Vietnam Journal of Community Medicine, Vol. 67, English version No. 1, 2026, 151-154

PREVALENCE AND ASSOCIATED FACTORS OF DEPRESSION MEASURED BY THE HAMILTON DEPRESSION RATING SCALE AMONG WORKING-AGE ADULTS WITH VESTIBULAR DISORDERS

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Received: 21/04/2026
Revised: 05/05/2026; Accepted: 27/05/2026

ABSTRACT

Objective: To describe the prevalence of depression and analyze its associated factors among inpatients aged under 60 years with vestibular disorders treated at the Department of Neurology, Bach Mai Hospital.

Methodology: The cross-sectional study was conducted on 91 inpatients diagnosed with vestibular disorders at the Department of Neurology, Bach Mai Hospital, from August 2024 to March 2025. The Hamilton Depression Rating Scale (HAM-D) was utilized to classify and assess depression levels among these patients.

Results: The prevalence of depression in patients with disorder of vestibular function was 20.9%. Longer disease duration ($p<0.01$), high frequency of dizziness ($p<0.01$) and history of vestibular dysfunction ($p<0.01$) are factors that increase the risk of depression in patients with vestibular dysfunction.

Conclusion: The chronicity and dizziness frequency of vestibular dysfunction are significantly associated with depression in affected patients.

Keywords: HAM-D, depression, vestibular dysfunction.

1. INTRODUCTION

Vestibular dysfunction is characterized by an impairment of the body's main system responsible for balance and spatial orientation. It commonly presents with a range of symptoms, including vertigo, nausea and vomiting, reduced tolerance to head movements, spontaneous nystagmus, gait instability, and difficulties maintaining posture[1]. Vestibular disorders are relatively common in the general population. The overall prevalence is estimated at approximately 35% among adults aged 40 years and older, based on objective evidence of vestibular impairment. In addition, the lifetime prevalence of clinically significant vestibular vertigo is about 7.4%, while the one-year prevalence is around 4.9%[2]. There is a strong association with age, as the likelihood of balance dysfunction rises markedly in older individuals. Among those aged 80 years and above, the prevalence of clinically detectable balance impairment approaches 85% [2].

Approximately 20–50% of individuals experiencing vertigo and balance disorders have coexisting psychiatric conditions[3]. Although the principal clinical concern in older adults is typically physical instability and an increased risk of falls, individuals of working age often experience substantial disruptions in occupational functioning, socioeconomic stability, and psychosocial well-being. Accordingly, the psychiatric comorbidities associated with these conditions—particularly the development and worsening of clinical depression—constitute a significant burden that warrants thorough investigation. A key qualitative study has underscored the substantial cognitive, emotional, and occupational impairments experienced by working-age adults with chronic vestibular disorders, including limitations in work capacity [4]. Individuals with vestibular dysfunction have a markedly increased risk of developing clinical depression; conversely, those with primary depressive disorder are more likely to experience subsequent vestibular impairments[5]. An expanding body of international evidence has consistently indicated a substantial prevalence of depressive symptoms among individuals with vestibular disorders. For example, a comprehensive systematic review and meta-analysis conducted by Kim et al. (2026), which included 85 studies and a total of 764,403 participants, found that patients with vestibular conditions exhibited markedly higher rates of depression (28.3%) compared with control populations (4.7%)[6]. However, evidence regarding depression among patients with vestibular dysfunction in Vietnam remains scarce. Therefore, this study was undertaken to estimate the prevalence of depression in this population, characterize symptom profiles using the Hamilton Depression Rating Scale (HAM-D), and explore factors associated with depressive symptoms in patients with vestibular disorders.

2. METHODS

2.1. Study subjects and sample

The study sample comprised 91 adult patients, aged 18

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to under 60 years, who were diagnosed with vestibular dysfunction and received treatment at the Department of Neurology, Bach Mai Hospital, between August 2024 and March 2025.

Participants were excluded if they declined to provide consent, had severe physical illnesses, or were unable to respond due to other medical or cognitive conditions.

2.2. Study design

The study is a cross-sectional study with a convenience sample by thorough psychiatric examination and research instruments which include medical records and Hamilton Depression Rating Scale (HAM-D).

2.3. Instruments and key variables

Patients were interviewed with an instrument consist of three parts:

(1) Demographics: The questionnaire includes name, gender, age, education, occupation, marital status, living areas (urban/rural), people living with, medical history

(2) Medical records of patients with vestibular disorders: Clinical history, disease duration, frequency of hospitalization last year, drugs using, treatment adherence, dizziness episodes per week, daily workout time, stress factors, the impact on daily life and work.

(3) Hamilton Depression Rating Scale comprises 17 items, covering five key sub-domains: mood symptoms (depressed mood, guilt), cognitive symptoms (suicidal ideation, pessimism, impaired concentration), somatic symptoms (fatigue, sleep disturbances, weight loss, gastrointestinal issues, loss of libido), anxiety symptoms (psychological anxiety, somatic anxiety, agitation), psychomotor symptoms (retardation, agitation).

2.4. Data management and statistical analysis

Data were recorded and organized using Microsoft Excel and subsequently analyzed with SPSS version 25.0. Categorical variables were summarized as frequencies and percentages, whereas continuous variables were expressed as means and standard deviations. The Chi-square test or Fisher's Exact Test was applied to evaluate univariate associations between demographic and clinical characteristics and depression, as measured by the Hamilton Depression Rating Scale.

2.5. Research Ethics

This study was designed as an observational investigation and did not interfere with patients' treatment at Bach Mai Hospital. All participants and their family members were fully informed about the study objectives and procedures prior to enrollment and provided voluntary consent to participate. Confidentiality, accuracy, and integrity of the collected data were strictly maintained; sensitive information was anonymized and securely coded. Participants and their families retained the right to withdraw from the study at any time without any negative consequences. The study protocol was reviewed and approved by the Scientific Review Committee of Hanoi Medical University and authorized by the Board of Directors of Bach Mai Hospital.

3. RESULTS

Table 1. Demographic background and medical history

Demographic background		n	%
Age	mean (sd)	46.8 (9.2)	
Gender	Male	28	30.7
	Female	63	69.3
Education	High school education and further	78	85.7
	Secondary school and under	13	14.3
Areas of living	Urban areas	30	33
	Rural areas	61	67
Medical history	Cardiovascular diseases	24	26.4
	Endocrine and metabolic diseases	24	26.4
	Neurological diseases	3	3.3
	Musculoskeletal diseases	7	7.7

Among patients under 60 years of age with vestibular dysfunction included in the study (N = 91), the mean age was 46.8 years (SD = 9.2). The sample demonstrated a clear female preponderance, comprising 69.3% (n = 63) of participants compared to 30.7% (n = 28) male. The majority of the study reported high educational attainment, with 85.7% (n = 78) having completed high school or further education, and predominantly resided in rural areas (n = 61). Regarding medical history, cardiovascular diseases and endocrine/ metabolic diseases were the most prevalent comorbidities, each present in 26.4% (n = 24) of the patients, while musculoskeletal and neurological diseases were less common, affecting 7.7% (n = 7) and 3.3% (n = 3) of the sample, respectively.

Table 2. Clinical characteristics of vestibular dysfunction

Clinical characteristics		n	%
History of vestibular dysfunction	No	56	61.5
	Yes	35	38.5
Stress factors	No	64	70.3
	Yes	27	29.7
Tinnitus	No	72	79.1
	Yes	19	20.9
Dizziness episodes per week	<3 episodes	65	71.4
	≥3 episodes	26	28.6
Disease duration	<1 year	50	54.9
	≥1 year	41	45.1
Treatment adherence	Yes	15	16.5
	No	76	83.5

The clinical characteristics of vestibular dysfunction was detailed within the study sample (N = 91). The majority of the study (61.5%, n = 56) presented without a prior history of vestibular dysfunction, and 70.3% (n = 64)

reported an absence of associated stress factors. Tinnitus was present in 20.9% (n = 19) of the patients. Regarding symptom frequency and chronicity, 71.4% (n = 65) experienced fewer than three dizziness episodes per week, and slightly more than half of the sample (54.9%, n = 50) had a disease duration of less than one year. Notably, a vast majority of the patients demonstrated poor treatment adherence, with 83.5% (n = 76) reporting non-adherence to their prescribed regimens.

The proportion of depression severity among the study participants as measured by the Hamilton Depression Rating Scale (HAM-D), 20.9% of the sample met the criteria for depression. Within this affected subgroup, moderate depression was the most frequently observed severity level, accounting for 9.9% of the total sample, followed by severe depression at 6.6% and mild depression at 4.4% (Figure 1).

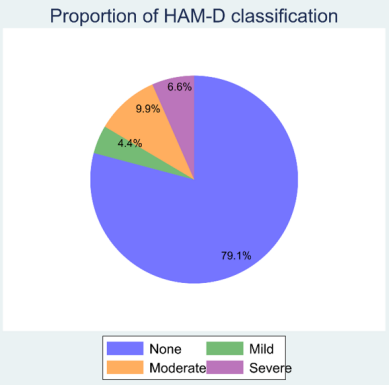


Figure 1. The severity distribution of depression by HAM-D classification

Table 3. Depression associated factors

Depression by HAM-D		No	Yes	Total	P-value n (%)
n%		72 (79.1)	19 (20.9)	91 (100.0)	
History of vestibular dysfunction, n (%)	No	53 (73.6)	3 (15.8)	56 (61.5)	< 0.001
	Yes	19 (26.4)	16 (84.2)	35 (38.5)	
Disease duration , n (%)	<1 year	47 (65.3)	3 (15.8)	50 (54.9)	< 0.001
	≥1 year	25 (34.7)	16 (84.2)	41 (45.1)	
Stress factors, n (%)	No	56 (77.8)	8 (42.1)	64 (70.3)	0.002
	Yes	16 (22.2)	11 (57.9)	27 (29.7)	
Tinnitus, n (%)	No	63 (87.5)	9 (47.4)	72 (79.1)	< 0.001
	Yes	9 (12.5)	10 (52.6)	19 (20.9)	
Dizziness episodes per week, n (%)	<3 episodes	63 (87.5)	2 (10.5)	65 (71.4)	< 0.001
	≥3 episodes	9 (12.5)	17 (89.5)	26 (28.6)	

The analysis showed that all examined clinical characteristics of vestibular dysfunction were significantly associated with comorbid depression. In particular, a prior history of vestibular dysfunction ($p < 0.001$), a disease duration of at least one year ($p < 0.001$), the presence of concurrent stressors ($p = 0.002$), coexisting tinnitus ($p < 0.001$), and experiencing three or more episodes of dizziness per week ($p < 0.001$) were each significantly associated with depression in this study.

4. DISCUSSION

Demographic characteristics: Among participants under 60 years of age, females outnumbered males by approximately 2:1. This distribution is consistent with epidemiological evidence indicating that women account for about 65–70% of patients with vestibular disorders, with the female predominance largely attributed to conditions such as vestibular migraine and benign paroxysmal positional vertigo[7]. Several factors have been associated with an increased likelihood of vestibular dysfunction, including female sex, lower levels of educational attainment, age over 40 years, the presence of cardiovascular disease, and comorbid depression[8].

A large systematic review and meta-analysis conducted by Cory Hyun-su Kim et al. (2026), which synthesized data from 85 studies involving 764,403 adult participants with vestibular disorders, demonstrated that these patients had a markedly higher prevalence and risk of depression compared with controls (28.3% vs. 4.7%, $p < 0.0001$; RR = 2.9, 95% CI: 1.8–4.4) [6]. This elevated risk may be explained, in part, by shared neurobiological pathways: the vestibular nuclei—central to the regulation of balance and vertigo—have extensive neural connections with key mood-related regions, including the parabrachial nuclei, the locus coeruleus, and the dorsal raphe nuclei, as well as higher-order structures such as the frontal cortex, hippocampus, and dentate gyrus; through these networks, vestibular dysfunction can disrupt the modulation of neurotransmitters such as dopamine, norepinephrine, and serotonin (5-HT), thereby contributing to dysregulation in affective circuits and increasing vulnerability to anxiety and depression[9].

Chronicity was a key risk factor for depression in our study. Patients with a disease duration of ≥1 year had a substantially higher prevalence of depression (84.2%) compared with those with shorter duration (15.8%, $p < 0.001$), underscoring the cumulative psychological burden of persistent vestibular symptoms. This finding is consistent with international literature, where long-standing vestibular disorders are closely linked to persistent postural-perceptual dizziness (PPPD), a chronic condition characterized by maladaptive central processing and heightened sensitivity to normal motion. Such sustained hypervigilance can lead to neurological fatigue and contribute to secondary depression. Studies on vestibular migraine similarly report that

recurrent and prolonged vertigo episodes are associated with increased psychological distress. Overall, our results align with global evidence emphasizing chronic disease duration as a major determinant of depression risk in vestibular disorders[6].

Tinnitus was also found to be a significant factor associated with depression in this study. Patients with tinnitus had a markedly higher prevalence of depression (52.6%) compared with those without tinnitus (47.4%, $p < 0.001$) , suggesting its substantial contribution to psychological burden. This finding is consistent with previous research indicating that tinnitus functions as a persistent and unavoidable auditory stressor. Continuous perception of sound in the absence of external stimuli can interfere with cognitive processing, prevent adequate neurological recovery, and significantly disrupt sleep. Over time, these effects may lead to emotional exhaustion and increase vulnerability to depressive symptoms. International studies have similarly demonstrated that vestibular patients with coexisting tinnitus exhibit higher rates of depression than those experiencing vertigo alone, highlighting the critical role of tinnitus in exacerbating psychiatric comorbidity.

Dizziness frequency was also strongly associated with depression in our study. Patients experiencing ≥3 episodes per week had a markedly higher prevalence of depression (89.5%) compared with those with fewer episodes (10.5%, $p < 0.001$) , highlighting the significant impact of recurrent symptoms on mental health. This finding is consistent with evidence from a large systematic review and meta-analysis of 85 studies ($n = 764,403$), which demonstrated that adults with vestibular disorders have substantially higher rates and risks of depression than controls, with a greater burden observed in episodic and recurrent conditions compared to single-event disorders. Together, these results suggest that not only the presence but also the frequency and persistence of dizziness play a critical role in increasing vulnerability to depression [6].

Stress-related factors were significantly associated with depression in our study. Patients experiencing stressors—such as illness-related distress, financial difficulties, family conflict, loneliness, work pressure, or bereavement—had a higher prevalence of depression (57.9% vs. 42.1%, $p = 0.002$) . These findings suggest that psychosocial stress exacerbates vestibular symptoms and contributes to depression, likely through a vicious cycle in which increased stress worsens vertigo, further intensifying emotional distress [6].

5. CONCLUSION

Depression is a common comorbidity among patients under 60 years of age with vestibular dysfunction, with a prevalence of 20.9% in this study. Clinical factors, particularly longer disease duration, higher frequency of dizziness episodes, tinnitus, and the presence of stressors, were significantly associated with depressive symptoms. These findings highlight the important role of chronicity and symptom burden in increasing psychological vulnerability. Routine screening for depression and a multidisciplinary management approach are essential to improving both mental health and clinical outcomes in this population.

REFERENCES

[1] Dougherty JM, Carney M, Hohman MH, Emmady PD. Vestibular Dysfunction. In: StatPearls [Internet] [Internet]. StatPearls Publishing; 2023 [cited 2026 Apr 15]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK558926/ PubMed PMID: 32644352.

[2] Agrawal Y, Ward BK, Minor LB. Vestibular dysfunction: Prevalence, impact and need for targeted treatment. J Vestib Res. 2013;23(3):113–7. doi:10.3233/VES-130498 PubMed PMID: 24177344; PubMed Central PMCID: PMC4069154.

[3] Feng S, Zang J. The effect of accompanying anxiety and depression on patients with different vestibular syndromes. Front Aging Neurosci. 2023 Aug 1;15:1208392. doi:10.3389/fnagi.2023.1208392 PubMed PMID: 37593373; PubMed Central PMCID: PMC10427919.

[4] Public health round-up. Bull World Health Organ. 2024 Jan 1;102(1):3–4. doi:10.2471/BLT.24.010124 PubMed PMID: 38164326; PubMed Central PMCID: PMC10753271.

[5] Hou SJ, Yu SC, Tsai SJ, Chen TJ, Chen MH. Bidirectional Association Between Peripheral Vestibular Disorders and Depressive Disorders: A Longitudinal Follow-Up Study. Journal of the Academy of Consultation-Liaison Psychiatry. 2025 Sep 1;66(5):409–16. doi:10.1016/j.jaclp.2025.07.001

[6] Kim CH su, McCray LR, Nguyen SA, Staab JP, Jafri S, Rizk H. Anxiety and Depression in Adults With Vestibular Disorders: A Systematic Review and Meta-Analysis. The Laryngoscope. 2026;136(2):535–46. doi:10.1002/lary.70055

[7] Thorman IB, Schrack JA, Schubert MC. Epidemiology and Comorbidities of Vestibular Disorders: Preliminary Findings of the AVOCADO Study. Otology & Neurotology. 2024 Jun;45(5):572. doi:10.1097/MAO.0000000000004185

[8] Dougherty JM, Carney M, Hohman MH, Emmady PD. Vestibular Dysfunction. In: StatPearls [Internet] [Internet]. StatPearls Publishing; 2023 [cited 2026 Apr 18]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK558926/ PubMed PMID: 32644352.

[9] Feng S, Zang J. The effect of accompanying anxiety and depression on patients with different vestibular syndromes. Front Aging Neurosci. 2023 Aug 1;15. doi:10.3389/fnagi.2023.1208392