants were recruited, and a history of the feeling of noise in the ear was confirmed. The participants were then taken through an already prepared questionnaire aimed at eliciting otological and general medical conditions. The severity of the tinnitus was determined using the visual analogue scale and perceived stress questionnaire (PSQ), and the mini tinnitus questionnaire (mini-TQ) was administered by a trained assistant.[11]

Study Instruments

Perceived Stress Questionnaire-30 (PSQ-30): This is a 30-item pencil and paper questionnaire that assesses the subjective experience of stress. The items are scored on a four-point Likert scale; 1- almost never, 2- sometimes, 3-often, 4-usually. The total score is derived by adding the scores of each item with higher scores denoting higher stress levels. Scores on Items 1, 7, 10, 13, 17, 21, 25 and 29 are, however, deducted from 5 before summing with others because they are reverse coded. The total score is then converted to an index score, which gives a score between 0-1 by using the formula: PSQ-Index = (raw score-30)/90.[20,21]
The PSQ-30 has seven subscales; Harassment, overload, irritability, lack of joy, fatigue, worries, and tension. Harassment, Overload, and Fatigue Subscales have four items: irritability, tension, and lack of joy, which have two, five, and seven items, respectively. Scores for each of the subscales were calculated by adding scores on items of each subscale which was also converted to index score to give a score between 0-1 by using the formula: subscale index score = (subscale score – number of items on the scale)/ (3 X number of items).
Mini Tinnitus Questionnaire (Mini-TQ): The mini-TQ is a short 12-item questionnaire developed from the Tinnitus Questionnaire with 52 items.[22] It assesses psychological distress related to tinnitus and correlates highly with the full Tinnitus Questionnaire (r=0.90). Responses on each item are scored from 0-2; 2-true, 1-partly true, and 0- not true. The sum of all items gives the total score, and a higher score denotes higher distress, the total score ranges from 0-24. The true and partly true responses were collapsed as "true" for bivariate analysis in this study.

Visual Analogue Scale: The visual analogue scale (VAS) is a simple tool for assessing different health outcomes, and it is very useful for assessing subjective symptoms. It has been used for pain intensity and severity of different health conditions as well as for measuring improvement during treatment. It was used in this study as a measure of the severity of tinnitus. A horizontal line of about 10 cm long was presented to the participants to measure the severity of tinnitus. One end is marked 1 (least severe) to 10 (most severe). Scores greater than 5 were rated as severe while scores of 5 and lower were considered as mild.

Data Analysis

Data was coded and entered into Statistical Package for Social Sciences (SPSS) version 22 for analysis. Mean scores of variables measured on interval scales were compared between male and female groups using the independent t-test. Proportions were compared using the chi-square test. Pearson correlation was used to determine the relationship between severity, PSQ score, and Mini-TQ scores. All tests were two-tailed, and significance was set at $p<0.05$.

RESULTS

196 (59.9%) of the 327 respondents were males, and the age range was between 19 and 80 years. The Mean age for all the respondents was 51.88 (±15.11) years with males having a mean age of 51.22 (±15.10) years and females 52.85 (±15.14) years, there was no significant difference between the mean age of male and female groups (t=-0.956, p=0.340). The education status, frequency of occurrence of tinnitus, affected ear, and severity were also comparable in both groups (Table 1). There was no significant difference in the mean scores of mini-TQ and PSQ-index scores between male and female groups.

Table 1: Comparison of sociodemographic and clinical variables between the male and female groups

Variables	**Male** (n=196)	**Female (**n=131)
	n (%)	n (%)
Age group		
≤50 years	79 (40.3)	50 (38.2)
≥51 years	117 (59.7)	81 (61.8)
	χ^2 =0.150, p=0.698	
Educational status		
None	11 (5.6)	4 (3.1)
Primary	37 (18.9)	29 (22.1)
Secondary	105 (53.6)	70 (53.4)
Tertiary	30 (15.3)	19 (14.5)
postgraduate	13 (6.6)	9 (6.9)
	χ^2 =1.575, p=0.813	
Family Hx of Tinnitus		
Yes	54 (27.6)	33 (25.2)
No	142 (72.4)	98 (74.8)
	χ^2 =0.224, p=0.636	
Frequency of occurrence		
≤ 3 months		
>3 months	172 (87.8)	121 (92.4)
	24 (12.2)	10 (7.6)
	χ^2 =1.792, p=0.181	
Affected Ear		
Single	65 (33.2)	49 (37.4)
Bilateral	131 (66.8)	82 (62.6)
	χ^2 =0.622, p=0.430	
Severity category		
Mild	120 (61.2)	83 (63.4)
Severe	76 (38.8)	48 (36.6)
	χ^2 =0.152, p=0.697	

The mean scores of the subscales of the PSQ were also similar among the two groups except for the worries subscale, which had a significantly higher mean score in the male group (t=2.301, p=0.022) (Table 2).

Table 2: Comparison of mean scores of severities, Mini-TQ and PSQ between male and female

Variable	**Male (n=196) Mean (SD)**	**Female (n=131) Mean (SD)**	**statistics**
Severity score	4.67 (1.56)	4.75 (1.49)	t=-0.431 p=0.667
Mini-TQ score	7.52 (3.93)	7.38 (4.24)	t= 0.292 p=0.771
PSQ total score	65.58 (8.28)	64.68 (8.80)	t=0.937 p=0.350
PSQ-index score	0.40 (0.09)	0.39 (0.10)	t=0.937 p=0.350
Harassment	0.39 (0.158)	0.38 (0.171)	t=0.665 p=0.507
overload	0.47 (0.14)	0.46 (0.13)	t=0.899 p=0.369
Irritability	0.32 (0.20)	0.33 (0.22)	t= -0.360 p=0.719
Lack of joy	0.36 (0.11)	0.39 (0.11)	t= -0.536 p=0.592
Fatigue	0.45 (0.14)	0.45 (0.16)	t= -0.300 p=0.765
Worries	0.29 (0.19)	0.24 (0.17)	t= 2.301 p=**0.022****
Tension	0.35 (0.18)	0.33 (0.19)	t= 1.187 p=0.236

Table 3 shows that higher proportions of females with severe tinnitus compared with those with mild tinnitus felt their lives would not be worth living if the noise continued. This was not, however, true about the male group. None of the groups showed greater irritability due to the noises, but the male group was worried that their physical health might be damaged. Severity was associated with the inability to relax, poor sleep, and feeling low in both groups. Conversely, the severity of tinnitus did not show any significant relationship with concentration in both groups.

Table 3: Selected MINI-TQ items and severity of tinnitus

Mini-TQ items	Male (n=196) Severity		Female (n=131) Severity		Total (n=327) Severity	
	Mild n (%)	Severe n (%)	Mild n (%)	Severe n (%)	Mild n (%)	Severe n (%)
If noise continues, my life will not be worth living	73 (60.8)	43 (56.6)	59 (71.7)	22 (45.8)	132 (65.0)	65 (52.4)
Not true	47 (39.2)	33 (43.4)	24 (28.9)	26 (54.2)	71 (35.0)	59 (47.6)
True	χ^2 =0.349, p=0.555		χ^2 =8.217, **p=0.004****		χ^2 =5.107, **p=0.024****	
I am more irritable with my family and friends because of the noises	97 (80.8)	63 (82.9)	68 (81.9)	43 (89.6)	165 (81.3)	106 (85.5)
Not true	23 (19.2)	13 (17.1)	15 (18.1)	5 (10.4)	38 (18.7)	18 (14.5)
True	χ^2 =0.132, p=0.716		χ^2 =1.378, p=0.240		χ^2 =0.958, p=0.328	
I worry that the noises might damage my physical health	87 (72.5)	42 (55.3)	55 (66.3)	31 (64.6)	142 (70.0)	73 (58.9)
Not true	33 (27.5)	34 (44.7)	28 (33.7)	17 (35.4)	61 (30.0)	51 (41.1)
True	χ^2 =6.145, p**=0.013****		χ^2 =0.038, p=0.845		χ^2 =4.196, p=**0.041****	
I find it harder to relax because of the noises	66 (55.0)	26 (34.2)	48 (57.8)	19 (39.6)	114 (56.2)	45 (36.3)
Not true	54 (45.0)	50 (65.8)	35 (42.2)	29 (60.4)	89 (43.8)	79 (63.7)
True	χ^2 =8.075, **p=0.004****		χ^2 =4.053, **p=0.044****		χ^2 =12.163, **p<0.001****	
It takes me longer to get to sleep because of the noises	81 (67.5)	34 (44.7)	58 (69.9)	15 (31.3)	139 (68.5)	49 (39.5)
Not true	39 (32.5)	42 (55.3)	25 (30.1)	33 (68.8)	64 (31.5)	75 (60.5)
True	χ^2 =9.943, **p=0.002****		χ^2 =18.394, **p<0.001****		χ^2 =26.412, **p<0.001****	
I am more likely to feel low because of the noises	69 (57.5)	27 (35.5)	58 (69.9)	21 (43.8)	127 (62.6)	48 (38.7)
Not true	51 (42.5)	49 (64.5)	25 (30.1)	27 (56.3)	76 (37.4)	76 (61.3)
True	χ^2 =8.991, **p=0.003****		χ^2 =8.674, **p=0.003****		χ^2 =17.605, **p<0.001****	
The noises have affected my concentration	54 (45.0)	30 (39.5)	44 (53.0)	17 (35.4)	98 (48.3)	47 (37.9)
Not true	66 (55.0)	46 (60.5)	39 (47.0)	31 (64.6)	105 (51.7)	77 (62.1)
True	χ^2 =0.580, p=0.446		χ^2 =3.784, p=0.052		χ^2 =3.356, p=0.067	

Tables 4 and 5 show a correlation between age, subjective tinnitus severity score, mini-TQ, PSQ-Index score, and PSQ subscales of male and female groups, respectively. Subjective severity of tinnitus showed a significant positive correlation with age and mini-TQ in both groups, but the correlation was stronger in the male group. The mini-TQ correlated positively with age and severity of tinnitus in both groups. In addition, while it correlated with PSQ-index, harassment, lack of joy, fatigue, worries, and tension in the female group, only the lack of joy and worries subscale correlated with it in the male group.

Table 4: Correlation between tinnitus severity and psychological distress among the male group

Variable	Age	severity	MiniTQ	PSQ	HSM	overload	irritable	Lo Joy	Fatigue	Worries	tension
1. Age	1	0.59**	0.35**	-0.01	0.02	-0.24**	-0.03	0.09	0,02	0.07	-0.08
2. severity	0.59**	1	0.39**	0.03	0.04	-0.30**	-0.08	0.12	0.10	0.07	0.03
3. Mini-TQ score	0.35**	0.39**	1	0.13	0.11	-0.07	0.04	0.23**	0.05	0.14*	0.05
4.PSQ	-0.01	0.03	0.13	1	0.56**	0.26**	0.44**	0.58**	0.52**	0.68**	0.74**
5.Harasment	0.02	0.04	0.11	0.56**	1	0.29**	0.09	0.33**	0.29**	0.22**	0.49**
6. Overload	-0.24**	-0.30**	-0.07	0.26**	0.29	1	0.02	-0.10	0.05	0.08	0.19**
7.Irritability	-0.03	-0.08	0.04	0.44**	0.09	0.02	1	0.30**	0.07	0.33**	0.33**
8.LoJoy	0.09	0.12	0.23**	0.58**	0.33**	-0.10	0.29**	1	0.34**	0.34**	0.36**
9. Fatigue	0.02	0.10	0.05	0.52**	0.29**	0.05	0.07	0.34**	1	0.24**	0.32**
10. worries	0.07	0.07	0.14*	0.68**	0.22**	0.08	0.33**	0.34**	0.24**	1	0.48**
11. Tension	-0.08	0.03	0.05	0.74**	0.49**	0.19**	0.33**	0.36**	0.32**	0.48**	1

**Correlation is significant at 0.01 level ; * Correlation is significant at 0.05 level

Table 5: Correlation between tinnitus severity and psychological distress among the female group

Variable	Age	severity	MiniTQ	PSQ	HSM	overload	Irritable	Lo Joy	Fatigue	Worries	tension
1.Age	1	0.56**	0.21*	-0.14	0.09	-0.16	-0.23**	-0.07	-0.12	0.03	-0.16
2. severity	0.56**	1	0.28**	-0.07	0.11	-0.30	-0.21*	0.11	0.07	0.13	-0.09
3. Mini-TQ score	0.21*	0.28**	1	0.32**	0.28**	0.01	0.05	0.27**	0.22*	0.23**	0.22*
4.PSQ	-0.14	-0.07	0.32**	1	0.51**	0.27**	0.46**	0.55**	0.43**	0.63**	0.73**
5.Harassment	0.09	0.11	0.28**	0.51**	1	0.33**	0.04	0.20*	0.24**	0.28**	0.44**
6. Overload	-0.16	-0.30	0.01	0.27**	0.33**	1	-0.04	0.07	0.10	0.04	0.20*
7.Irritability	-0.23**	-0.21*	0.05	0.46**	0.04	-0.04	1	0.29**	0.08	0.35**	0.37**
8.LoJoy	-0.07	-0.11	0.27**	0.55**	0.20**	0.07	0.29**	1	0.13	0.46**	0.42**
9. Fatigue	-0.12	0.07	0.22*	0.43**	0.24**	0.10	0.08	0.13	1	0.15	0.27**
10. worries	-0.03	-0.13	0.23**	0.63**	0.28**	0.04	0.35**	0.46**	0.15	1	0.53**
11. Tension	-0.16	-0.09	0.22*	0.73**	0.44**	0.20*	0.37**	0.42**	0.27**	0.53**	1

**Correlation is significant at 0.01 level; * Correlation is significant at 0.05 level

DISCUSSION

The study aimed to determine gender differences in the relationship between the severity of tinnitus and stress. The socio-demographic variables of the male and female groups in this study were comparable even though more males participated, which may point to the fact that tinnitus has a higher prevalence among males as reported in previous studies.[4,5] The severity rating of tinnitus, affected ear as well and the frequency of occurrence of symptoms in both groups were also comparable. This suggests that both groups have a similar severity rating of tinnitus as well as other

clinical variables assessed in this study. The Mini-TQ score was similar in both groups, suggesting that they experienced similar psychological distress to tinnitus. This is similar to a previous study[17] and further emphasizes the significance of the psychological component of care for people with tinnitus.
The mean PSQ-index was similar in the two groups, suggesting similar experiences with stress. Likewise, the mean scores on all the subscales but Worries of PSQ were similar; with males having significantly higher mean scores on the subscale. Furthermore, the finding was that men with more severe illness were more likely to endorse the statement "I worry that the noises might damage my physical health" as true, with contrary findings in the females. This is contrary to the general opinion that males are more likely to show externalizing symptoms when in distress, Clinicians must therefore attempt to address this for a better outcome during treatment.

In this study, no relationship was established between tinnitus severity and irritability as well as between tinnitus severity and concentration in the two groups. There was however a significant relationship with low mood in both groups, as those with more severe illness in both groups endorsed feeling low. Similar findings were recorded for sleep and relaxation. Despite the relationship found between the severity of illness and poor sleep, inability to relax, and low mood in both groups, it was only in the female group that an association was found between the severity of tinnitus and the feeling that life may no longer be worth living if symptoms persist. Previous studies have also reported an association between tinnitus and suicide. Age showed a moderate positive correlation with severity among the two groups.

CONCLUSION

This study has shown more male preponderance for tinnitus in the community but the emotional distress expressed by females to the severity of the tinnitus is more than that of the males. This finding will serve as a basis for ensuring that, the assessment of emotional stress is included as part of the routine evaluation of patients with tinnitus, to improve their general well-being and quality of life.

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