

Validity and Reliability of the Turkish Version of the Screening for Anxiety and Depression in Tinnitus-Hyperacusis-Misophonia

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ABSTRACT

Objective: The purpose of this study was to assess the validity and reliability of the Turkish version of the screening for anxiety and depression in tinnitus-hyperacusis-misophonia (SAD-T) in individuals with tinnitus.

Methods: The SAD-T has four items and was translated into Turkish using the “back-translation” method. The study included 105 individuals (33 M, 72 F) with subjective tinnitus whose mean age was 31.87 ± 15.16 (min: 20, max: 65). Cronbach's α was used to measure internal consistency, and the intraclass correlation coefficient (ICC) was used to measure test-retest reliability in a subgroup of thirty participants, based on repeated assessments over two weeks. Confirmatory factor analysis was used to assess construct validity. The depression anxiety stress scale-21 (DASS-21) was used to evaluate the concurrent validity of the Turkish version of SAD-T (SAD-T-TR). Additionally, the DASS-21 subscale scores were used to categorize participants into anxiety-positive and anxiety-negative, and depression-positive and depression-negative groups to assess discriminant validity.

Results: Every item had a corrected item-total correlation coefficient higher than 0.30. The scale demonstrated excellent test-retest reliability (ICC=0.945) and good internal consistency (Cronbach's α =0.879). The model demonstrated an acceptable fit [$\chi^2(1)=3.046$, $p=0.081$; comparative fit index=0.991; Tucker-Lewis index=0.945; root mean square error of approximation (RMSEA)=0.140], supporting a unidimensional structure despite an inflated RMSEA due to low degrees of freedom (df=1). SAD-T-TR scores were moderately positively correlated with DASS-21 scores ($r=0.680$ for total, $r=0.670$ for depression, $r=0.586$ for anxiety, $r=0.639$ for stress, $p<0.001$). SAD-T-TR scores were significantly higher in participants with anxiety and depression than in those without these conditions ($p<0.001$).

Conclusion: SAD-T-TR is a valid and reliable tool for screening depression and anxiety in individuals with tinnitus. The scale may be a helpful tool for clinical practice and research in tinnitus populations because it is brief and simple to administer.

Keywords: Tinnitus, anxiety, depression, surveys and questionnaires, self-report, psychometrics

INTRODUCTION

Tinnitus is a common auditory symptom characterized by the perception of sound without an external sound source (1). Tinnitus is considered a complex disorder that affects individuals' cognitive, emotional, and psychosocial functioning, and is not solely an auditory disorder. In individuals with tinnitus, the persistence and perceived severity of the symptom are associated with limitations in daily living activities, sleep problems, and decreased quality of life, which can increase the risk of developing comorbid psychological diagnoses (2).

The literature shows that the prevalence of anxiety and depression is significantly higher among individuals with tinnitus than among those without tinnitus. A systematic review reported an average

depression prevalence of 33% in patients with tinnitus, varying between 6% and 84% across studies (3). Similarly, Bhatt et al. (4) found that approximately 26% of adults with tinnitus experienced anxiety and 25.6% experienced depression; these rates remained at approximately 9% in individuals without tinnitus, and the likelihood of these psychological problems increased with the severity of tinnitus. These findings demonstrate that tinnitus significantly affects not only individuals' auditory perception but also their psychological well-being.

Therefore, it is crucial for clinical practice and research to evaluate comorbid psychiatric problems, including anxiety and depression, in people with tinnitus. Self-report measures significantly contribute to our understanding of the psychosocial effects of tinnitus by directly reflecting the emotional, cognitive, and

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behavioral challenges people face daily. Clinicians can use these simple-to-use, time-saving, and cost-effective scales to evaluate the presence, severity, and functional impact of symptoms. They also facilitate early referral and treatment planning.

Due to the limited availability of objective measurement methods for assessing tinnitus, self-report scales are predominantly used in clinical practice and research (5,6). In this context, the most commonly used scales are the tinnitus handicap inventory (THI) (7,8), the tinnitus functional index (9), and the tinnitus impact questionnaire (10), and these scales are used in studies examining the relationships between tinnitus and anxiety and depression.

Researchers often use general mental health scales instead of tinnitus-specific scales in the evaluation of anxiety and depression in people with tinnitus (6,11). The patient health questionnaire-9, Beck depression inventory, hospital anxiety and depression scale - depression subscale, and depression, anxiety and stress scales (DASS-21) - depression subscale are among the most commonly used scales for depression screening. These scales have been shown to exhibit significant correlations with tinnitus severity and perceived level of discomfort (3,12,13). Short and reliable screening scales like the generalized anxiety disorder 7-item and 2-item, the hospital anxiety and DASS-21 - anxiety subscale are frequently used in anxiety assessment (3,13,14).

A novel method of screening for psychiatric disorders in this population is provided by the screening for anxiety and depression in tinnitus-hyperacusis-misophonia (SAD-T) scale, which was created especially for tinnitus, misophonia, and hyperacusis (15). The SAD-T was developed as a condition-specific adaptation of the patient health questionnaire-4 (PHQ-4) to facilitate screening for anxiety and depression symptoms in individuals with tinnitus, hyperacusis, and misophonia. While retaining the brevity of the PHQ-4, it incorporates symptom attribution within the context of these auditory conditions, which may improve its clinical relevance for affected populations. However, studies of validity and reliability are necessary to ensure the valid and reliable use of such scales across diverse languages and cultures. Although the SAD-T was originally designed for tinnitus, hyperacusis, and misophonia populations, the present study focused exclusively on individuals with tinnitus. Therefore, the findings should not be generalized to populations with hyperacusis or misophonia without further validation studies. The current literature indicates a scarcity of studies examining the Turkish psychometric properties of scales utilized for screening anxiety and depression in individuals with tinnitus. Thus, this study aims to assess the Turkish validity and reliability of the SAD-T scale among individuals with tinnitus.

METHODS

This study was designed to be both descriptive and cross-sectional. Between March and November 2025, the study was conducted in the Department of Audiology at Trakya University Faculty of Health Sciences. The Trakya University Non-Interventional Ethics Committee approved it with decision number 05/19 and protocol code 2025/104 (date: 06.01.2025). Written informed consent was obtained from all participants.

Participants

The study included 105 individuals with tinnitus, aged between 20 and 65 years. The inclusion criteria for the participants were: subjective tinnitus for at least 6 months; age older than 18 years; absence of any known neurological disorder; and absence of hearing loss.

All participants underwent hearing evaluations prior to inclusion in the study. Hearing thresholds were measured using an Interacoustics AC40 audiometer. Air- and bone-conduction thresholds were obtained for both ears at 500, 1000, 2000, and 4000 Hz. Participants with a four-frequency pure tone average of 25 dB HL or lower were included in the study.

Participants were classified into subgroups based on their scores on the DASS-21. For discriminant validity analyses, participants were classified as anxiety-positive or anxiety-negative based on the DASS-21 anxiety subscale cut-off scores, and as depression-positive or depression-negative based on the DASS-21 depression subscale cut-off scores.

Materials

The participants underwent hearing evaluations, and those who met the requirements were asked to complete the THI, SAD-T, and DASS-21 questionnaires in person. To evaluate test-retest reliability, 30 participants were randomly selected from the study sample and asked to complete the SAD-T again two weeks after the initial assessment.

The THI was used to assess the impact of tinnitus on an individual's daily life. Turkish validity and reliability were established by Aksoy et al. (8), with a Cronbach's α value of 0.88. The total score ranges from 0 to 100, with higher scores indicating a greater negative impact of tinnitus on the individual.

SAD-T is used to assess symptoms of anxiety and depression that may require referral for psychiatric evaluation. The SAD-T includes four items that match the PHQ-4 (16). The total SAD-T score is obtained by summing all item scores, resulting in a range of 0-12, and the scale demonstrated good internal consistency (Cronbach's $\alpha=0.91$) (17).

DASS-21 is a 21-item self-report measure designed to assess the severity of general psychological distress and symptoms associated with depression and anxiety. It consists of 3 subscales, each with 7 items. These subscales are depression, anxiety, and stress. Turkish reliability validity was done by Sarıçam (18) and Cronbach's α values for the subscales were found to be between 0.87 and 0.81. Subscale scores represent the total score of the relevant items. All subscales are scored between 0 and 21 points. When no symptoms are present, the cut-off score for the depression subscale is 4, the anxiety subscale is 3, and the stress subscale is 7 (19).

Translation Process

The original English form of the SAD-T scale was adapted into Turkish using the back-and-forth translation method in accordance with the proposed standard adaptation steps (20).

In the initial stage, two subject-matter experts who were native Turkish speakers and fluent in English independently translated the scale into Turkish. After comparing the draft texts, the authors reached a single Turkish version by consensus. Two independent translators, who were unfamiliar with the original version of the scale, then retranslated the form into English. The back-translations were compared with the original scale to evaluate conceptual and linguistic equivalence, and the preliminary Turkish version of SAD-T (SAD-T-TR) was created after applying the necessary corrections. The preliminary form was administered to 5 adults with tinnitus, and the comprehensibility and cultural appropriateness of the items were evaluated. The final SAD-T-TR was developed and utilized in validity and reliability assessments following minor language modifications identified in the pilot application.

Statistical Analysis

IBM SPSS Statistics version 27 and AMOS version 23 were used for all statistical analyses. The normality of the data distribution was assessed using the Kolmogorov-Smirnov test and visual inspection of histogram graphs. The results indicated that the data were not normally distributed. Categorical data were reported as percentages and frequencies, whereas continuous variables were reported as median (interquartile range).

The distribution of the SAD-T-TR scores was examined for floor and ceiling effects. It is accepted that the floor and ceiling effects occur when the number of participants with the lowest or highest scores exceeds 15% of the total number of participants. Item analysis was performed on all the scale items, and the item was considered reliable when the item-total correlation coefficient was higher than 0.3 (21).

Analyses of construct, concurrent, and discriminant validity were used to assess the SAD-T-TR. The factor structure of the SAD-T-TR was tested for construct validity using confirmatory factor analysis (CFA). The chi-square statistic (χ^2), chi-square/degrees of freedom ratio (χ^2/df), comparative fit index (CFI), Tucker-Lewis index (TLI), incremental fit index (IFI), normed fit index (NFI), goodness-of-fit index (GFI), root mean square error of approximation (RMSEA), and root mean square residual (RMR) were among the goodness-of-fit indices used to assess model fit. Model fit was assessed using the following criteria: $\chi^2/df < 5$, CFI, TLI, IFI, NFI, and GFI ≥ 0.90 indicating acceptable fit, and RMSEA ≤ 0.08 indicating acceptable model fit (22,23). The concurrent validity of the SAD-T-TR was evaluated by analyzing Spearman correlation coefficients between SAD-T-TR and DASS-21 scores. The correlation coefficient of concurrent validity was considered a weak correlation under 0.3, a moderate correlation between 0.3 and 0.7 and a high correlation with 0.7 and above (24). Differences in SAD-T-TR scores between participants with and without anxiety and depression symptoms, based on the DASS-21 anxiety and depression subscales, were evaluated using the Mann-Whitney U test to examine discriminant validity. Statistical significance was defined as a p-value of less than 0.05.

Internal consistency and test-retest reliability were used to evaluate the scale. Cronbach's α coefficients were rated excellent

when $r > 0.80$ (25). Test-retest reliability was assessed using the intraclass correlation coefficient (ICC). ICC values of 0.8 and above were accepted to be perfectly correlated (26).

RESULTS

A total of 105 individuals with tinnitus (33 M, 72 F) were included in the study. The mean age of the participants was 31.87 ± 15.16 (min: 20, max: 65). According to DASS-A, 47 individuals had anxiety, whereas DASS-D identified depression in 29 individuals. The mean tinnitus duration was 42.99 ± 45.92 months (range: 6-160 months), and the mean THI score was 15.99 ± 15.46 (range: 1-50). Based on the THI severity classification, 66, 20, and 19 participants had slight, mild, and moderate tinnitus, respectively. None of the participants reported ear pain. Tinnitus was bilateral in 86 participants (81.9%) and unilateral in 19 participants (18.1%), of whom 11 had right-sided tinnitus and 8 had left-sided tinnitus. Participant characteristics are shown in Table 1.

The median score for the SAD-T-TR across all participants was 1.00 (3.00). No statistically significant difference was found in SAD-T-TR scores between male and female participants ($p = 0.384$). A moderate positive correlation was observed between SAD-T-TR and THI scores ($r = 0.350$, $p < 0.001$). No significant correlations were found between SAD-T-TR and tinnitus duration ($r = -0.155$, $p = 0.114$) or between SAD-T-TR and age ($r = 0.136$, $p = 0.167$). Two participants (1.9%) scored the highest, and 28 participants (26.7%) scored the lowest. The SAD-T-TR scale exhibited a floor effect, and no data were lost. Item characteristics, means and standard deviations, and corrected item-total correlations are shown in Table 2. The item-total correlation coefficients of all items were higher than 0.3.

Validity Analysis

Concurrent validity was examined by comparing the DASS-21 total and subscale scores with the SAD-T-TR scores (Table 3). A moderately positive correlation was observed between SAD-T-TR and each DASS-21 subscale, as well as with the total score ($p < 0.001$).

Discriminant validity was evaluated by classifying participants based on DASS-21 anxiety and depression subscale scores. SAD-T-TR scores were compared between tinnitus participants with and without anxiety and between those with and without depression (Table 4). Participants with anxiety and depression showed significantly higher SAD-T-TR scores than those without anxiety or depression.

The construct validity of the SAD-T-TR was tested using CFA. The original study suggested a one-factor structure for the SAD-T (15); therefore, CFA was performed to test this structure (Figure 1). All standardized factor loadings were ≥ 0.68 , indicating strong item-factor relationships. A correlated error term was specified between items 1 and 3 ($r = 0.35$) based on the modification indices. In PHQ-4 validation studies, the anxiety and depression subfactors have been shown to be highly intercorrelated, and under a unidimensional model this structural overlap may manifest as residual covariance between items tapping the two constructs

Table 1. Participant characteristics

Characteristic	n (%)
Gender	Male 33 (31.4%)
	Female 72 (68.6%)
Education	Primary education 3 (2.9%)
	Middle school 2 (1.9%)
	High school 14 (13.3%)
	Graduate 80 (76.2%)
	Postgraduate 6 (5.7%)
Anxiety	No (DASS-A score ≤ 3) 58 (55.2%)
	Yes (DASS-A score > 3) 47 (44.8%)
Depression	No (DASS-D score ≤ 4) 76 (72.4%)
	Yes (DASS-D score > 4) 29 (27.6%)
THI classification	Slight 66 (62.9%)
	Mild 20 (19.0%)
	Modarate 19 (18.1%)

DASS-A: Depression anxiety stress scale-21-anxiety subscale, DASS-D: Depression anxiety stress scale-21-depression subscale, THI: Tinnitus handicap inventory

Table 2. Item characteristics of SAD-T-TR

Item	Question	Mean	SD	Corrected item-total correlation (r)
Item 1	Feeling nervous, anxious or on edge	0.50	0.76	0.707
Item 2	Not being able to stop or control worrying	0.61	0.83	0.749
Item 3	Little interest or pleasure in doing things	0.59	0.84	0.728
Item 4	Feeling down, depressed or hopeless	0.66	0.80	0.770

SAD-T-TR: Turkish version of screening for anxiety and depression in tinnitus-hyperacusis-misophonia, SD: Standard deviation,

Table 3. Concurrent validity findings

	DASS-total	DASS-A	DASS-D	DASS-S	SAD-T-TR
DASS-total	1.000				
DASS-A	0.931*	1.000			
DASS-D	0.936*	0.867*	1.000		
DASS-S	0.899*	0.732*	0.759*	1.000	
SAD-T-TR	0.680*	0.670*	0.586*	0.639*	1.000

*: Spearman correlation, p-value is significant at .001 level, DASS-A: Depression anxiety stress scale-21-anxiety subscale, DASS-D: Depression anxiety stress scale-21-depression subscale, DASS-S: Depression anxiety stress scale-21-stress subscale, SAD-T-TR: Turkish version of the screening for anxiety and depression in tinnitus-hyperacusis-misophonia

(27). The model yielded an acceptable fit to the data [$\chi^2(1)=3.046$, $p=0.081$, $\chi^2/df=3.046$]. Incremental fit indices indicated an excellent model fit (CFI=0.991, TLI=0.945, IFI=0.991, NFI=0.987). Absolute fit indices were also satisfactory (GFI=0.986, RMR=0.010). Although the RMSEA value was 0.140 (90% confidence interval: 0.000-0.332), RMSEA is known to be unstable and systematically inflated in models with very few degrees of freedom; simulation studies have demonstrated that RMSEA should not be interpreted in isolation when $df=1$ (28). Given the non-significant chi-square, high incremental fit indices, and the inherent psychometric constraints of four-item scales, these results should be interpreted with appropriate caution. Nevertheless, the overall pattern of findings supports the unidimensional structure of the SAD-T-TR.

Reliability Analysis

The internal consistency and test-retest reliability of the SAD-T-TR are presented in Table 5. The ICC value for test-retest reliability was 0.945, and the α value was 0.879. The ICC (test-retest reliability) and Cronbach's α (internal consistency) indicated that SAD-T-TR has excellent reliability.

DISCUSSION

The present study aimed to evaluate the validity and reliability of the SAD-T-TR in individuals with tinnitus. Overall, the results show that the SAD-T-TR is a valid and reliable instrument with satisfactory psychometric properties. In line with previous

Table 4. Discriminant validity findings

	SAD-T-TR median (IQR)	U	Z	p-value*	Effect size (r)
Anxiety (+) (n=47)	4.00 (4.00)	345.000	-6.697	<0.001	0.65
Anxiety (-) (n=58)	1.00 (1.00)				
Depression (+) (n=29)	4.00 (4.00)	434.000	-4.887	<0.001	0.48
Depression (-) (n=76)	1.00 (2.00)				

Note: Anxiety (+) defined as DASS-A score >3, depression (+) defined as DASS-D score >4

*: Mann-Whitney U test, SAD-T-TR: Turkish version of the screening for anxiety and depression in tinnitus-hyperacusis-misophonia, IQR: Interquartile range, DASS-A: Depression anxiety stress scale-21-anxiety subscale, DASS-D: Depression anxiety stress scale-21-depression subscale

Table 5. Internal consistency and test-retest reliability of the SAD-T-TR

	Test-retest reliability		Internal consistency
	Intraclass correlation coefficient	95% CI	Cronbach's α
SAD-T-TR	0.945	0.876-0.975	0.879

SAD-T-TR: Turkish version of the screening for anxiety and depression in tinnitus-hyperacusis-misophonia, CI: Confidence interval

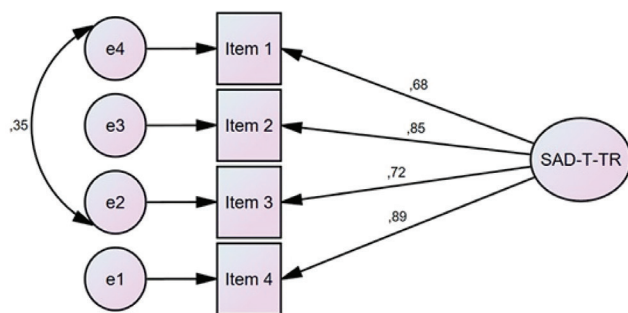


Figure 1. Confirmatory factor analysis of SAD-T-TR

SAD-T-TR: Turkish version of the screening for anxiety and depression in tinnitus-hyperacusis-misophonia

research (15), CFA validated the scale's one-factor structure. The scale showed sufficient construct, concurrent, and discriminant validity as well as good internal consistency and test-retest reliability. People with tinnitus often report psychological distress, especially anxiety and depression, which is thought to be one of the main causes of tinnitus-related disability and a lower quality of life (12,29). Thus, quick screening methods that can quickly detect psychological symptoms could be very helpful for tinnitus treatment in audiology clinic. SAD-T was developed as an ultra-brief screening instrument with the express purpose of identifying symptoms of anxiety and depression in people seeking treatment for tinnitus.

The SAD-T-TR had a high internal consistency (Cronbach's $\alpha=0.879$), which means that the items measure a common underlying construct. Item-total correlations for SAD-T-TR items ranged between 0.707 and 0.770. These correlation coefficients demonstrate strong consistency and distinguish among different levels of the measured trait. Aazh et al. (17) also found a Cronbach's α value of 0.91 for the SAD-T in a clinical tinnitus

population. The item-total correlation coefficients ranged from 0.76 to 0.84, indicating that each item made a strong contribution to the total score. The scale also has high test-retest reliability (ICC=0.945), which means that it gives consistent results over time. These results collectively indicate that the SAD-T is reliable across diverse populations and languages.

The current study found that SAD-T-TR scores demonstrated a floor effect (26.7%), exceeding the commonly accepted threshold of 15%. Similar floor effects have been reported in ultra-brief screening instruments, including the PHQ-4, particularly in samples with low levels of psychological distress (30,31). A systematic review have also indicated that such effects may occur in very brief screening tools designed primarily to identify clinically relevant symptoms rather than to capture the full range of symptom severity (32). This finding may partly reflect the distribution of psychological symptoms within the present tinnitus sample, which included individuals with minimal or no clinically significant distress. The primary aim of the SAD-T is rapid screening rather than detailed symptom profiling; this emphasis may further contribute to this pattern. Nevertheless, the presence of a floor effect should be considered a potential limitation, as it may reduce the scale's sensitivity in distinguishing subtle differences among individuals with low levels of psychological distress.

The CFA supported a one-factor structure for the SAD-T-TR, consistent with the original validation study (15). This unidimensional structure is supported by satisfactory model fit indices and strong standardized factor loadings (≥ 0.68), indicating that all items adequately represent a single latent construct. Conversely, the PHQ-4 are generally regarded as two-factor models representing distinct constructs of anxiety and depression (27,33). The difference between these structures may be explained by the conceptual purpose of the instruments and the characteristics of the sample. The PHQ-4 is used to assess two areas of mental health, anxiety and depression, while the SAD-T is a brief instrument that assesses general emotional distress specifically related to tinnitus, hyperacusis, and misophonia.

In individuals with tinnitus, anxiety and depressive symptoms frequently co-occur and may reflect a shared underlying distress dimension rather than clearly separable constructs. These findings support the notion that the unidimensional structure identified for the SAD-T may be population-specific. Unlike studies using the PHQ-4 that typically distinguish anxiety and depression as separate constructs, individuals with tinnitus may experience these symptoms as part of a broader, more integrated emotional-distress response.

The results of the concurrent validity tests add to the evidence that the scale is validly constructed. A moderate correlation was observed between SAD-T-TR scores and DASS-21 total and subscale scores. The current study also supports discriminant validity. People diagnosed with anxiety or depression based on their DASS-21 scores had SAD-T-TR scores much higher than those who did not have these symptoms. This finding indicates that the scale can effectively distinguish between individuals exhibiting clinically significant psychological symptoms and those who do not. These findings confirm that the SAD-T-TR scale can identify psychological symptoms more quickly and consistently.

There were no significant differences in SAD-T-TR scores between men and women. This result could suggest that the psychological distress associated with tinnitus is influenced less by gender and more by how the person perceives tinnitus and how it affects their daily life. Other studies on tinnitus have also suggested that emotional distress related to tinnitus may depend more on tinnitus severity and how well people deal with it than on things like gender (17). Moreover, associations between sound sensitivity symptoms and mental health disorders have been documented in previous research (34).

Psychological symptoms may also play a role in how individuals with tinnitus perceive and cope with their condition, as well as in their response to treatment. Previous research indicates that higher SAD-T scores correlate with increased tinnitus handicap and diminished confidence in managing tinnitus (11,35). In our study, a moderate positive correlation was found between SAD-T-TR and THI scores ($r=0.35$), indicating that higher levels of anxiety and depressive symptoms are associated with a greater impact of tinnitus. Although this association was statistically significant, its magnitude indicates that psychological distress represents only one of several factors contributing to the perceived impact of tinnitus. Nevertheless, these findings support the potential value of including a brief psychological screening tool as part of a comprehensive tinnitus assessment.

Study Limitations

Several limitations should be considered when interpreting the findings. First, the sample's relatively large age variability may further restrict the generalizability of the results to specific age groups. Although no significant sex-related differences were observed in SAD-T scores, the predominance of women and individuals with higher educational attainment in the sample may limit the generalizability of the findings. Future studies involving more demographically diverse tinnitus populations are warranted.

Second, the study relied on self-report measures that may be affected by response bias, potentially leading to inaccuracies in the collected data and limiting the reliability of the findings. Third, participants were included only if their hearing thresholds were below 25 dB HL, consistent with the standard audiological definition of normal hearing and with the inclusion criteria used in previous tinnitus research (36,37). Although this criterion was applied to minimize the confounding influence of peripheral hearing loss on psychological distress scores, it excludes a substantial proportion of the tinnitus population with hearing loss, thereby limiting the generalizability of the findings. Fourth, since only individuals with tinnitus were included, the findings should not be generalized to individuals with hyperacusis or misophonia without further validation studies. Finally, the CFA was based on a four-item scale with $df=1$, which constrains the reliability of fit indices such as RMSEA and warrants cautious interpretation of the model fit results. Future studies involving more demographically diverse samples and larger populations with tinnitus, hyperacusis, and misophonia are warranted to further examine the psychometric properties and clinical utility of the SAD-T-TR.

CONCLUSION

The SAD-T-TR exhibited satisfactory psychometric properties in individuals with tinnitus. The scale demonstrated strong internal consistency, excellent test-retest reliability and adequate construct validity, concurrent validity, and discriminant validity. The CFA validated the one-factor structure of the scale. The SAD-T-TR may be a useful screening tool for detecting symptoms of anxiety and depression in people with tinnitus because it is brief, easy to use, and psychometrically sound. Using concise instruments in clinical audiology may enhance prompt detection of psychological distress and promote a more holistic and interdisciplinary approach to tinnitus management. Subsequent research should examine the scale's sensitivity to treatment-related variations and assess its applicability in larger tinnitus populations.

Ethics

Ethics Committee Approval: Trakya University Non-Interventional Ethics Committee approved it with decision number 05/19 and protocol code 2025/104 (date: 06.01.2025).

Informed Consent: Written informed consent was obtained from all participants.

Footnotes

Author Contributions: Concept - N.B.A.; Design - N.B.A., İ.T.G.; Data Collection and/or Processing - N.B.A., İ.T.G.; Analysis and/or Interpretation - N.B.A.; Literature Search - İ.T.G.; Writing - N.B.A.

Conflict of Interest: The authors have no conflicts of interest to declare.

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REFERENCES

1. Møller AR. Epidemiology of tinnitus in adults. Textbook of tinnitus: Springer; 2011. p. 29-37.
2. Jacques D, Nozeret Y, Zdanowicz N, Reynaert C, Garin P, Gilain C. Tinnitus and psychiatric comorbidities in liaison psychiatry analysis of three years in an audiophonology centre. Psychiatr Danub. 2013; 25(Suppl 2): S102-4.

3. Salazar JW, Meisel K, Smith ER, Quiggle A, McCoy DB, Amans MR. Depression in patients with tinnitus: a systematic review. *Otolaryngol Head Neck Surg*. 2019; 161: 28-35.
4. Bhatt JM, Bhattacharyya N, Lin HW. Relationships between tinnitus and the prevalence of anxiety and depression. *Laryngoscope*. 2017; 127: 466-9.
5. Henry JA. "Measurement" of tinnitus. *Otol Neurotol*. 2016; 37: e276-85.
6. Hall DA, Haider H, Szczepek AJ, Lau P, Rabau S, Jones-Diette J, et al. Systematic review of outcome domains and instruments used in clinical trials of tinnitus treatments in adults. *Trials*. 2016; 17: 270.
7. Newman CW, Jacobson GP, Spitzer JB. Development of the tinnitus handicap inventory. *Arch Otolaryngol Head Neck Surg*. 1996; 122: 143-8.
8. Aksoy S, Firat Y, Alpar R. The tinnitus handicap inventory: a study of validity and reliability. *Int Tinnitus J*. 2007; 13: 94-8.
9. Meikle MB, Henry JA, Griest SE, Stewart BJ, Abrams HB, McArdle R, et al. The tinnitus functional index: development of a new clinical measure for chronic, intrusive tinnitus. *Ear Hear*. 2012; 33: 153-76. Erratum in: *Ear Hear*. 2012; 33: 443.
10. Aazh H, Hayes C, Moore BCJ, Vitoratou S. Psychometric evaluation of the tinnitus impact questionnaire using patients seeking help for tinnitus or tinnitus with hyperacusis. *Int J Audiol*. 2023; 62: 835-44.
11. Aazh H, Moore BCJ, Erfanian M. Confirmatory factor analysis of the tinnitus impact questionnaire using data from patients seeking help for tinnitus alone or tinnitus combined with hyperacusis. *PLoS One*. 2024; 19: e0302837.
12. Hackenberg B, Döge J, O'Brien K, Bohnert A, Lackner KJ, Beutel ME, et al. Tinnitus and its relation to depression, anxiety, and stress-a population-based cohort study. *J Clin Med*. 2023; 12: 1169.
13. Husain WSW, Othman A, Othman NAN, Mohamad WNW, Zakaria MN. Determining the internal and external reliability of depression, anxiety and stress scales (DASS-21) in assessing psychological symptoms among patients with tinnitus. *NeuroQuantology*. 2018; 16: 97-102.
14. Plummer F, Manea L, Trepel D, McMillan D. Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. *Gen Hosp Psychiatry*. 2016; 39: 24-31.
15. Aazh H, Hayes C, Erfanian M, Moore BCJ, Vitoratou S. Confirmatory factor analysis of the hyperacusis impact questionnaire, sound sensitivity symptoms questionnaire, and screening for anxiety and depression in tinnitus, including preliminary analyses of the parent versions for use with children. *J Am Acad Audiol*. 2024; 35: 81-92.
16. Kroenke K, Spitzer RL, Williams JB, Löwe B. An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics*. 2009; 50: 613-21.
17. Aazh H, Hayes C, Moore BCJ, Danesh AA, Vitoratou S. Psychometric evaluation of the hyperacusis impact questionnaire (HIQ) and sound sensitivity symptoms questionnaire (SSSQ) using a clinical population of adult patients with tinnitus alone or combined with hyperacusis. *J Am Acad Audiol*. 2022; 33: 248-58.
18. Sarıçam H. The psychometric properties of Turkish version of depression anxiety stress scale-21 (DASS-21) in health control and clinical samples. *JCBPR*. 2018; 7: 19-30.
19. Lovibond SH. Manual for the depression anxiety stress scales. Sydney Psychology Foundation. 1995.
20. Herdman M, Fox-Rushby J, Badia X. A model of equivalence in the cultural adaptation of HRQoL instruments: the universalist approach. *Qual Life Res*. 1998; 7: 323-35.
21. Field A. *Discovering statistics using SPSS*. 3rd ed. London: SAGE Publications Ltd; 2009.
22. Hu Lt, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling*. 1999; 6: 1-55.
23. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *MPR-online*. 2003; 8: 23-74.
24. Abma IL, Rovers M, van der Wees PJ. Appraising convergent validity of patient-reported outcome measures in systematic reviews: constructing hypotheses and interpreting outcomes. *BMC Res Notes*. 2016; 9: 226.
25. Streiner DL, Norman GR, Cairney J. *Health measurement scales: a practical guide to their development and use*. Oxford: Oxford University Press. 2024.
26. Weir JP. Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. *J Strength Cond Res*. 2005; 19: 231-40.
27. Adzrago D, Walker TJ, Williams F. Reliability and validity of the patient health questionnaire-4 scale and its subscales of depression and anxiety among US adults based on nativity. *BMC Psychiatry*. 2024; 24: 213.
28. Kenny DA, Kaniskan B, McCoach DB. The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research*. 2015; 44: 486-507.
29. Haider HF, Ribeiro SF, Hoare DJ, Fialho G, Hall DA, Antunes M, et al. Quality of life and psychological distress in Portuguese older individuals with tinnitus. *Brain Sci*. 2021; 11: 953.
30. Materu J, Kuringe E, Nyato D, Galishi A, Mwanamsangu A, Katebalila M, et al. The psychometric properties of PHQ-4 anxiety and depression screening scale among out of school adolescent girls and young women in Tanzania: a cross-sectional study. *BMC Psychiatry*. 2020; 20: 321.
31. Meidl V, Dallmann P, Leonhart R, Bretthauer B, Busch A, Kubosch EJ, et al. Validation of the patient health questionnaire-4 for longitudinal mental health evaluation in elite Para athletes. *PM R*. 2024; 16: 141-9.
32. Caro-Fuentes S, Sanabria-Mazo JP. A systematic review of the psychometric properties of the patient health questionnaire-4 in clinical and nonclinical populations. *J Acad Consult Liaison Psychiatry*. 2024; 65: 178-94.
33. Christodoulaki A, Baralou V, Konstantakopoulos G, Touloumi G. Validation of the patient health questionnaire-4 (PHQ-4) to screen for depression and anxiety in the Greek general population. *J Psychosom Res*. 2022; 160: 110970.
34. Siepsiak M, Rosenthal MZ, Raj-Kozia D, Dragan W. Psychiatric and audiologic features of misophonia: use of a clinical control group with auditory over-responsivity. *J Psychosom Res*. 2022; 156: 110777.
35. Aazh H, Kartsonaki C, Moore BCJ. Psychometric evaluation of the 4C tinnitus management questionnaire for patients with tinnitus alone or tinnitus combined with hyperacusis. *Int J Audiol*. 2024; 63: 21-9.
36. Goodman A. Reference zero levels for pure-tone audiometer. *ASHA*. 1965; 7: 1.
37. Spankovich C, Gonzalez VB, Su D, Bishop CE. Self reported hearing difficulty, tinnitus, and normal audiometric thresholds, the National Health and Nutrition Examination Survey 1999-2002. *Hear Res*. 2018; 358: 30-6.