

## Original Research Article

# Demographic and etiological analysis of peripheral vertigo, as a common public health problem

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### ABSTRACT

**Background:** Vertigo was defined by Gowers in 1893 as any movement or sense of movement either in the individual himself or in external environment that involves a defect, real or seeming in the equilibrium of body. The aim of present study was evaluation of demographics and etiology of patient presenting with vertigo.

**Methods:** The study was prospective study. Present study consisted of an assessment of 55 cases of vertigo whose examination was conducted in the ENT department. All patients were evaluated for the various causes of vertigo and include all the age group and both sexes.

**Results:** Out of 55 patients, 80% belonged to 21-50 years age group. In present study, 29 cases out of 55 cases were diagnosed as a case of BPPV. Among them 22 diagnosed as posterior canal BPPV (benign paroxysmal positional vertigo) and 7 as horizontal canal BPPV.

**Conclusions:** The maximum number of patients belongs in the 4 decades. Of the associated sign and symptoms dizziness is most common than dizziness with other sign and symptoms. Among peripheral causes posterior canal BPPV is most common. This approach leads not only to diagnosis but also helps to plan the intervention for the patient. In the present study, 12 cases (21.8%) were diagnosed clinically normal. It shows those tests used in this study are efficient to diagnose true or false vertigo.

**Keywords:** Vertigo, BPPV, Peripheral vertigo, Dix Hallpike

### INTRODUCTION

Vertigo is derived from the Latin verb, “Vertere” to turn around, in a strictly physiological sense. Vertigo was defined by Gowers in 1893 as any movement or sense of movement either in the individual himself or in external environment that involves a defect, real or seeming in the equilibrium of body.<sup>1</sup> According to Brain 1962 vertigo may be defined as the consciousness of disordered orientation of the body in space.<sup>2</sup> The derivation of the term implied a sense of rotation of the patient or of his surroundings, but this though frequently present is not the only form of vertigo. There are 3 ways in which the spatial orientation of the body may be felt to be disordered. They are: the external environment may

appear to move, often in a rotatory fashion, but other forms of movement such as oscillations may be experienced; the body itself may be felt to be moving, either in rotation or a sensation of falling or the movement may be referred to within the body like within the head; the postures and movements of the limbs specially the lower limb are felt to be ill adjusted and unsteady.

Perfect equilibrium may be defined as reflex control of bodily posture in relation to environments, reflex control of muscular coordination in relation to movement and accurate cortical awareness which is essential for voluntary purposive regulation of activity. The maintenance of an appropriate position of the body in

space depends in man upon several groups of afferent impulses, of which the following are the most important: (1) from the retina are derived visual impulses which, contributing to our perception of visual space are intimately concerned in spatial orientation; (2) the labyrinth is a highly specialized spatial. The otoliths are mainly concerned in the orientation with references to gravity, while the semicircular canals respond to movements and to angular momentum; (3) the proprioceptors of the joints and muscles of the neck are of importance in relating labyrinthine impulses, which convey information solely concerning the position of the head, to the attitude of the rest of the body; (4) light touch and pressure receptors in the skin detect bodily contact with the environment. The most important areas of skin are on the soles of the foot, the hands and buttocks.

The afferent impulses derived from these various sense organs are mutually related by central mechanisms, of which the cerebellum, the vestibular nuclei, the medial longitudinal fasciculus and the red nuclei are probably the most important and which constitute reflex paths by which the position of the body is normally appropriately oriented. From these lower centre impulses reach the cerebral cortex mainly in the temporal and parietal lobes and so influence voluntary movement. Vertigo may result from the disordered function of the sensory end-organs or of the afferent paths or of the central mechanism concerned.

The present study had been undertaken as vertigo was often a difficult symptom to evaluate and its cause was often hard to find as there were many influences present all over the body in order to maintain normal balance, and a slight disturbance of any of them may cause giddiness. Also vertigo is always impressive, it is noticed and it is wrongly attributed by patient to high blood pressure or the like. Thus from this study, it was hoped that we became more familiar with the common causes of vertigo, so that we may help patients get rid of this often distressing symptom.

The aim of present study was evaluation of demographics and etiology of patient presenting with vertigo.

## **METHODS**

### ***Study design***

The study was a prospective study.

### ***Collection of data and statistical analysis***

Patients were evaluated in department of otorhinolaryngology in NSCB Medical College, Jabalpur (Madhya Pradesh) in period from March 2018 to August 2018. 55 patients were included in study, followed by thorough examination for characterization of vertigo.

Purposive sampling method was applied. Considering the best availability of the patients by reviewing the previous records of this health facility to achieve the maximum sample size we screened patients who had fulfilled the inclusion and exclusion criteria and were ready to give the written informed consent. All the records were recorded by using structured schedule (case report form) and entered in Microsoft excel sheet. Considering the different test of vertigo as standard for diagnosing peripheral vertigo, different conclusion was made and then we compared the results with results of previous studies and conclusion was done. Study was approved by ethics committee of NSCB medical Jabalpur.

### ***Selection criteria***

Present study consisted of an assessment of 55 cases of vertigo whose examination was conducted in the ENT department. All patients were evaluated for the various causes of vertigo and include all the age group and both sexes.

### ***Inclusion criteria***

Patient diagnosed to be peripheral vertigo in final diagnoses were included in the study.

### ***Exclusion criteria***

Central vertigo patients, patients who refused for consent, pregnant patients were excluded from the study.

### ***Method***

A diagnosis was made by means of the following methods.

### ***History***

A detailed history of each patient including age, sex and occupation were taken followed by the presenting complaints. The symptoms of vertigo were studied in detail, the following points being taken into account: onset, whether sudden or gradual; duration; course-whether progressive, regressive or stationary; how was it relieved?; how was it aggravated?; how many attacks, at what intervals, duration of each attack and their history; accompanying signs and symptoms; a detailed past history were taken as per proforma.

### ***Physical examination***

The physical examination was done. It included the following:

***General examination:*** General examination was performed.

**Systemic examination:** Systemic examination was performed with special emphasis given to the examination of the central nervous system.

**Local examination:** Local examination of the ear, nose and throat was done, particular attention being given to the ear examination. Functional examination of the ear done for assessment of the hearing status of the patient by way of the turning fork tests which included the Rinne's, Weber's and absolute bone conduction tests. The 512 frequency turning fork was used in all cases.

**Vestibular examination:** It was done to rule out the problem of vertigo due to inner ear problems. It was further sub divided in two types: (1) subjective vestibular assessment-Romberg test, sharpened Romberg test, Fukuda stepping test, finger to nose test, tandem walk test/heel to toe test, gaze stabilization test, positional test (Dix-Hallpike's test, supine roll test, slide laying test); (2) objective vestibular assessment-vestibular evoked myogenic potential (VEMP).

**Audiometry:** PTA and impedance audiometry was done.

**Investigation:** CBC, RBS and HRCT temporal bone if required were investigated.

**Fundus examination:** Fundus examination was performed.

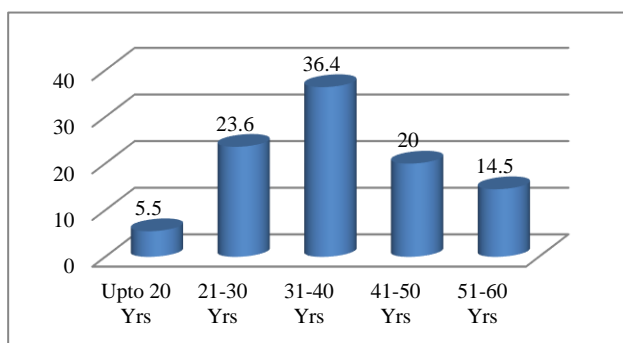
**Psychiatric evaluation:** Psychiatric examination was also performed.

The findings collected, analyzed and discussed in order to evaluate the etiology and its correlation. From all this study a conclusion was drawn and a summary was prepared.

**RESULTS**

**Age wise distribution**

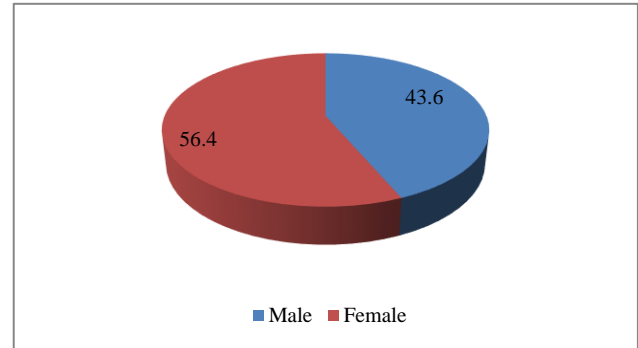
From the Figure 1, it is observed that 80% of patients were between the 3rd and 5th decade of life. Among them maximum incidence of vertigo was seen in 4th decade (36.4%).



**Figure 1: Age wise distribution.**

**Sex distribution**

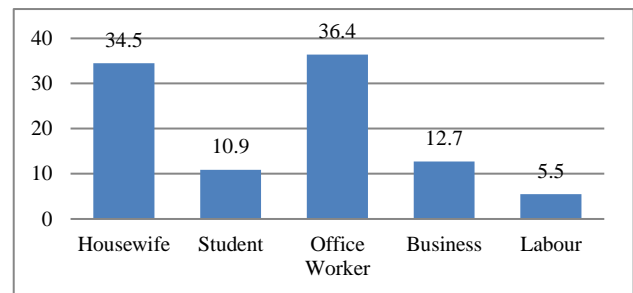
From the Figure 2, it is shown that females were predominantly (56.4%) affected than males (43.6%). Male female ratio is 1.29.



**Figure 2: Sex distribution.**

**Occupation wise distribution**

Figure 3 shows distribution among various occupations. Office workers (36.4%) were more affected, then housewife (34.5%), business (12.7%), students (10.9%) and labours (5.5%) respectively.



**Figure 3: Occupation wise distribution.**

**Table 1: Distribution of various accompanying sign and symptoms.**

Complaints	Frequency	%
Dizziness	16	29.1
Head heaviness, imbalance, dizziness	8	14.5
Dizziness and disbalance	12	21.8
Imbalance, headache, dizziness	3	5.5
Dizziness and spinning sensation	10	18.2
Dizziness, imbalance, spinning sensation	2	3.6
Dizziness and otalgia	2	3.6
Disbalance, spinning sensation, AF, tinnitus	2	3.6
<b>Total</b>	<b>55</b>	<b>100</b>

**Table 2: Percentage of various otological causes of vertigo.**

Diagnosis	Frequency	Percent
Clinically normal	12	21.8
Posterior canal bppv	22	40
Horizontal canal bppv	7	12.7
Meniere's disease	9	16.4
Labyrinthitis	2	3.6
Vestibular neuritis	3	5.5
Total	55	100

*Distribution of various accompanying sign and symptoms*

In Table 1, it is shown that among the accompanying signs and symptoms dizziness was most common (29.1%), then dizziness and disbalance, and dizziness and spinning sensation seen in 21.8% and 18.2% respectively.

**Table 4: Gender incidence of BPPV in present study.**

Diagnosis	Sex		Total
	Male	Female	
	N (%)	N (%)	
Posterior canal BPPV	10 (45.4)	12(54.5)	22
Horizontal canal BPPV	2 (28.5)	5 (71.4)	7
Total	29		

**Table 5: Age incidence of BPPV in present study.**

Age group (years)	Diagnosis	
	Post canal BPPV	Horizontal canal BPPV
	N (%)	N (%)
Up to 20	3 (13.6)	0 (0.0)
21-30	4 (18.2)	1 (14.3)
31-40	8 (36.4)	4 (57.1)
41-50	2 (9.1)	1 (14.3)
51-60	5 (22.7)	1 (14.3)
Total	22 (100)	7 (100)

**DISCUSSION**

We included about 55 patients came with complaint of vertigo and attended the outpatient department of ENT, during the period of March 2018 to August 2018.

**Age incidence**

According to Table 3, in the series of Nsamba (1970-71) 75% cases were above 40 years of age and remaining 25% below 40 year of age.<sup>3</sup> In the study of Ponniah (1977) 62.5% were above 40 year of age and 37.5% below 40 year of age.<sup>4</sup> In the present study, 65.5% cases were below 40 year of age and 34.5% of cases above 40 year of age.

**Distribution of various otological causes if vertigo**

In Table 2, it is shown that BPPV is most common among all the peripheral causes of vertigo that is 52.7%. among BPPV posterior canal BPPV is more common than horizontal canal BPPV that is 40% and 12.0% respectively. Among other causes incidence of Meniere's disease, labyrinthitis, vestibular neuritis is 16.4%, 3.6%, and 5.5% respectively. 21.8% cases were detected clinically normal.

**Table 3: Age incidence of vertigo by different authors.**

Authors	Incidence in %	
	Above 40 years	Below 40 years
Nsamba <sup>3</sup>	75	25
Ponniah <sup>4</sup>	62.5	37.5
Present study	34.5	65.5

The incidence in the present study was less consistent with the previous studies. In previous studies incidence was more common above 40 year of age while in present study incidence was more common below 40 year of age.

In the present study incidence was more in 3rd decade of life (36.4%) and least below 20 year of age (5.5%).

**Sex incidence**

In the study of Nsamba 1970-71 there was no sexual difference in the 100 cases he reported.<sup>3</sup> In the study of Ponniah 1977 males were more affected than female consist of 200 cases out of which 130 males and 70 females.<sup>4</sup> A study by Yetiser et al 2015 reported females were more affected than males consist of 263 cases.<sup>5</sup>

In present study females were more affected than male which was 56.4% for females and 43.6% for males. So our study results were more consistent with Yetiser et al. The reason for higher incidence of vertigo among females was not sure may be due hormonal fluctuations or due to change in life styles.

**Percentage of various peripheral causes**

*Benign paroxysmal positional vertigo*

A study done by Ogun et al 2014 in 1360 total adult patients, age and gender distribution of BPPV patients (n=227 total) BPPV cases diagnosed at BTNRH in 2002-2011 (n=1377 total) and Nebraska population in year 2010 (n=1826341 total), majority of BPPV cases were females.<sup>6</sup>

A study done by Liu et al 2017 showed that BPPV was most common cause of peripheral vertigo.<sup>7</sup> Numerous investigations had reported an increased BPPV incidence

in females and in aged population. In a multivariate analysis, they found that older people more than 65 years of age were more prone to develop BPPV. The risk of BPPV was analyzed in two specific age subgroups of elderly females. Results revealed that in both age groups (45-65 years old and >65 years old), patients who took estrogen for menopausal syndromes had a significantly lower incidence of BPPV.

A study done by Patangay et al in 2016 showed that BPPV was common cause of vertigo.<sup>8</sup> A total of 205 cases studied out of which 43 patients had BPPV. It was more common in the age range of 40-70 years.

In present study 29 cases out of 55 cases diagnosed as a case of BPPV. Among them 22 diagnosed as posterior canal BPPV and 7 as horizontal canal BPPV.

Table 4 shows that in present study females were more diagnosed with BPPV than males which was more consistent with the work of other authors.

**Table 6: Percentage of Meniere’s disease by various authors.**

Authors	Frequency	Percentage	Total
Cawthorne et al <sup>9</sup> (1954)	1169	61.4	1902
Nsamba <sup>3</sup> (1970-71)	2	2	100
Ponniah <sup>4</sup> (1977)	17	8.5	200
Present study (2017-18)	9	16.5	55

**Table 7: Percentage of vestibular neuritis by various authors.**

AUTHOR	Frequency	Percentage	Total
Cawthorne et al <sup>9</sup> (1954)	152	7.9	1902
Nsamba <sup>3</sup> (1970-71)	12	12	100
Ponniah <sup>4</sup> (1977)	36	18	200
Present study (2017-18)	3	5.5	55

From Table 5 it is shown that incidence of BPPV is more in 4th decade. Above results were consistent with the work of other author.

*Meniere’s disease*

The cause of Meniere disease is mainly idiopathic, though various causes responsible for Meniere disease. From Table 3, it is shown that percentage incidence of Meniere’s disease in Cawthorne et al, Nsamba and Ponniah studies were 61.4%, 2% and 8.5% respectively.<sup>3,4,9</sup>

In the present study percentage of Meniere’s disease was 16.5%, which was more consistent with the work of Ponniah.<sup>8</sup>

The differences in percentage of Meniere disease in present study with other authors are may be due to the

geographical area where studies performed are different (Table 6). The studies done by other authors were of mid 90’s while present study done in 2018, time gap between studies was big. The present study was small, consisted of only 55 cases while other studies were comparatively large this may affect the result.

*Vestibular neuritis*

From Table 7, it is shown that percentage of vestibular neuritis in study of Cawthorne et al, Nsamba and Ponniah were 7.9%, 12%, 18% respectively.<sup>3,4,9</sup>

In present study percentage of vestibular neuritis was 5.5% which was more in consistent with the work of Cawthorne et al.<sup>10</sup> The differences in percentage of vestibular neuritis in present study with other authors were may be due to the geographical area where studies performed were different. The study done by other



authors were of mid 90's while present study done in 2017-18, time gap between studies was big. The present study was small consisting of only 55 cases while other studies were comparatively large this may affect the result.

Limitation of study was we have not included patient of central vertigo in this study.

## CONCLUSION

In the present study all the cases coming to the ear, nose and throat department with the complaint of vertigo were examined, investigated for the clinicopathological evaluation of vertigo. From those it is observed that, out of 55 patients, 80% belong to 21-50 year age group, the maximum belonging in the 4th decade. Females were predominantly affected than males. Among the occupation office workers are more affected irrespective of their work. Of the associated sign and symptoms dizziness is most common than dizziness with other sign and symptoms. Among peripheral causes posterior canal BPPV is most common. This approach leads not only to diagnosis but also helps to plan the intervention for the patient. In the present study 12 cases (21.8%) were diagnosed clinically normal. It shows those tests used in this study are efficient to diagnose true or false vertigo.

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

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