

Original Research Article

Unveiling the prevalence of benign paroxysmal positional vertigo in adults of Bangladesh

Mohammad Abdul Motalib*, Dipok Kumar Pramanik

Department of Internal Medicine Khwaja Yunus Ali Medical College and Hospital, Sirajganj, Bangladesh

Received: 07 December 2024

Accepted: 06 January 2025

*Correspondence:

Dr. Mohammad Abdul Motalib,

E-mail: mamtlb@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Benign paroxysmal positional vertigo (BPPV) is a common disorder of the inner ear with symptoms including dizziness, vertigo, unsteadiness and nausea. It is considered as one of the most common causes of vertigo. This study aimed to investigate the prevalence of BPPV in patients in adults of Bangladesh.

Methods: This study included 100 patients diagnosed with BPPV who visited the department of medicine, Khawja Yunus Ali Medical College, Sirajgonj, Bangladesh. This 18-month long study included adult patients who were suffering from vertigo caused by benign paroxysmal positional vertigo only. Past medical history, general, neurological, and other systematic examinations, were conducted. The Dix-Hallpike test brain imaging (CT or MRI) and pure tone audiometry tests were done in selected cases. Cox proportional hazard regression analysis was used to investigate the risk of BPPV by sex, age and comorbidities.

Results: During the 1.5 year study period, 500 patients were diagnosed with BPPV among them 57% were male. The most common comorbidity was hyperthyroidism (17%). Vomiting was the most frequent symptom, present in 17% of the patients in this study. The Hallpike test was positive in 38% and among those, 87% showed improvement after undergoing the Epley manoeuvre.

Conclusions: Patients with depressive disorders may have a higher risk of developing BPPV, particularly those who have hyperthyroidism or systemic lupus erythematosus (SLE), significant number of patients although my present with vertigo may have some neurological problems such as acoustic neuroma, lateral medullary syndrome, cerebellar stroke, multiple sclerosis.

Keywords: BPPV, Depressive disorders, Emotional stress, Migraine, Neurological, SLE, Vertigo

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vestibular condition encountered in neurotology clinics, accounting for approximately 20% to 30% of all vestibular complaints. The mechanism behind BPPV is believed to involve dislodged otoliths that leave the utricle and either float freely in the semicircular canals or attach to the cupula, causing the labyrinth to become sensitive to gravitational forces. BPPV is characterized by brief episodes of recurrent vertigo accompanied by corresponding nystagmus, triggered by movements such as turning or extending the neck, getting up or lying down,

or rolling over in bed. In most cases, BPPV is idiopathic, meaning the cause is unknown. However, it can also occur secondarily due to factors such as head trauma, viral infections, Meniere's disease, migraines, otologic and non-otologic e.g. Lateral medullary syndromes, multiple sclerosis, acoustic neuroma, vestibular neuronitis, labyrinthitis, surgeries, or prolonged bed rest.¹⁻⁶ Benign paroxysmal positional vertigo (BPPV) is the most common type of peripheral vertigo, with a lifetime prevalence of approximately 2.4%. It is characterized by brief episodes of spinning sensations usually triggered by sudden changes in head position relative to gravity, with each episode typically lasting less than one minute.

The underlying cause of BPPV involves dislodged calcium carbonate crystals from the utricle of the inner ear that enter the semicircular canals.⁷ Risk factors for developing BPPV include older age and several comorbidities such as hypertension, diabetes mellitus, hypercholesterolemia, and pre-existing cardiovascular, thyroid, and autoimmune diseases. Patients experiencing symptoms related to BPPV may also face significant economic burdens.⁸⁻¹¹ Additionally, psychiatric disorders and emotional stress are often noted in individuals suffering from vertigo.^{12,13} Numerous studies have shown a higher prevalence of depression in patients with vestibular disorders, which can create a vicious cycle and significantly impact quality of life.¹⁴⁻¹⁷ Peripheral vertigo may play a crucial role in the development of subsequent depressive disorders. However, many studies on this topic have yielded contradictory or conflicting results. A small-scale case-control study has specifically explored the association between depression and BPPV, suggesting that life stressors and related depressive disorders may act as triggers for vestibular dysfunction, potentially serving as precursors to BPPV.¹⁸

METHODS

This 1.5 year prospective study included a total of 500 patients, who were adults. These patients visited the Department of Medicine at Khawja Yunus Ali Medical College, Sirajganj, Bangladesh with the symptoms of BPPV, from July 2022 to December 2024. The present study included all adult patients who were selected by purposive sampling.

Inclusion criteria

The current study included all adult patients who had symptoms of BPPV and who were under treatment for BPPV during the study period.

Exclusion criteria

Patients who were critically ill, unable to communicate, suffering from vertigo caused by other factors than BPPV or below 18 years were excluded of this study.

All patients presenting with vertigo underwent a thorough evaluation, which included taking a detailed history. This history encompassed various factors such as age, sex, duration and frequency of episodes, precipitating factors, and the relationship of symptoms to head and body position. This study also assessed the course of the symptoms and any accompanying issues, particularly tinnitus and hearing loss, facial weakness, loss of corneal reflexes, swallowing difficulty, tremor, weakness of lower limbs, reflexes and sensory functions. A review of past medical history, as well as general, neurological, cardiovascular and other systematic examinations, was conducted, including the Dix-Hallpike test. In selective cases, brain imaging (CT or MRI) and pure tone audiometry (PTA) were performed. The causes and

clinical features of vertigo were summarized, and all variables were analyzed descriptively. Statistical significance was not assessed in this study.

RESULTS

Among 500 study patients, 285 were males and 215 were female. Patients aged from 40 to 59 were mostly suffering from BPPV (Figure 1, Table 1).

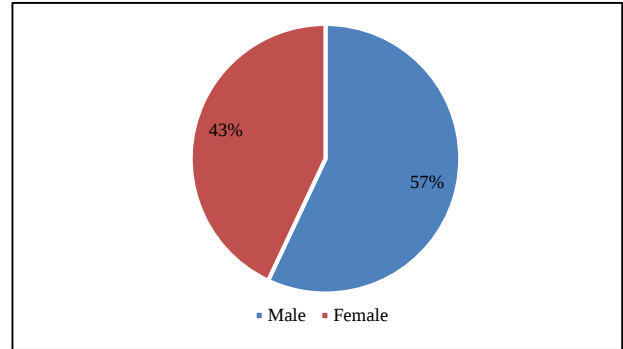


Figure 1: Gender distribution of the study sample.

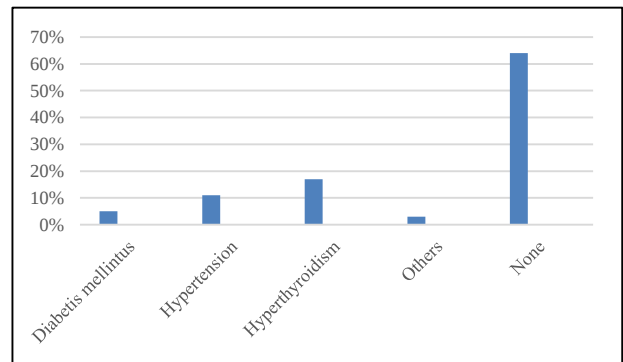


Figure 2: Comorbidities of the study patients.

Table 1: Socio-demographic data of the study sample.

Characteristics	Variables	N	%
Age (years)	18-29	20	4
	30-39	60	12
	40-49	190	38
	50-59	180	36
	60-69	30	6
	70-80	20	4
	Mean±SD	45.45±12.46	
	Range	18-80	
Residence	Urban	290	58
	Rural	210	42
Occupation	Student	25	5
	Housewife	170	34
	Service holder	120	24
	Businessman	70	14
	Retired	50	10
	Others	65	13

Table 2: Symptoms of BPPV.

Symptoms	N	%
Sense of spinning movements	275	55
Nausea, palpitation, restlessness	75	15
Vomiting	50	10
Headache	15	3
Hearing loss	15	3
Diplopia		
Slurring of speech		
Liquid dysphagia		
Tremor		
Weakness of lower limbs		
Loss of sensation of half side of body		
Dizziness on standing	40	8
Low Blood pressure	30	5
Joint pain, dry eyes, facial rash		1

Table 3: Distribution of patients by tests and reports.

Tests and reports	Types	N	%
Hallpike test	Positive	190	38
	Negative	310	62
Nystagmus	Positive	375	75
	Negative	125	25
Post Epley's manoeuvre improvement	Improved	435	87
	Not improved	65	13
Pure tone audiometry (PTA) report	Normal	170	34
	Mild deafness	265	53
	Moderate deafness	35	7
	severe deafness	20	4

Sens of spinning movements, nausea, vomiting, restlessness and palpitation are commonly found symptoms among the study patients, 55%, 10% and 15% respectively (Table 2). The Hallpike test was positive in 38% of the BPPV patients, and among those, improvement was seen after undergoing the Epley manoeuvre in 87% of patients (Table 3). According to Figure 2, 17% of patients had hyperthyroidism and 11% of patients had hypertension.

DISCUSSION

In this study with the 500 patients visited the hospital, the most common cause of BPPV were anxiety neurosis, depression and emotional stress, hypotension. Other important causes were Meniere's disease, migraine, cervical spondylosis, and labyrinthitis, acoustic neuroma, lateral medullary syndrome, multiple sclerosis, cerebellar stroke. It has been reported earlier that migraine is strongly associated with the incidence of vertigo.¹⁹⁻²¹ In a study with Chinese patients, posterior circulation insufficiency was the causative factor in nearly 60% of the vertigo patients.²²

Benign paroxysmal positional vertigo (BPPV) is a disorder related to labyrinthine function, characterized by sudden episodes of vertigo and nystagmus that occur only when the head is in specific positions, particularly when lying down or rolling over in bed. BPPV is caused by the displacement of calcium carbonate otoliths from the macula of the utricle into one of the semicircular canals. Because these otoliths have a higher density, they respond to gravity, leading to ampullary nerve excitation in the affected canal. This excitation triggers a sudden episode of vertigo accompanied by nystagmus specific to the affected canal.²³ In this study, it is found that vertigo associated with BPPV is typically latent, rotational, transient, and exhaustible. Surprisingly, none of the patients studied had previously been diagnosed with BPPV, possibly due to a lack of related medical history or a Dix-Hallpike test. BPPV was found to be more prevalent among young and middle-aged adults, with approximately 86% of patients aged 30 to 59 years. Out of the 400 patients with BPPV, 228 were male (57%) and 172 were female (43%), indicating that BPPV is relatively more common in males. Sense of spinning movements were the most frequently reported associated symptoms, present in 55% of the patients in this study. The Hallpike test was positive in 38% of the BPPV patients, and among those, 87% showed improvement after undergoing the Epley manoeuvre. Consistent with the present findings, BPPV has been reported as the most common cause of vertigo in both younger and older patient groups in a recent similar study.²⁴

Most studies have shown a correlation between benign paroxysmal positional vertigo (BPPV) and various depressive disorders. To the best of our knowledge, this is the first study suggesting that patients with depressive disorders are at a higher risk of developing BPPV. While depressive disorders can produce somatic symptoms similar to those of BPPV, one study indicated that patients with unrecognized BPPV were more likely to have a depressive disorder.²⁵⁻²⁸

Stone and Francis propose that benign paroxysmal positional vertigo (BPPV) could arise from either a direct or indirect attack by the immune system, leading to debris accumulation in the inner ear. This theory is supported by studies that show an association between BPPV and several autoimmune diseases, including systemic sclerosis, systemic lupus erythematosus (SLE), ulcerative colitis, Sjögren's syndrome, and rheumatoid arthritis.^{29,30} The mechanical movement of thyroid autoantibodies in the inner ear fluid, or the development of autoimmune microangiitis in the labyrinth, may lead to benign paroxysmal positional vertigo (BPPV) in individuals with hyperthyroidism or hypothyroidism. Other studies indicate that fluctuations in thyroid hormone levels and the presence of circulating anti-thyroid autoantibodies are associated with vestibular dysfunction, which can contribute to the development of BPPV.³¹⁻³³

The relationship between migraine and benign paroxysmal positional vertigo (BPPV) is not well understood. Ishiyama et al suggest that repeated vasospasms may impact the microvasculature of the inner ear.³⁴ These recurrent vasospasms could stress and damage the vestibular cells, leading to the displacement of otoconia from the macula. Additionally, the reduction of blood flow to the inner ear caused by vasospasms may result in cochlear symptoms, such as hearing disturbances, as well as vestibular symptoms. The vascular effects of migraine can range from small-vessel to large-vessel disease.³⁵

CONCLUSION

In a population-based study, it was found that patients with depressive disorders have a statistically higher risk of developing benign paroxysmal positional vertigo (BPPV). Additionally, hyperthyroidism and systemic lupus erythematosus (SLE) were identified as independent risk factors for developing BPPV. Future research is needed to clarify the biological mechanisms underlying these associations.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- De Stefano A, Dispenza F, Suarez H, Perez-Fernandez N, Manrique-Huarte R, Ban JH, et al. A multicenter observational study on the role of comorbidities in the recurrent episodes of benign paroxysmal positional vertigo. *Auris Nasus Larynx*. 2014;41(1):31-6.
- Sreenivas V, Sima NH, Philip S. The role of comorbidities in benign paroxysmal positional vertigo. *Ear Nose Throat J*. 2021;100(5):NP225-30.
- Su P, Liu YC, Lin HC. Risk factors for the recurrence of post-semicircular canal benign paroxysmal positional vertigo after canalith repositioning. *J Neurol*. 2016;263:45-51.
- Picciotti PM, Lucidi D, De Corso E, Meucci D, Sergi B, Paludetti G. Comorbidities and recurrence of benign paroxysmal positional vertigo: personal experience. *Int J Audiol*. 2016;55(5):279-84.
- Pérez P, Franco V, Cuesta P, Aldama P, Alvarez MJ, Méndez JC. Recurrence of benign paroxysmal positional vertigo. *Otol Neurotol*. 2012;33(3):437-43.
- Sfakianaki I, Binos P, Karkos P, Dimas GG, Psillas G. Risk factors for recurrence of benign paroxysmal positional vertigo. A clinical review. *J Clin Med*. 2021;10(19):4372.
- Fife TD, von Brevern M. Benign paroxysmal positional vertigo in the acute care setting. *Neurol Clin*. 2015;33:601-17.
- Kim JS, Zee DS. Clinical practice. Benign paroxysmal positional vertigo. *N Engl J Med*. 2014;370:1138-47.
- Kerrigan MA, Costigan MF, Blatt KJ, Mathiason MA, Domroese ME. Prevalence of benign paroxysmal positional vertigo in the young adult population. *PM&R*. 2013;5(9):778-85.
- Messina A, Casani AP, Manfrin M, Guidetti G. Italian survey on benign paroxysmal positional vertigo. *Acta Otorhinolaryngol Ital*. 2017;37(4):328.
- Benecke H, Agus S, Kuessner D, Goodall G, Strupp M. The burden and impact of vertigo: findings from the REVERT patient registry. *Front Neurol*. 2013;4:136.
- Ketola S, Havia M, Appelberg B, Kentala E. Psychiatric symptoms in vertiginous patients. *Nordic J Psychiatr*. 2015;69(4):287-91.
- Söderman AC, Möller J, Bagger-Sjöbäck D, Bergenius J, Hallqvist J. Stress as a trigger of attacks in Meniere's disease. A case-crossover study. *Laryngoscope*. 2004;114(10):1843-8.
- Monzani D, Casolari L, Guidetti G, Rigatelli M. Psychological distress and disability in patients with vertigo. *J Psychosomat Res*. 2001;50(6):319-23.
- Chen ZJ, Chang CH, Hu LY, Tu MS, Lu T, Chen PM, et al. Increased risk of benign paroxysmal positional vertigo in patients with anxiety disorders: a nationwide population-based retrospective cohort study. *BMC Psychiatr*. 2016;16:1-7.
- Yuan Q, Yu L, Shi D, Ke X, Zhang H. Anxiety and depression among patients with different types of vestibular peripheral vertigo. *Medicine*. 2015;94(5):e453.
- Best C, Eckhardt-Henn A, Tschann R, Dieterich M. Psychiatric morbidity and comorbidity in different vestibular vertigo syndromes. Results of a prospective longitudinal study over one year. *J Neurol*. 2009;256:58-65.
- Monzani D, Genovese E, Rovatti V, Ludovica Malagoli M, Rigatelli M, Guidetti G. Life events and benign paroxysmal positional vertigo: a case-controlled study. *Acta Oto-laryngol*. 2006;126(9):987-92.
- Kerber KA. Vertigo and dizziness in the emergency department. *Emerg Med Clin*. 2009;27(1):39-50.
- Bhattacharyya N, Baugh RF, Orvidas L, Barrs D, Bronston LJ, Cass S, et al. American Academy of Otolaryngology- Head and Neck Surgery Foundation. Clinical practice guideline: benign paroxysmal position vertigo. *Otolaryngol Head Neck Surg*. 2008;139(5 Suppl 4):S47-81.
- Lempert T, Neuhauser H. Epidemiology of vertigo, migraine and vestibular migraine. *J Neurol*. 2009;256(3):333-8.
- Eggers SD. Migraine-related vertigo: diagnosis and treatment. *Curr Neurol Neurosci Rep*. 2006;6(2):106-15.
- Caplan LR, Wityk RJ, Glass TA, Tapia J, Pazdera L, Chang HM, et al. New England medical center posterior circulation registry. *Ann Neurol*. 2004;56(3):389-98.
- Pan Q, Zhang Y, Long T, He W, Zhang S, Fan Y, et al. Diagnosis of vertigo and dizziness syndromes in a

- neurological outpatient clinic. *Eur Neurol.* 2018;79(5-6):287-94.
25. Hagr A. Comorbid psychiatric conditions of benign paroxysmal positional vertigo. *Int J Health Sci.* 2009;3:23-8.
 26. Eckhardt-Henn A, Best C, Bense S, Breuer P, Diener G, Tschan R, Dieterich M. Psychiatric comorbidity in different organic vertigo syndromes. *J Neurol.* 2008;255:420-8.
 27. Ferrari S, Monzani D, Baraldi S, Simoni E, Prati G, Forghieri M, et al. Vertigo “in the pink”: the impact of female gender on psychiatric-psychosomatic comorbidity in benign paroxysmal positional vertigo patients. *Psychosomatics.* 2014;55(3):280-8.
 28. van der Zaag-Loonen HV, Van Leeuwen RB, Bruintjes TD, Van Munster BC. Prevalence of unrecognized benign paroxysmal positional vertigo in older patients. *Eur Arch Oto-Rhino-Laryngol.* 2015;272(6):1521-4.
 29. Stone JH, Francis HW. Immune-mediated inner ear disease. *Curr Opin Rheumatol.* 2000;12:32-40.
 30. Thombs BD, Jewett LR, Kwakkenbos L, Hudson M, Baron M, Canadian Scleroderma Research Group. Major depression diagnoses among patients with systemic sclerosis: Baseline and one-month followup. *Arth Care Res.* 2015;67(3):411-6.
 31. Papi G, Guidetti G, Corsello SM, Di Donato C, Pontecorvi A. The association between benign paroxysmal positional vertigo and autoimmune chronic thyroiditis is not related to thyroid status. *Thyroid.* 2010;20(2):237-8.
 32. Lautermann J, ten Cate WJ. Postnatal expression of the alpha-thyroid hormone receptor in the rat cochlea. *Hear Res.* 1997;107:23-8.
 33. Chiarella G, Tognini S, Nacci A, Sieli R, Costante G, Petrolo C, et al. Vestibular disorders in euthyroid patients with Hashimoto’s thyroiditis: role of thyroid autoimmunity. *Clin Endocrinol.* 2014;81(4):600-5.
 34. Ishiyama A, Jacobson KM, Baloh RW. Migraine and benign positional vertigo. *Ann Otol Rhinol Laryngol.* 2000;109(4):377-80.
 35. Evans RW, Ishiyama G. Migraine with transient unilateral hearing loss and tinnitus. *Headache.* 2009;49(5):756-8.

Cite this article as: Motalib MA, Pramanik DK. Unveiling the prevalence of benign paroxysmal positional vertigo in adults of Bangladesh. *Int J Res Med Sci* 2025;13:605-9.