ORIGINAL ARTICLE

Prevalence and Association Factors of Anxiety and Depression in Thai Patient with Tinnitus

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Background: Tinnitus has demonstrated varying impacts on quality of life and is linked to various psychological and psychosomatic problems. The most common psychiatric disorders among tinnitus patients were anxiety and depression.

Objective: To evaluate the prevalence of anxiety and depression associated with tinnitus in Thai patients and to identify risk factors.

Materials and Methods: The cross-sectional descriptive study was conducted in a university hospital. Three-hundred subjects who had subjective tinnitus for less than five years were included in the present study. The prevalence of anxiety and depression was evaluated by the Hospital Anxiety and Depression Scale (HADS). A Tinnitus Handicap Inventory (THI) was performed to evaluate the impact of tinnitus on daily life. The variables associated with anxiety and depression in tinnitus patients were explored.

Results: Thirty-nine out of 300 tinnitus subjects, or 13% (95% CI 9.6 to 17.2) suffered from anxiety, and 26 of 300 subjects, or 8.7% (95% CI 5.9 to 12.2) suffered from depression. There were 21 subjects, or 7% (95% CI 4.5 to 10.3) who demonstrated both anxiety and depression. Individuals aged over 60 were statistically significantly less likely to experience anxiety (adjusted OR 0.22, p=0.016, 95% CI 0.06 to 0.76). There was no statistically significant difference in depression (adjusted OR 0.39, p=0.178, 95% CI 0.1 to 1.64). THI's severe and catastrophic handicaps were statistically significantly related to anxiety and depression in tinnitus patients. Surprisingly, intermittent tinnitus was 19.63 times more likely to have depression than persistent tinnitus (adjusted OR 19.63, p=0.006, 95% CI 2.39 to 161.49).

Conclusion: The prevalence of anxiety and depression in Thai tinnitus patients was lower than in previous reports from other countries. Younger people were more likely to have anxiety and depression. Prompt evaluation and treatment of these conditions should be carried out.

Keywords: Tinnitus; Anxiety; Depression; HADS; THI

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Tinnitus is the perception of sound without external auditory stimulus. Two different kinds of tinnitus are classified, objective and subjective tinnitus. Objective tinnitus is usually generated in the body while subjective tinnitus is caused by neuronal hyperactivity. The prevalence of subjective tinnitus in adults is in the range of 10% to 30%[1,2]. Tinnitus demonstrated varying impact on quality of life from mild to severe functional impairment and linked to various psychological and psychosomatic problems[3-5]. The most common psychiatric disorders among tinnitus patients were anxiety and depression[6,7]. A study of anxiety and depression in otolaryngology clinic found that tinnitus was one of top three otolaryngologic problems related to anxiety and depression[8]. The prevalence of depression in tinnitus is reported in the range of 5.6% to 60%[5,9-12] and anxiety is reported in 19% to 45%[3,5,13].

There was a correlation between severity of tinnitus and severity of depression as well as anxiety[3,13,14]. The mechanism of associations between depression and tinnitus either as a predisposing factor to tinnitus or as a consequence of tinnitus or as an independent comorbidity is poorly understood[12]. The relation of auditory system and limbic system such as amygdala and hippocampus may lead to psychological and cognitive disorder[15]. Clinical practice guidelines of tinnitus did not recommend routinely prescribe antidepressant and anxiolytic medication, because clinical trial showed modest or inconsistent benefit for improvement of tinnitus[16].

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Even though the impact of depression and anxiety treatment on tinnitus is unclear, screening and treating these conditions were recommended[11,17,18].

There is no report of anxiety and depression prevalence in Thai tinnitus patients. The present study aimed to evaluate prevalence of anxiety and depression associated with tinnitus in Thai patients and to identify associating factors. The authors also evaluated the correlation between Tinnitus Handicap Inventory (THI) and Hospital Anxiety and Depression Scale (HADS).

Materials and Methods

The present study was a cross-sectional descriptive study conducted at King Chulalongkorn Memorial Hospital, Thailand. Ethical approval was obtained from the Institutional Review Board of the Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, in accordance with the Helsinki Declaration of 1983 (IRB No. 084/63). Patients with recent-onset tinnitus are more likely to experience anxiety and depression, whereas those with long-standing symptoms have likely already received diagnosis and treatment. Patients aged 18 to 80 years with subjective tinnitus of less than five years' duration who visited the otolaryngology clinic between March 2020 and February 2021 were enrolled in the present study. Patients diagnosed with psychological disorders, such as schizophrenia, delusional disorder, anxiety, depression, dementia, Parkinson's disease, Alzheimer's disease, or those who were illiterate were excluded from the study.

Demographic data included age, gender, underlying disease, level of education, income, duration of tinnitus, lateralization of tinnitus, consistency of tinnitus and sleeping time were collected. Pure tone audiometry was undergone in all patients. A pure tone average (PTA) for each ear was calculated by averaging the threshold at 500, 1,000 and 2,000 Hz. The PTA of worse ear was reported. Thai version THI[19] and HADS[20] were obtained from all subjects.

THI (Newman et al., 1995)[21] is the common instrument used to determine the impact of tinnitus. THI is composed of 25 items, with a functional subscale, emotional subscale, and catastrophic subscale. Each item is rated as 0 for none, 2 for sometimes, and 4 for always, and the total score is calculated. Scores of 0 to 16, 18 to 36, 38 to 56, 58 to 76, and 78 to 100 were considered as no handicapped, mild handicapped, moderate handicapped, severe handicapped, and catastrophic handicapped, respectively.

Evaluation of anxiety and depression due to tinnitus was performed by using HADS (Zigmond & Snaith, 1983)[22], which is composed of 14 items, in a self-rating questionnaire. The anxiety subscale items (seven items) which are 1, 3, 5, 7, 9, 11, and 13. The depression subscale items (seven items) which are 2, 4, 6, 8, 10, 12, and 14. Each item is rated from 0 to 3 points. The scores are calculated for each subscale and score of 11 or more is considered probable disorders[22,23]. The HADS was developed for use with medical outpatient. It does not only separate depression and anxiety disorder, but it is not affected by physical illness[22]. HADS has been reported to be a reliable and valid screening tool for evaluating anxiety and depression in tinnitus patients[24].

All data were analyzed using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). A p-value of 0.05 or below was considered statistically significant. Continuous data was reported in mean with standard deviation or median with interquartile range. Categorical variables were reported in number of patients and percentage. Correlation between HADS and THI was evaluated by Pearson's correlation. The point prevalence of anxiety and depression were reported in percentage with 95% confidence interval (CI). Parameters affecting anxiety and depression in tinnitus patients were analyzed using univariable and multivariable logistic regression analysis. For univariable analysis, chi-square or Fisher's exact test was used to compare categorical variables between groups, whereas, Mann Whitney-U test or unpaired t-test was used to compare continuous variables. Any variables significant at p-value less than 0.2 were further assessed on multivariable logistic regression analysis. Binary logistic regression analysis was performed to identify the association of the independent variables with anxiety and depression. The results were presented as an adjusted odds ratio (OR) with 95% CI.

The sample size was calculated to have a z-score of 1.96 at 95% confidence level and acceptable error at 5%. From the previous publication, the prevalence of anxiety and depression in tinnitus was 26.1% and 25.6%, respectively[25]. The calculated sample size was 297 subjects.

Results

Three hundred subjects completed the questionnaires and hearing tests, with 98 males (32.7%) and 202 females (67.3%). The average age of participants was 54.03±14.59 years old with a

Table 1. Demographic data

Characteristic	Number (n=300)
Age (years); n (%)	
Mean±SD	54.03±14.59
≤60 years	193 (64.3)
>60 years	107 (35.7)
Female; n (%)	202 (67.3)
No comorbidity; n (%)	164 (54.7)
Education; n (%)	
Under bachelor's degree	98 (32.7)
Bachelor's degree	136 (45.3)
Master's degree or higher	66 (22.0)
Income; n (%)	
<500 USD/month	75 (25.0)
500 to 1,600 USD/month	149 (49.7)
>1,600 USD/month	76 (25.3)
Duration of tinnitus (months)	
Median (Q1, Q3)	6 (2, 24)
<6 months; n (%)	131 (43.7)
6 to 24 months; n (%)	106 (35.3)
24 to 60 months; n (%)	63 (21.0)
Unilateral tinnitus; n (%)	202 (67.3)
Persistent tinnitus; n (%)	229 (76.3)
Sleeping time (hours); mean±SD	6.38±1.23
Audiogram (decibel); median (Q1, Q3)	27 (20, 43)
THI score	
Median (Q1, Q3)	30 (18, 46)
Non handicapped; n (%)	73 (24.3)
Mild handicapped; n (%)	111 (37)
Moderate handicapped; n (%)	62 (20.7)
Severe handicapped; n (%)	37 (12.3)
Catastrophic handicapped; n (%)	17 (5.7)

SD=standard deviation; Q=quartile; THI=Tinnitus Handicap Inventory

range of 20 to 80 years old. One hundred ninety-three subjects (64.3%) were 60 years old or less. At least one comorbidity was identified in 136 subjects (45.3%). Most participants (45.3%) had a bachelor's degree, followed by those with less than a bachelor's degree at 32.7%, and those with a master's degree or higher at 22%. One hundred forty-nine subjects (49.7%) had an income between 500 to 1,600 USD per month, 75 subjects (25%) had income lower than 500 USD per month and 76 subjects (25.3%) had income over 1,600 USD per month. The median duration of tinnitus was eight months (2, 24). When categorized the duration of tinnitus to less than six months, six months to two years, and two to five years, there were 131 subjects (43.7%), 106 subjects (35.3%), and 63 subjects (21%), respectively. The majority of subjects (67.3%) reported unilateral tinnitus perception. Two hundred twenty-nine subjects (76.3%) had persistent tinnitus. The average sleeping time was 6.38±1.23 hours. The median of PTA in worst ear was 27 dB (20, 43) (Table 1).

Table 2. Thai Hospital Anxiety and Depression Scale in tinnitus subjects

HADS	Subject (n=300) n (%)	95% confidence interval
Anxiety (score ≥11)	39 (13.0)	9.6 to 17.2
Score <8	218 (72.7)	
Score 8 to 10	43 (14.3)	
Score 11 to 15	31 (10.3)	
Score ≥16	8 (2.7)	
Depression (score ≥11)	26 (8.7)	5.9 to 12.2
Score <8	246 (82)	
Score 8 to 10	28 (9.3)	
Score 11 to 15	25 (8.3)	
Score ≥16	1 (0.3)	
Anxiety and depression	17 (6.9)	4.5 to 10.3

HADS=Hospital Anxiety and Depression Scale

The median THI score in tinnitus patients was 30 (18, 46). Tinnitus had no impact in seventy-three subjects (24.3%). Two hundred eleven subjects (37%) had mild handicapped, 62 subjects (20.7%) had moderate handicapped, 37 subjects (12.3%) had severe handicapped, and 17 subjects (5.7%) had catastrophic handicapped from tinnitus (Table 1).

The distribution of HADS in tinnitus patients is shown in Table 2. Thirty-nine of three hundred subjects, or 13% (95% CI 9.6 to 17.2) suffered from anxiety and 26 of 300 subjects, or 8.7% (95% CI 5.9 to 12.2) suffered from depression. There were 17 subjects, or 6.9% (95% CI 4.5 to 10.3) who demonstrated both anxiety and depression. The median HADS anxiety subscale was 5 (3, 8), while the median HADS depression subscale was 4 (1, 7). There was a statistically significant correlation between THI and HADS ($r=0.791$, $p<0.001$).

The association factors of anxiety and depression in tinnitus patients were evaluated by univariate analysis. Only age group and THI scores are associated with both anxiety and depression. Sleeping time was associated with anxiety ($p=0.018$) but not depression ($p=0.622$). There was no association between anxiety as well as depression and gender, comorbidity, education, income, duration of tinnitus, lateralization, consistency of tinnitus, and hearing level (Table 3).

Multivariate analysis was performed by binary logistic regression. For anxiety, the age group more than 60 years old was 0.22 times less likely to have

Table 3. Association factors of anxiety and depression in tinnitus patients

	No anxiety (n=261)	Anxiety (n=39)	p-value	No depression (n=223)	Depression (n=24)	p-value
Age; n (%)			0.001α			0.007α
≤60 years (n=193)	159 (82.4)	34 (17.6)		170 (88.1)	23 (11.9)	
>60 years (n=107)	102 (95.3)	5 (4.7)		104 (97.2)	3 (2.8)	
Sex; n (%)			0.199α			0.510α
Male (n=98)	81 (82.7)	17 (17.3)		88 (89.8)	10 (10.2)	
Female (n=202)	180 (89.1)	22 (10.9)		186 (92.1)	16 (7.9)	
Comorbidity; n (%)			0.355α			0.461α
Yes (n=136)	121 (89.0)	15 (11.0)		126 (92.6)	10 (7.4)	
No (n=164)	140 (85.4)	24 (14.6)		148 (90.2)	16 (9.8)	
Education; n (%)			0.479α			0.515α
<Bachelor's degree (n=98)	82 (83.7)	16 (16.3)		88 (89.8)	10 (10.2)	
Bachelor's degree (n=136)	121 (89.0)	15 (11.0)		127 (93.4)	9 (6.6)	
Master's degree/higher (n=66)	58 (87.9)	8 (12.1)		59 (89.4)	7 (10.6)	
Income; n (%)			0.724α			0.951‡
<500 USD/month (n=75)	64 (85.3)	11 (14.7)		68 (90.7)	7 (9.3)	
500 to 1,600 USD/month (n=149)	129 (86.6)	20 (13.4)		136 (91.3)	13 (8.7)	
>1,600 USD/month (n=76)	68 (89.5)	8 (10.5)		70 (92.1)	6 (7.9)	
Duration of tinnitus; n (%)			0.124α			0.460α
<6 months (n=131)	109 (83.2)	22 (16.8)		118 (90.1)	13 (9.9)	
6 to 24 months (n=106)	93 (87.7)	13 (12.3)		96 (90.6)	10 (9.4)	
24 to 60 months (n=63)	59 (93.7)	4 (6.3)		60 (95.2)	3 (4.8)	
Lateralization; n (%)			0.924α			0.825α
Unilateral (n=202)	176 (87.1)	26 (12.9)		185 (91.6)	17 (8.4)	
Bilateral (n=98)	85 (86.7)	13 (13.3)		89 (90.8)	9 (9.2)	
Consistency; n (%)			0.926α			0.063α
Persistent (n=229)	199 (86.9)	30 (13.1)		213 (93.0)	16 (7.0)	
Intermittent (n=71)	62 (87.3)	9 (12.7)		61 (85.9)	10 (14.1)	
Sleeping time (hours); mean±SD	6.5±1.2	5.9±1.6	0.018†	6.4±1.2	6.3±1.5	0.622†
Audiogram (decibel); mean±SD	35.1±22.9	31.9±19.8	0.205‡	34.9±22.2	32.5±25.6	0.142‡
THI score; n (%)			<0.001α			<0.001α
Non- to moderate handicap	240 (97.6)	6 (2.4)		243 (98.8)	3 (1.2)	
Severe to catastrophic	21 (38.9)	33 (61.1)		31 (57.4)	23 (42.6)	

THI=Tinnitus Handicap Inventory; SD=standard deviation
† Independent t-test, ‡ Mann Whitney-U test, α Chi-square test

anxiety compared to the younger group, but the result did not reach statistical significance (adjusted OR 0.22, p=0.016, 95% CI 0.06 to 0.76). Severe to catastrophic handicapped (adjusted OR 60.92, p=0.001, 95% CI 21.55 to 172.20) from THI were statistically significantly associated with anxiety in tinnitus patients. Similarly, severe to catastrophic handicapped (adjusted OR 218.74, p<0.001, 95% CI 25.59 to 1869.59) were also statistically significantly associated with depression. Surprisingly, intermittent tinnitus was 19.63 times more likely to have depression than persistent tinnitus (adjusted OR 19.63, p=0.006, 95% CI 2.39 to 161.49) (Table 4).

Discussion

The present study investigated the prevalence of anxiety and depression among Thai patients with tinnitus and identified predictive factors. The results showed that 13% of tinnitus patients experience anxiety, while 8.7% had depression. Only 6.9% of patients had both anxiety and depression. Patients with severe or catastrophic handicaps on the THI were more likely to experience both anxiety and depression. The younger age is associated with anxiety, whereas intermittent tinnitus is associated with a higher prevalence of depression. There was a statistically significant correlation between THI and HADS (r=0.791, p<0.001) in the present study

Table 4. Multivariate analysis association factors of anxiety and depression in tinnitus patients

	Adjusted odds ratio	95% confidence interval	p-value
Anxiety			
Age			
• ≤ 60 years old	Reference	1	
• >60 years old	0.22	0.06 to 0.76	0.016*
THI			
• Non- to moderate handicapped	Reference	1	
• Severe to catastrophic handicapped	60.92	21.55 to 172.20	0.001*
Sleeping time	0.79	0.57 to 1.09	0.156
Sex	0.97	0.35 to 2.67	0.953
Duration of tinnitus	0.14	0.53 to 2.14	0.854
Depression			
Age			
• ≤ 60 years old	Reference	1	
• >60 years old	0.39	0.1 to 1.64	0.178
Consistency			
• Persistent	Reference	1	
• Intermittent	19.63	2.39 to 161.49	0.006*
THI			
• Non- to moderate handicapped	Reference	1	
• Severe to catastrophic handicapped	218.74	25.59 to 1869.59	<0.001*

THI=Tinnitus Handicap Inventory

data. Unsurprisingly, the high THI score, from 58 to 100 points, associated with anxiety (adjusted OR 60.92, p=0.001) and depression (adjusted OR 218.74, p<0.001) symptoms. The adjusted OR was high with a wide 95% CI, likely due to the low prevalence of anxiety at 2.4%, and depression at 1.2%, in the non- to moderately handicapped group, compared to the much higher prevalence of anxiety at 61.1% and depression at 42.6% in the severely to catastrophically handicapped group.

There is a high rate of tinnitus in psychological disorders and tinnitus also increases severity of existing psychological problems[3,26]. Personality traits such as high neuroticism, lower extraversion, high stress reaction, lower self-control and type D personality were associated with tinnitus distress[7]. Inversely, tinnitus may cause psychological problems[3,13,26-28]. The presence of anxiety and depression leading to aggravation of tinnitus, increasing intolerance of tinnitus and disability[3,6]. A recent population-based cohort study demonstrated a significantly higher prevalence of depression, anxiety, and somatic symptoms among participants with tinnitus. Participants with tinnitus were more likely to experience depression and anxiety, with ORs of 2.033 and 1.841, respectively[29]. It is important to identify and properly treat anxiety and depression because these disorders affect the quality of life and prognosis of tinnitus related disability[3,12,14,28].

A systematic review of depression in tinnitus found that the median prevalence of depression among 28 studies was 33%, which was comparable poststroke at 33%, and myocardial infarction at 28.7%[30,31]. In Thai patients, the authors found the prevalence of anxiety and depression were lower than previous studies, which was 13% and 8.7%, respectively. Nevertheless, it is difficult to compare the true prevalence of anxiety and depression due to using different tools and cut-off scores between the studies.

By using HADS cut-off score of 11 points, the study in Nigeria, Sweden, which were using Internet-based HADS questionnaires, and U.K., reported 26.5%, 25%, 28% prevalence of anxiety and 24.5%, 17%, 10% prevalence of depression in tinnitus patients, respectively[28,32]. The study in Netherland identified 10.2% of tinnitus patients suffered from anxiety and 9.8% of patients suffered from depression, which was close to the authors' results. However, the previous study used cut-off score of greater than 8 point to identify anxiety and depressive symptoms[4], whereas the present study used cut-off score of 11 point. The prevalence of anxiety and depression in Korea tinnitus patients was higher

than Thai patients. By using the Beck Depression Inventory and State Trait Anxiety Inventory 1 and 2, there was around 21% prevalence of anxiety and 57% prevalence of depression[33]. The difference of prevalence between countries may be due to factors such as genetic, culture, socioeconomic status, education, occupation, and health beliefs. However, the prevalence of anxiety and depression in tinnitus patients is higher than in general population in every studies.

Thai National Mental Health Survey in 2013 demonstrated that the prevalence of anxiety and depression in the general population was 1.6% and 0.6%, respectively[34]. The prevalence of anxiety in the general Thai population much lower than countries such as Colombia at 7.8%[35], Sweden at 8%[36], Germany at 8.1%[37], Korea at 8.9%[38], and U.K. at 12.6%[23]. Similarly, the prevalence of depression in the general Thai population was also lower than in U.K. at 3.6%[23], Sweden at 6%[36], Germany at 9.3%[37], Colombia at 10.5%[35], and Korea at 16.1%[38]. The lower prevalence in Thai population might be from the different research methodology, tools, and diagnostic criteria.

The mean HADS score for anxiety subscale in Thai tinnitus patients was 5.7, which was close to HADS score in general population in countries such as Germany at 4.7[37], Sweden at 4.5[36], Hong Kong at 3.4[39], Korea at 5.3[38], U.K. at 6.1[23], and Colombia at 4.6[35]. The mean HADS score for depression subscale in Thai tinnitus patients, which was 4.2, was also close to general population in Germany at 4.7[37], Sweden at 4.0[36], Hong Kong at 3.7[39], Korea at 6.6[38], U.K. at 3.7[23], and Colombia at 4.3[35]. The results may imply that the prevalence of anxiety and depression in Thai population were lower than other countries.

Previous studies evaluated the association factor of anxiety and depression in tinnitus. However, the results were inconsistent. According to the present study findings, individuals aged over 60 were statistically significantly less likely to experience anxiety (adjusted OR 0.22, p=0.016). There was no statistically significant difference in depression (adjusted OR 0.39, p=0.178). Gomaa et al. found strong correlation between the age of tinnitus patients and severity of anxiety and depression. The younger age trended to report higher anxiety and depression score than the older age, which was similar to the authors' data[18]. Additionally, McCormack et al. showed the same significant association between age and both anxiety and depression symptoms in tinnitus patients[40]. However, the result in tinnitus patients was opposite to the general population, which older people reported higher anxiety and depression scores[37,38]. The authors thought that younger age with tinnitus had experienced higher anxiety because they worry about their health, especially as they are still active in the workforce. When developing tinnitus, they may fear serious health issues like brain tumors or potential hearing loss. Additionally, tinnitus can disrupt their daily lives by impairing concentration and causing sleep disturbances. In contrast, older age, especially those retired, are more likely to view tinnitus as part of the natural aging process and accept it as a degenerative change.

In the general population, most publications reported that female had more anxiety and depression than male[23,35,38,41-43]. However, studies found male had higher depressive symptoms than female[18,41]. In tinnitus patients, there was no difference between gender for either anxiety or depression, like in the present study[18,32], but other studies reported that female showed higher level of distress than men[6,44]. The present data, comorbidity, education, income, duration of tinnitus, lateralization, sleeping time, and hearing level neither correlate with depression nor anxiety, similar to previous report[18].

Treatment of tinnitus modestly improve in anxiety and depression[13,33]. Falkenberg & Wie reported statistically significant improvement in HADS anxiety subscale, with pre-treatment at 1.10 versus post-treatment at 0.92 versus 5-year follow-up at 0.87, and depression subscale with pre-treatment at 0.77 versus post-treatment at 0.62 versus 5-year follow-up at 0.55, after habituation therapy. However, the mean score of each subscales was very low[45]. Even cognitive behavioral therapy (CBT), which had evidence that it may reduce the impact of tinnitus on the quality of life, however, there was limited evidence for CBT for improving anxiety and depression in tinnitus patients[46]. Even though the benefit of anxiety and depression treatment was limited, treating these conditions were recommended.

There are limitations in the present study. First, the authors used HADS questionnaires to identify anxiety and depressive patients, which was a screening tool. The authors did not perform standardized diagnostic interviews, which is the gold standard in accordance with the Diagnostic and Statistical Manual of Mental Disorders. However, using HADS was less time consuming and more practical in the clinic with good reliability and

validity as screening tools for anxiety and depression in tinnitus patients. Second, the evaluation of association factors of depression or anxiety in tinnitus patients is limited due to the small number of tinnitus patients with anxiety or depression, therefore, caution is required when interpreting these results. Further research should include more subjects.

Conclusion

The prevalence of anxiety and depression in Thai tinnitus patients were lower than previous reports from other countries. Younger people were more likely to have anxiety and depression. The higher THI score patients have, the higher the chance of anxiety and depression. Even though, the prevalence of anxiety and depression in Thai tinnitus was low, the prompt evaluation and treatment should be performed.

What is already known about this topic?

Tinnitus is one of the top three otolaryngologic problems related to anxiety and depression. There is no report of anxiety and depression prevalence in Thai tinnitus patients.

What does this study add?

The prevalence of anxiety and depression in Thai tinnitus patients was lower than previous reports from other countries. Patients with a high THI score, younger age, and intermittent tinnitus are more prone to psychological issues.

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Authors' contributions

SW, PT, and PC were involved in the conception and design of study; SW and PC collected the data; SW and PC analyzed the data and interpreted the results; SW and PC wrote the first draft; SW, PT, and PC critically revised and approved the final version of the manuscript. All agree to take responsibility for statements made in the published article.

Conflicts of interest

The authors have each completed the International Committee of Medical Journal Editors Form for Disclosure of Conflicts of Interest. No author has any potential or actual conflict of interest to disclose. None of the authors discloses any potential conflict of interest related to the present article.

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