Original Article

Clinicoepidemiology of benign paroxysmal positional vertigo in Nigerian

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Abstract

Objective: Benign paroxysmal positional vertigo (BPPV) is poorly reported in developing countries. This study aimed at determining the prevalence, aetiology, and comorbid illnesses of benign paroxysmal positional vertigo in our center. **Materials and Methods:** This was a prevalence hospital-based study of all patients with the diagnosis of benign paroxysmal positional vertigo (BPPV). Pretested interviewer assisted questionnaire was administered to obtain data. Otoscopic examination, otoneurologic review, followed by mandatory Dix Hallpike maneuver and supine roll test was performed on all patients to diagnose posterior, lateral or anterior canal benign paroxysmal positional vertigo. All the data obtained were collated and analyzed by using SPSS version 16.0. **Results:** Prevalence was 1.9%. Peak prevalence of 37.0% was at age group 41–50 years. Male accounted for 46.1% with male to female ratio of 1:1.2. Benign paroxysmal positional vertigo accounted for 62.3% urban dwellers, 33.1% postsecondary education, 39.6% Civil servant and 33.8% married. There were 99.4% unilateral and 64.3% right benign paroxysmal positional vertigo. Idiopathic was 70.1% while trauma, migraine, and inner ear disorder were 20.8%, 7.1%, and 1.9%, respectively. Benign paroxysmal positional vertigo was 66.2% posterior semicircular canal followed by 24.7% lateral semicircular canal and 0.6% anterior semicircular canal. Commonly associated comorbid illnesses were visual disorder, hypertension, arthritis, and diabetes mellitus in 27.9%, 23.4%, 22.1%, and 2.6%, respectively. **Conclusion:** Benign paroxysmal positional vertigo is common otologic disorder. It is associated with significant comorbid illnesses. Early detection will reduce morbidity and mortality. Improvement in the level of health care at primary level and health education to create awareness among the populace is to be encouraged.

Keywords: Aetiology, benign paroxysmal positional vertigo, comorbid illnesses, lateralisation, prevalence

Introduction

Benign paroxysmal positional vertigo is a clinical symptom characterized by short standing episodes of vertigo precipitated by a change in head position, the most common provocative movements being looking upward, bending over, and rolling over in bed.[1] There is feeling of dizziness, patients feel everything around is spinning, and feeling of imbalance. Nausea may commonly associate. Benign paroxysmal positional vertigo is the most common cause of vertigo in the adult population.[2,3] It accounted for approximately 20–30% of diagnoses of vertigo in specialized vestibular or dizziness clinics.[4,5] The condition is diagnosed by the person's history, and by performing the Dix-Hallpike test or the roll test, or both.[6,7]

This disorder is believed to be due to dislodged otoconia (canaliths) inside one of the semicircular canals cause continuing movement of the endolymph, even after head movement has ceased.[8] This is as a result in bending and affectation of the cupula, thus, provoking vertigo. In majority of cases, the posterior semicircular

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canal is affected. Other semicircular canals are less likely affected. Others were horizontal (lateral) and anterior (superior). Triggering factors are rolling over in bed, getting in and out of bed, bending over, tipping your head back, quick head movements.[9] The most common form of benign paroxysmal positional vertigo is the posterior semicircular canal is affected (about 90% of cases), others were lateral semicircular canal, anterior, and mixed type of benign paroxysmal positional vertigo.[10,11] Benign paroxysmal positional vertigo is classified according to its nature of causes into primary (idiopathic) and secondary. Idiopathic is considered as the most common form.[12] The main causes of the secondary benign paroxysmal positional vertigo are post-operative ear surgery, traumatic brain injury, vertebrobasilar insufficiency, vestibular neuronitis, and metabolic disorders.[13] Recurrences benign paroxysmal positional vertigo is usually associated with factors like diabetes mellitus, hypertension, osteoporosis, and osteoarthritis.[14] It is the most readily diagnosed causes of peripheral vestibular disorders and treatable causes of vertigo.[15]

There is paucity of literature on the epidemiology of benign paroxysmal positional vertigo in the general population or otorhinolaryngology practice in sub Saharan Africa. This study aimed at determining the prevalence, aetiology, and comorbid illnesses of benign paroxysmal positional vertigo in our center.

Materials and Methods

This was a prevalence hospital-based study of all patients with the diagnosis of benign paroxysmal positional vertigo in ear, nose, and throat department of Ekiti state university teaching hospital, Ado Ekiti, Nigeria. The study was carried out over a period of five years between periods of November 2013 to October 2018.

Pretested interviewer assisted questionnaire was administered regarding sociodemographic features, medical history, history of falls or imbalance relative to the vertigo, anxiety, onset with progression of symptoms and provoking factors. Also, data on comorbid illnesses were obtained.

The overall examination conducted to confirm the diagnosis of benign paroxysmal positional vertigo in all the examinees were otoscopic examination, otoneurologic review, followed by mandatory Dix Hallpike maneuver and supine roll test (Pagnini-McClure test) was performed on all patients to diagnose posterior, lateral, or anterior canal benign paroxysmal positional vertigo to induce intense vertigo in conjunction with a burst of nystagmus with associated typical characteristics of latency, crescendo, fatigability, and transience was considered necessary to establish our diagnosis. In addition, horizontal canal type of benign paroxysmal positional vertigo was diagnosed by the presence of horizontal geotropic (in the geotropic form the fast phase of the nystagmus always beats towards the lowermost ear and the affected side is where nystagmus is the strongest) and apogeotropic (in apogeotropic lateral canal paroxysmal nystagmus is directed always toward the uppermost ear and the affected side is where the nystagmus is the weakest) paroxysmal nystagmus provoked by turning the head from the supine to either lateral position. This is according to the Guidelines of the United States Academy of Otolaryngology and Head and Neck Surgery in 2008.[16]

Exclusion criteria were detection of central nervous system diseases in patients following clinical examination, laboratory findings, or imaging studies.

All the data obtained were collated and analyzed by using SPSS version 16.0 Statistical Package for the Social Sciences (SPSS, Version 16.0. for Windows, Chicago II, USA). Descriptive statistics by frequency table, percentage, bar and pie charts were used to express the data.

Ethical clearance for this study was sought for and obtained from the ethical committee of the hospital.

Results

The total number of patients seen during the study period in our department was 8,109 out of which 154 had benign paroxysmal positional vertigo with prevalence of 1.9%.

All the studied age groups were affected with peak prevalence of 57 (37.0%) at age group (41-50) years. As showed in Table 1. There were 71 (46.1%) males and 83 (53.9%) females with male to female ratio of 1:1.2. Majority (62.3%) of the patients were urban dwellers. in were commoner than rural dwellers in 58 (37.7%). Large percentages (91.6%) of them are Christian while 8.4% practice Islam. Fifty-one (33.1%) of them had post-secondary education others were primary, secondary, and nil formal education in 46 (30.0%), 38 (24.7%), and 19 (12.3%), respectively. On occupation of our patients, 61 (39.6%) are Civil servant, 43 (27.9%) artisans, and 32 (20.8%) farmers. Benign paroxysmal positional vertigo was common among our patients that are married representing 52 (33.8%) others were divorced and widow in 45 (29.2%) and 44 (28.6%), respectively. Demonstrated in Table 2.

Unilateral benign paroxysmal positional vertigo was recorded in 153 (99.4%) of our patients while 1 (0.6%) had bilateral paroxysmal positional vertigo. Ninety-nine (64.3%) of our patients had right paroxysmal positional vertigo while 54 (35.1%)

Table 1: Age group distribution of the patients

Age (years)	Frequency (*n*)	Percentage
1-10	1	0.6
11-20	4	2.6
21-30	10	6.5
31-40	24	15.6
41-50	57	37.0
51-60	30	19.5
61-70	12	7.8
≥71	16	10.4
Total	154	100.0

had left paroxysmal positional vertigo. This is illustrated in Figure 1.

Primary (Idiopathic) in 108 (70.1%) was the commonest causes of benign paroxysmal positional vertigo other causes were trauma, migraine and inner ear disorder in 32 (20.8%), 11 (7.1%) and 3 (1.9%), respectively. This is illustrated in Figure 2.

Based on the anatomical location, 102 (66.2%) posterior semicircular canal was the commonest followed by 38 (24.7%) lateral (horizontal) semicircular canal, and 1 (0.6%) anterior (superior) semi-circular canal. This is showed in Figure 3.

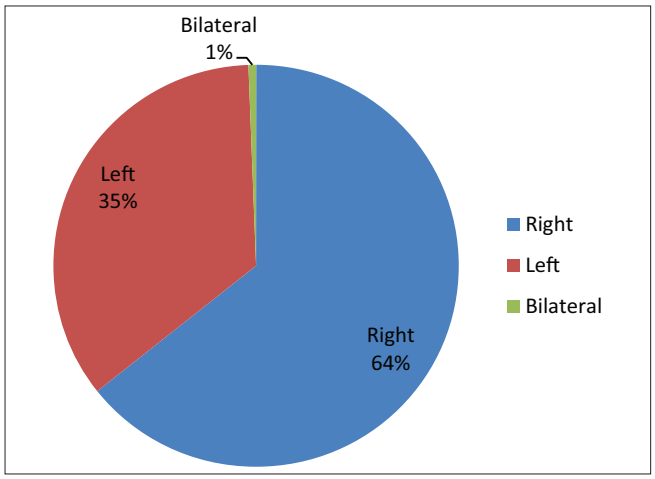

Figure 1: Laterisation of Benign paroxysmal positional vertigo

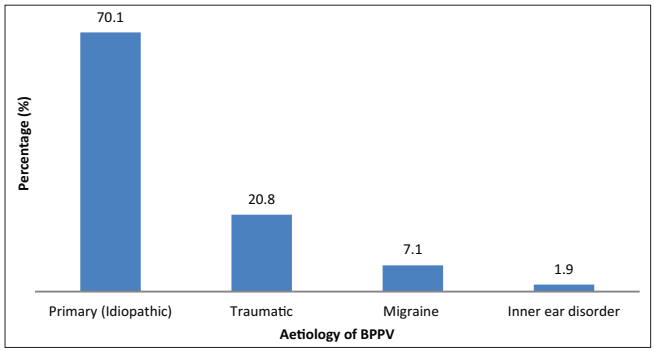

Figure 2: Aetiology of Benign paroxysmal positional vertigo

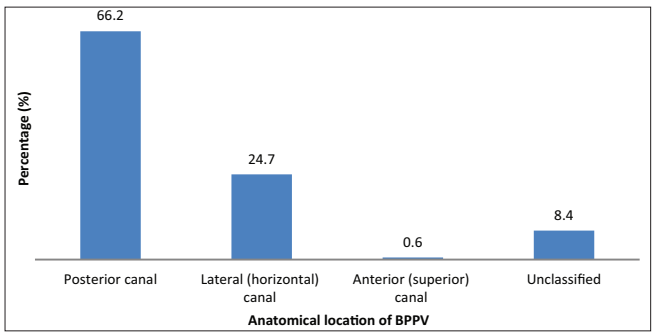

Figure 3: Anatomical location of BPPV among the patients

Comorbid illnesses associated with benign paroxysmal positional vertigo in this study were visual disorder, hypertension, arthritis and diabetes mellitus in 43 (27.9%), 36 (23.4%), 34 (22.1%), and 4 (2.6%), respectively. See Table 3.

Discussion

Study on prevalence of benign paroxysmal positional vertigo (BPPV) in our community is very scanty. The prevalence was 1.9% in this study and is lower than prevalence of 2.4% from other study.[17] Despite, BPPV was the most common vestibular disorders and the most common causes of vestibular vertigo in our previous study there are still low level of referred cases.[18] This may be due to low level of understanding, referral, and management of this disorder. The condition is poorly understood by the patients themselves and unqualified health workers who doesn't have high index of suspicion to the problem. For initially they tend to ascribe any form of dizziness to shortage of blood, inadequate intake of diet or cardiovascular-related problems and may be attempting to treat another condition. Hence, some may find themselves in the chemist to purchase blood tonic to boost their blood level. Hence, there is need to strengthen or

Table 2: Sociodemographic features of the patients (*n*=154)

Sociodemographic features	Frequency (*n*)	Percentage
Sex		
Male	71	46.1
Female	83	53.9
Dwelling		
Rural	58	37.7
Urban	96	62.3
Religion		
Christian	141	91.6
Muslim	13	8.4
Education level		
Nil	19	12.3
Primary	46	30.0
Secondary	38	24.7
Postsecondary	51	33.1
Previous/present occupation		
Business	18	11.7
Artisan	43	27.9
Civil servant	61	39.6
Farming	32	20.8
Marital status		
Single	13	8.4
Married	52	33.8
Divorced	45	29.2
Widow	44	28.6

Table 3: Comorbid illnesses of among patients

Comorbid illnesses	Frequency (*n*)	Percentage
Diabetes mellitus	4	2.6
Hypertension	36	23.4
Arthritis	34	22.1
Visual disorder	43	27.9
Nil	37	24.0
Total	154	100.0

to improve on our primary health care delivery since it is the health facility that is closer or at grass root level to the majority of the populace at large. Improvement in the primary health care in this sense will entail providing relevant health workers, General or Family physicians, Otorhinolaryngologist and Neuro- Ophthalmologist at designated primary health care in various local governments. Other problems that may be related to dizziness include medication, visual and sensory impairment.

In this study, all the age group suffered benign paroxysmal positional vertigo although less seen in lower age group. The peak age group prevalence was 41–50 years. Prevalence in lower age group was recorded in other studies.[19,20] Our findings might be due to growing level of awareness of benign paroxysmal positional vertigo and the use of diagnostic maneuver. Previous study shows that this problem mainly affects elderly patients, resulting from various degenerative changes associated with aging.[21]

In our study, female gender had slightly higher prevalence compared to males. There was equal representation of both sexes in a study done on benign paroxysmal positional vertigo secondary to injury.[22] Another study revealed there was no difference based on gender.[23]

Due to political policies in developing countries, the health facilities are located in the state capital. Majority of the patients in this study were urban dwellers and lower patronage by the rural dwellers may be as a result of various forms of barriers to access health facilities. Apart from dearth of health worker mentioned earlier, road networks must also be improved in the rural areas. Of the sociodemographic features such as education level, occupation, and marital status their effects seemed not to be related to benign paroxysmal positional vertigo except in a stress-related occupational activities.

On lateralization of benign paroxysmal positional vertigo, right labyrinth was commoner than left labyrinth in this study. Previous studies have found that benign paroxysmal positional vertigo affects predominantly the right labyrinth than left labyrinth.[24] From previous study it has been reported that most patients had the habit of sleeping on their right side.[25] It has also been demonstrated that a significant correlation has been found between head position during sleep and the side affected by benign paroxysmal positional vertigo.[26]

Primary (idiopathic) cause of benign paroxysmal positional vertigo is commoner than combined secondary causes from trauma, migraine, and inner ear disorder in this study. Previous record revealed similar findings on primary (idiopathic) and secondary causes such as head trauma, vestibular neuritis, Meniere's disease, otitis media, otosclerosis, inner ear surgery, migraine, ototoxicity, and viral diseases.[26,27] A recent study showed an increased prevalence of diabetes in patients with BPPV compared with the general population.[28] Another study found that the prevalence of migraine in patients with BPPV was twice as high as that in age and sex matched controls.[29] The relationship between migraine and BPPV is poorly understood. It has been speculated that migraine could cause vasospasm of the labyrinthine arteries, leading to detachment of otoconia from the utricular macula.[30]

Posterior canal benign paroxysmal positional vertigo was the commonest form followed by lateral semicircular canal and anterior semicircular canal type was the least in this study. Similar report was recorded by Esra *et al.* in his study.[31] Treatment of BPPV which is out of scope of this study will include repositioning maneuvers (Epley maneuver, semont maneuver, Brandt–Daroff exercises and Roll maneuver), Medications using anti-vertigo drugs and Surgical treatments, such as a semi-circular canal occlusion.[32] Usually Surgery is reserved as a last resort option for severe and persistent cases which fail vestibular rehabilitation (including particle repositioning and habituation therapy).

Common associated Comorbid illnesses among the patients were visual disorder, hypertension, arthritis and diabetes mellitus. These were associated with causative or risk factors in a reported study.[33,34] Bousser *et al.* noted that age, hyperlipidaemia, hypertension, and migraine all represent vascular risk factors and one could speculate that the common predisposing factor of BPPV might be ischaemia.[35]

Conclusion

In developing countries, benign paroxysmal positional vertigo is very common. It is associated with significant comorbid illnesses. Detailed review of all patients with presentation of dizziness is advised. Improvement in the level of health care at primary level and health education to create awareness among the populace is to be encouraged.

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Conflicts of interest

All the authors declare that there was no competing interest.

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