



## The effects of tinnitus and/or hearing loss on the Symptom Checklist-90-Revised test

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### ABSTRACT

**Objective:** This study aims to evaluate the psychological attitudes of patients with tinnitus by using The Symptom Checklist-90-Revised and to investigate the relationship between hearing loss and attributed psychological attitudes.

**Materials and methods:** 142 subjects (73 female, 69 male) divided into 4 groups: Group 1 (32 patients with tinnitus and hearing loss-), Group 2 (38 patients with tinnitus), Group 3 (36 patients with hearing loss), Group 4 (36 healthy subjects without tinnitus and hearing loss-control group). The Symptom Checklist-90-Revised (SCL-90-R) test was used to detect the subjects' tendency for psychological problems due to tinnitus and/or hearing loss.

**Results:** Mean values of Somatization (SOM), Obsessive-Compulsive (O-C) and Additional Scale (AS) were higher than cut-off points of 1.00 for Groups 1 and 2 (tinnitus and/or hearing loss). In patients with tinnitus and/or hearing loss, SOM, O-C, Depression (DEP), AS and Global Severity Index (GSI) were significantly higher than patients with hearing loss and control group. By multiple linear regression analysis, tinnitus was the significantly detected confounding factor for increase of SOM, O-C, Interpersonal Sensitivity (I-S), DEP, Hostility (HOS), Paranoid Ideation (PAR), AS and GSI parameters.

**Conclusion:** It was concluded that tinnitus could induce some psychological symptoms such as depression; and this is independent of hearing loss. Tinnitus with or without hearing loss is the essential factor for causing psychological problems in patients. Tinnitus duration is not important in the scene of psychological status of the patients. This result shows that, age, gender (male, female), chronic or acute tinnitus experience, and having hearing loss did not cause too much problems in patients. But tinnitus experience in every form (for the present study, intermediate level subjective tinnitus) is significantly important confounding factor for affecting psychological status of the patients.

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## 1. Introduction

Tinnitus is the perception of sound reported by a patient in the absence of any corresponding external sound. It is typically referred to as “ringing in the ears,” but other forms of sound such as hissing, roaring and whistling have been described [1,2].

Tinnitus is not a disease but a symptom resulting from a range of underlying causes, including ear infections, head or neck injury, changes in blood pressure or metabolism, foreign objects in the ear and injury from loud noises. Tinnitus is also a side effect of some

oral medications, such as aspirin and may also result from an aberrant low level of serotonin activity [1,3,4]. Tinnitus can occur in one ear or both ears and can be a symptom of a condition that causes hearing loss, or it can exist without any hearing loss.

Almost everyone at least one time has experienced brief periods of tinnitus in the ear, or has been suffering with it for a long time, so that tinnitus is pervasive. Tinnitus can be annoying problem for those who are sufferers and a frustrating problem for the physicians, and audiologist and others. While most of cases have more annoying and constant types of tinnitus, in some cases it is not a serious problem. The most effective treatment for tinnitus is to eliminate the underlying cause. Unfortunately, the cause often cannot be identified so. Drug therapy, vitamin therapy, biofeedback, hypnosis and tinnitus maskers are types of treatments that have been helpful for some people [5].

Tinnitus is a symptom common to many problems, both physiological and psychological. Importance of tinnitus may range

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in severity from complaints of mild irritation to severe depression and suicidal ideation [2,4,6]. The Symptom Checklist-90-R (SCL-90-R), consists of 90 items, is one of quick screening instrument to measure psychological distress [7–10]. It is an assessment instrument for otologists and audiologists because it helps evaluate a broad range of psychological problems and symptoms of psychopathology more than diagnosing these symptoms. This test can be used as a reference measurement if consultation requested. SCL-90-R test is also useful to help the patients deal with tinnitus and to monitor and control progress of treatment period.

The present study investigated the effects of tinnitus and/or hearing loss on psychological status of the patients. SCL-90-R test is used for this purpose. The results were discussed in terms of patients' getting maximum benefits from tinnitus management program.

## 2. Materials and methods

The present study was performed in Audiology and Speech Pathology Section of Otorhinolaryngology Department of Faculty of Medicine, Hacettepe University.

### 2.1. Subjects

The study was conducted with 142 individuals (73 female, 69 male):

- 70 of 142 patients who have tinnitus (T) were separated two groups according to whether having hearing loss (HL).
  - Group 1 ( $n = 32$ ): tinnitus (+), hearing loss (+) [T(+),HL(+)]
  - Group 2 ( $n = 38$ ): tinnitus (+) + hearing loss (-) [T(+),HL(-)]
- 72 of 142 patients without tinnitus were also divided into two groups according to whether having hearing loss:
  - Group 3 ( $n = 36$ ): tinnitus (-), hearing loss (+) [T(-),HL(+)]
  - Group 4 ( $n = 36$ ): tinnitus (-) + hearing loss (-) [T(-),HL(-)] (Control group)

The features of 4 groups were given detailly below:

1. Group 1 ( $n = 32$ ): The patients with tinnitus (T) + hearing loss (HL) were included into this group [T(+),HL(+)]. 16 (50%) female and 16 male (50%) patients with the mean age of  $47.50 \pm 12.40$  years (ranged from 21 to 73) were in this group. Tinnitus duration (years); and subjective tinnitus loudness level was also detected for this group.
2. Group 2 ( $n = 38$ ): The patients with only tinnitus were included into this group. 14 (36.8%) female and 24 male (63.2%) patients with the mean age of  $39.55 \pm 11.16$  years (ranged from 18 to 63) were in this group. No hearing loss was detected by audiological evaluation [T(+),HL(-)]. Tinnitus duration (years); and subjective tinnitus loudness level was also detected for this group.
3. Group 3 ( $n = 36$ ): The patients with only hearing loss, evaluated by audiological tests, were included into this group. 24 (66.7%) female and 12 male (33.3%) patients with the mean age of  $42.36 \pm 11.25$  years (ranged from 25 to 65) were in this group. The patients in this group experienced no tinnitus [T(-),HL(+)].
4. Group 4 ( $n = 36$ ): This group was the control group, consisting of healthy subjects without tinnitus or hearing loss [T(-),HL(-)]. 19 (52.8%) female and 17 male (47.2%) patients with the mean age of  $41.53 \pm 10.68$  years (ranged from 21 to 59) were in this group. Their hearing assessment was in normal limits. There was no hearing loss.

In Group 1 and 2, the patients with tinnitus had no experience of any therapy intended for tinnitus in past. Data for patients

with tinnitus and hearing loss in Group 1; for patients with tinnitus in Group 2; and for healthy subjects in Group 4 (control group) were also studied previously; and retrospective data was used in the present study [11,12]. For Group 3, the patients with hearing loss were included into the study after their signed informed consents.

### 2.2. Hearing assessment

Audiometric measurements were done Industrial Acoustic Company (Bronx NY, USA) soundproof test rooms. Measurements were included of pure tone air conduction and bone conduction hearing thresholds. Pure tone air conduction tests were carried out between 125 and 16,000 Hz and bone conduction tests were performed between 500 and 4000 Hz. Air conduction hearing thresholds were achieved using Interacoustics (Assens, Denmark) AC-5 clinical audiometer, TDH receiver, and standard earphones with MX41/AR. Bone conduction tests were performed by Oticon (Smørum, Denmark) B71 vibrator. Hearing thresholds of all individuals were measured and evaluated according to ISO 1964 standarts.

### 2.3. Tinnitus loudness level

The patients in Groups 1 and 2 were asked to grade the severity of their subjective tinnitus loudness level (STLL) using a ten-point scale, with 1 being very mild and 10 being very severe (0–2 very quiet, 3–7 intermediate loudness, 8–10 very loud) [13]. All patient's STLL in Groups 1 and 2 were at intermediate loudness level.

### 2.4. SCL-90-R test

The SCL-90-R assesses psychological distress in terms of nine primary symptom dimensions and three summary scores termed global scores [14]. SCL-90-R test was applied to all individuals involved in this study. Somatization (SOM), Obsessive-Compulsive (O-C), Interpersonal Sensitivity (I-S), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic Anxiety (PHOB), Paranoid Ideation (PAR) and Psychoticism (PSY) subscales of SCL-90-R test were evaluated and general assessment of SCL-90-R test was performed by the means of Global Severity Index (GSI). Reliability and validity of the test for Turkey was accomplished [15]. GSI results show a general assessment of SCL-90-R test; and AS (Additional Scale) results shows eating and sleeping status of the patients.

SCL-90-R is configured by 90 items of psychiatric symptoms and complaints to assess 9 different sizes of separate symptoms, each of them consists of 6–13 material [15–18]. For each item, 0,1,2,3,4 point was given respectively according to the no/very little/moderate/very much/advanced degree options [15,19]. Cutting score of this scale of 'psychiatric screening is widely recommended that GSI = 1.00 points. An increase of the scores over then 1.00 indicates increase in the individual's suffering of psychiatric symptoms and the best index of the scale [15,19]. Scores of underline 1.00 indicates non-patient, "normal" individuals or populations [15,20].

Nine items (1st–9th items below), Additional Scale (AS) (10th item below) and GSI (11th item below) are explained detailly below [15–18]:

1. Somatization (SOM): To assess distress for various bodily functions (pains in the chest or heart region).
2. Obsessive-Compulsive (O-C): To assess the strain due to unwanted thoughts and behaviors, individual's being unable to protect himself from thinking and performing (repeating state of some movements, such as bathing, counting, touching).

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