Auditory sensation with affective agnosia: A prevalence of alexithymia among tinnitus patients

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ABSTRACT

Objectives: The aim of the present study was to determine the prevalence and association of alexithymia, depression, and anxiety in patients affected by tinnitus. Methods: The study was conducted among the patients referred for audiometric evaluation for tinnitus. They were further evaluated with the Hospital Anxiety and Depression Scale, the Tinnitus Handicap Inventory, and the Toronto Alexithymia Scale. Analysis was done for prevalence and the sample was categorized as high and low tinnitus handicap subgroups, and mean scores of alexithymia, anxiety, and depression were compared. Results: A total of 70 patients (55.7% – male and 44.3% – female) with a mean age of 33.17 ± 12.24 years were finally analyzed. The severity of tinnitus was most severe (34.3%), followed by moderate (20%), catastrophic (18.6%), mild (17.1%), and slight (10%). The prevalence of alexithymia, anxiety, and depression among patients of tinnitus was found to be 65.7%, 37.1%, and 20%, respectively. The high tinnitus handicap group showed higher scoring on total alexithymia score, anxiety, and depression and higher scoring with describing emotion and identification of emotion, but there was no difference for the subscale of externally oriented thinking. Conclusions: The study found a prevalence of alexithymia, anxiety, and depression as 65.7%, 37.1%, and 20%, respectively, among patients of tinnitus, and problem of describing and identification of emotion are associated with higher tinnitus handicap.

Keywords: Alexithymia, anxiety, depression, tinnitus

THIS is a symptoms of hearing sound sensation without external auditory stimulation of various etiology.[1] Tinnitus may be associated with annoyance, concentration difficulties, distress, sleep problems, psychological disorders, anxiety, depression, and suicidal ideations.[2] Tinnitus is a common problem.[3] In a systemic review of all published papers in 35 years, McCormack et al. found an overall prevalence of 5.1%–42.7%.[4] Another systemic review reported 4.7%–46% in the general pediatric population and 23.5%–62.2% among children with hearing loss.[5] Gender-wise men are more affected than women,[6] and menstrual cycle irregularity may also be a related factor of tinnitus in women.[6] Many associated factors such as abnormal tympanic membrane, unilateral hearing loss, bilateral hearing loss, different noise exposures, use of earphones, smoking history, less sleep (≤6 h), smaller households, hyperlipidemia, osteoarthritis, rheumatoid arthritis, asthma, thyroid disease, stress, and depression.[7]

Many psychological problems are associated with tinnitus such as anxiety, depression, stress, and sleep problems.[8,9] The relationship between psychological problems and tinnitus is reciprocal, as studies reported that psychological distress is related to patients of tinnitus,[10] whereas 48%–78% of patients with chronic tinnitus developed major depression.[11] Yet, another study found a lifetime
prevalence of major depression in 62% and current depression in 48% of their sample. A study on a large sample of 51,574 from the general population found that persons with tinnitus scored significantly higher on anxiety and depression and lower on self-esteem and well-being than people without tinnitus.

Alexithymia is a trait that comprises impairments in the perception of bodily states, their cognitive representation, and verbal communication; very recently, it has been conceptualized as “Affective Agnosia.” The concept of alexithymia has attained great relevance in a psychological construct such as emotional regulation and associated disorders. Numerous studies have shown that alexithymia is associated with a variety of medical and psychiatric disorders including physical disorders such as hypertension, substance use disorders, eating disorders, somatic symptoms and somatization disorders, functional gastrointestinal disorders and depression. Studies have also found a strong correlation between alexithymia and somatization in depressed patients.

The present study aimed to determine the prevalence of alexithymia, depression, and anxiety among the patients affected by tinnitus.

**METHODS**

The study was conducted at the department of ear, nose, and throat (ENT) at a Medical college and hospital. The study was approved by the institutional review board. The sample consisted of patients who visited the hospital for tinnitus and referred for audiometric evaluation to the Audiologist. Inclusion criteria were all patients with either unilateral or bilateral tinnitus, aged 18 years or above, consenting to participate in the study. The exclusion criteria were the patient’s condition too incapacitated to participate in the study due to poor medical status, presence of vertigo, gross language, and communication barrier. Information on patient demographics, history of alcohol or substance use, past history, and family history was obtained from interviews with patients and accompanying persons. A detailed physical, ENT, and neurological examination was done to exclude any comorbid general medical condition. All detailed evaluation and data collection were done by a team of an audiologist and a clinical psychologist.

**Tools**

**Sociodemographic data sheet**

The sociodemographic data sheet included age, marital status, religion, community, education, and occupation. Clinical variables recorded were alcohol and drug use, history of epilepsy, and past history of medical or psychiatric illness.

**The Hospital Anxiety and Depression Scale**

This is a very well-validated scale to assess anxiety and depression among hospital-based patients. It consists of 14 questions, 7 scoring anxiety and 7 scoring depression. Patients were asked to read each question and place a tick against the reply that came closest to how they had been feeling that day. Each answer was scored 0, 1, 2, or 3. The possible range of scores was, therefore, 0–21, with higher scores indicating greater levels of anxiety. A score of 0–7 is considered normal, scores of 8–10 are borderline abnormal, and scores of 11–21 are abnormal. The sensitivity and specificity for both Hospital Anxiety and Depression Scale (HADS) A and D subscales is approximately around 0.80; the mean Cronbach’s alpha for HADS-A is 0.83, and for HADS-D, it is 0.82.

**The Tinnitus Handicap Inventory**

The Tinnitus Handicap Inventory (THI) is a widely used self-administered test to determine the degree of distress suffered by the tinnitus patient. It consists of 25 questions divided into 3 subgroups: functional (11 items), emotional (9 items), and catastrophic (5 items). It has high internal consistency and reliability with the Cronbach’s alpha coefficient (0.88) and a high intraclass correlation coefficient (0.78–0.90).

**The Toronto Alexithymia Scale**

The Toronto Alexithymia Scale (TAS) is one of the most commonly used measures of alexithymia with good internal consistency (Cronbach’s alpha = 0.81) and test–retest reliability (0.77, P < 0.01). This self-report scale consists of 20 items which are rated on a five-point Likert scale 1 (strongly disagree) to 5 (strongly agree). The total alexithymia score is the sum of responses to all 20 items and a score of 61 or greater suggests alexithymia. Scores of 52–60 suggest possible alexithymia, and a score of 51 or less suggests nonalexithymia. It has three subscales: the first one consisting of five items numbered 2, 4, 7, 12, and 17 is for describing difficulty in feelings or emotions. The second one consists of seven items – 1, 3, 6, 9, 11, 13, and 14, which measures difficulty in identifying feelings or emotions. The third subscale consists of eight items – 5, 8, 10, 15, 16, 18, 19, and 20, which measures externally oriented (EO) thinking.

**Statistical analysis**

The collected data of all patients were statistically analyzed using the Statistical Package for the Social Sciences (SPSS, Inc., Chicago, Illinois, USA) version 16.0. Data analysis included means and standard deviations of continuous variables for the total sample. Descriptive statistics included frequency and percentage of categorical variables. The
Mann–Whitney U test was used to determine if differences of distribution existed between two groups of the sample. Statistically significant levels are reported for $P \leq 0.05$. Highly significant levels are $P < 0.001$.

**RESULTS**

**Characteristics of the study sample**

A total of 70 patients (55.7% – male and 44.3% – female) were included for the study. Table 1 summarizes the sample characteristics. The mean age of the group was $33.17 \pm 12.24$ years, and the mean years of education were $9.72 \pm 5.61$ years [Table 1]. The marital status of the sample was mostly married (64.3%) and 35.7% were single. Hindu religion dominated the sample size with 85.7%, followed by 12.9% of Muslims, and only one subject was Christian. 48.6% were unemployed and the remaining 12.9% were in service and 38.6% were self-employed.

**Tinnitus severity and prevalence**

The tinnitus severity as measured by THI was found to be most severe (34.3%), followed by moderate (20%), catastrophic (18.6%), mild (17.1%), and slight (10%). The prevalence of alexithymia, anxiety, and depression among patients of tinnitus was 65.7%, 37.1%, and 20%, respectively [Table 2]. The distribution of different grading of THI scoring and presence of alexithymia as per TAS-20 is shown in Table 3.

**Comparison of alexithymia across high and low distressed as measured by the Tinnitus Handicap Inventory**

The mean score of the THI was 53.92 ± 2.46; hence, we categorized the patients based on the mean THI score of the sample: group with THI score of 54 and above and another group of below 54 THI score. This high THI scoring group consisted of 43 sample size, and the low THI scoring group was of 27 sample size. The mean scores of TAS total scores and subscales, HADS score, and Mann–Whitney U-test statistics were done and are tabulated in Table 4. There was a significant difference ($P = 0.000$) among these two groups for alexithymia, i.e., total TAS score. Among the subscales of TAS, the significant difference was found with identification ($P = 0.000$) and describing ($P = 0.001$) the emotions, whereas there was no difference in these groups in domains of EO thinking. Similarly, we found significantly higher depression and anxiety among the high THI scoring group as measured by HADS [Table 4].

**DISCUSSION**

Our study reveals significantly high alexithymia, anxiety, and depression in patients of tinnitus. Furthermore, as hypothesized, in this study, we found that the TAS-20 subscale assessing difficulty identifying and expressing feelings is more closely associated with tinnitus compared to other subscales of EO thinking. In accordance with our study, an earlier study addressed the association of

| Variable                          | Total sample (n=70) |
|-----------------------------------|--------------------|
| Mean age±SD in years              | 33.17±12.24        |
| Mean years of education±SD        | 9.72±5.61          |
| Gender                            |                    |
| Male                              | 39 (55.7)          |
| Female                            | 31 (44.3)          |
| Marital status                    |                    |
| Single                            | 25 (35.7)          |
| Married                           | 45 (64.3)          |
| Religion                          |                    |
| Hindu                             | 60 (85.7)          |
| Muslim                            | 9 (12.9)           |
| Christian                         | 1 (1.4)            |
| Occupation                        |                    |
| Unemployed                        | 34 (48.6)          |
| Service                           | 9 (12.9)           |
| Others/business                   | 27 (38.6)          |
| Habitant                          |                    |
| Rural                             | 22 (31.4)          |
| Urban                             | 33 (47.1)          |
| Semi-urban                        | 15 (21.4)          |
| Community                         |                    |
| Tribal                            | 14 (20)            |
| Nontribal                         | 56 (80)            |
| Economic status                   |                    |
| Lower                             | 19 (27.1)          |
| Middle                            | 49 (70)            |
| Higher                            | 2 (2.9)            |
| History of substance use          |                    |
| No                                | 53 (75.7)          |
| Alcohol                           | 9 (12.9)           |
| Others                            | 8 (11.4)           |
| History of epilepsy               |                    |
| No                                | 69 (98.6)          |
| Yes                               | 1 (1.4)            |
| History of medical illness        |                    |
| No                                | 55 (78.6)          |
| Diabetes                          | 4 (5.7)            |
| Hypertension                      | 6 (8.6)            |
| Others                            | 5 (7.1)            |
| Family history                    |                    |
| Nil contributory                  | 48 (68.6)          |
| Hypertension                      | 7 (10)             |
| Diabetes                          | 12 (17.1)          |
| Others                            | 3 (4.3)            |
| Presenting complains              |                    |
| Ear pain                          | 58 (82.9)          |
| Ear discharge                     | 12 (17.1)          |

SD – Standard deviation
Bakhla, et al.: A prevalence of alexithymia among tinnitus patients

We found a 65.7% point prevalence of alexithymia among patients suffering from tinnitus; this is much higher than what is usually reported for the general population as 17%. Yet, another study that examined the prevalence of alexithymia in patients with two studies. The average age of our study was 33.17 years, whereas earlier study consisted of 70–85 years aged olders.

Although our sample was purposive, it indicates that men presented tinnitus more frequently than women (55.7% of males and 44.3% of females), in agreement with what was reported by Salviati et al. as 63.17% of males and the remaining 36.83% of females. Our sample consisted of 55.7% of male patients, which may partially contribute to the high prevalence of alexithymia, as the male gender is known to be associated with alexithymia.

Table 2: Prevalence of anxiety, depression, and alexithymia among patients of tinnitus

| Diagnosis        | Negative cases (n) | Borderline cases (n) | Definite cases (%) |
|------------------|--------------------|----------------------|-------------------|
| Depression       | 40                 | 16                   | 14 (20)           |
| Anxiety          | 28                 | 16                   | 26 (37.1)         |
| Alexithymia      | 6                  | 18                   | 46 (65.7)         |

Table 3: Distribution of different grading of Tinnitus Handicap Inventory scoring and alexithymia

| Tinnitus handicap | Nonalexithymic | Borderline | Alexithymic | Total | Pearson Chi-square | df | Asymptotic significant (two-sided) |
|-------------------|----------------|------------|-------------|-------|-------------------|----|-----------------------------------|
| Slight or no      | 4              | 2          | 1           | 7 (10) | 38.79             | 8  | 0.000                             |
| Mild              | 0              | 4          | 8           | 12 (17.14) |                 |    |                                   |
| Moderate          | 2              | 7          | 5           | 14 (20) | 14 (34.28)       |    |                                   |
| Severe            | 0              | 5          | 19          | 24 (34.28) |                 |    |                                   |
| Catastrophic      | 0              | 0          | 13          | 13 (18.57) |                 |    |                                   |
| Total             | 6 (8.57)       | 18 (25.71) | 46 (65.71)  | 70     |                   |    |                                   |

Table 4: Mean scores, standard deviation, and Mann-Whitney U-test across low scoring and high scoring Tinnitus Handicap Inventory

|                     | Mean±SD       | Mean rank | U     | W     | Z     | P       |
|---------------------|---------------|-----------|-------|-------|-------|---------|
| Alexithymia describing |               |           |       |       |       |         |
| Low                 | 14.18±4.30    | 25.70     | 316.00| 694.00| -3.212| 0.001** |
| High                | 17.37±3.50    | 41.65     |       |       |       |         |
| Alexithymia identification |           |           |       |       |       |         |
| Low                 | 17.07±5.21    | 21.30     | 197.00| 575.00| 4.636 | 0.000** |
| High                | 24.16±4.97    | 44.42     |       |       |       |         |
| Alexithymia externally oriented thinking |       |           |       |       |       |         |
| Low                 | 26.96±4.34    | 36.50     | 553.50| 1499.50| -0.327| 0.743   |
| High                | 26.81±3.26    | 34.87     |       |       |       |         |
| TotalTAS            |               |           |       |       |       |         |
| Low                 | 58.22±11.22   | 24.17     | 274.50| 652.50| -3.695| 0.000** |
| High                | 68.34±8.73    | 42.62     |       |       |       |         |
| HADS Depression     |               |           |       |       |       |         |
| Low                 | 4.33±2.96     | 20.22     | 168.00| 546.00| -4.994| 0.000** |
| High                | 9.06±3.46     | 45.09     |       |       |       |         |
| Anxiety             |               |           |       |       |       |         |
| Low                 | 5.81±3.92     | 21.93     | 214.00| 592.00| -4.433| 0.000** |
| High                | 10.74±4.01    | 44.02     |       |       |       |         |
| Total               |               |           |       |       |       |         |
| Low                 | 10.14±6.13    | 20.06     | 163.50| 541.50| -5.038| 0.000** |
| High                | 19.81±6.44    | 45.20     |       |       |       |         |

P – Asymptotic significant (two-tailed), *Significant at P<0.05, **Significant at P<0.01. HADS – Hospital Anxiety and Depression Scale
psychogenic nonepileptic seizures and epileptic seizures reported 36.9% and 28.6%, respectively. These findings are in concordance to most of the previous studies which conclude that alexithymia seems to be a common feature of neurological disease. Tinnitus is also an overlapping illness of neurological, ear, and psychological problems. However, a review found most evidence available for patients with traumatic brain injury, stroke, and epilepsy. We also found a 20% prevalence of depression among our sample. This high point prevalence of depression directly contributes to the found high prevalence of alexithymia. Earlier studies and meta-analysis suggest a strong association between alexithymia and depression. Furthermore, depression poses as a confounding factor in studies of alexithymia. This comorbidity may be the reason for the very high found prevalence of alexithymia in our study.

We also found a 37.1% prevalence of anxiety in our study; this is the third dimension along with alexithymia and depression. The result of the study also shows that tinnitus is highly associated with alexithymia, anxiety, and depression; this conforms to earlier studies that demonstrated a higher prevalence of psychological problems such as depression, anxiety, somatization, and obsession. These findings may have important implications for understanding and promoting general psychological health among patients of tinnitus. Limitations of this study include lack of control group, very small sample size, and cross-sectional observation; these may be planned to overcome for future studies. These available findings have been based on questionnaire data, but future studies may employ structured psychiatric interviews adopting diagnostic criteria.

CONCLUSIONS

The prevalence of alexithymia, anxiety, and depression among the patients of tinnitus was found to be 65.7%, 37.1%, and 20%, respectively. The high tinnitus handicap group showed significantly higher scoring on total alexithymia score, anxiety, and depression compared to the low tinnitus handicap group. The high tinnitus handicap group also showed significantly higher scoring with describing emotion and identification of emotion, but there was no difference for the subscale of EO thinking.

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Conflicts of interest
There are no conflicts of interest.

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