Vertigo Patients Characteristic in Neurotology Outpatient Clinic, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

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ORIGINAL ARTICLE

Vertigo Patients Characteristic in Neurotology Outpatient Clinic, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

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ABSTRACT

Introduction: Vertigo is estimated to occur in 3% of adults every year. In contrast to dizziness, vertigo is associated with symptoms of peripheral or central balance disorders, while dizziness is associated with cardiovascular, neuropathic, neuromuscular, or psychosomatic diseases. **Methods:** Data for 123 patients at Hospital were taken retrospectively. The variables studied were demographic data, vestibular examination, audiometry, and vertigo diagnosis. **Results:** There were 123 vertigo patients consisting of 42 men and 81 women. The average age of the patients was 48.46 years. Most patients were diagnosed with other peripheral vertigo 37.40%, then unspecified disorder of vestibular function 15.45%, BPPV 14.63%, Meniere's disease 8.94%, dizziness 8.94%, central vertigo 8.13%, and vestibular neuritis 6.50%. The types of hearing loss were Conductive Hearing loss (CHL) 6.10%, Sensorineural Hearing Loss (SNHL) 21.54%, and Mixed Hearing Loss (MHL) 11.38%. Location of hearing loss was unilateral 23.58% and bilateral 26.83%. Mean Pure Tone Average (PTA) of vertigo with hearing loss was 52.54 dB in right ear and 55.96 dB in left ear. **Conclusion:** Most patients were diagnosed with other peripheral vertigo is female. They had normal hearing. The most common type of hearing loss was SNHL with a mean PTA of 52.54 dB in right ear and 55.96 dB in left ear. Mean PTA in vertigo patients with normal hearing was 18.29 ± 4.24 dB in right ear and 17.55 ± 4.13 dB in left ear, while mean PTA in vertigo with hearing loss was 52.54 ± 29.93 dB in right ear and 55.96 ± 28.01 in left ear.
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INTRODUCTION

The term vertigo is generally confused with complaints of dizziness. Vertigo is defined as a sensation of motion when the head moves normally without any actual movement occurring in a person, or a sensation of distorted movement when the head moves normally (1). Vertigo is associated with symptoms of peripheral (Benign Paroxysmal Positioning Vertigo [BPPV], vestibular neuritis, Meniere's disease) or central (vestibular migraine, brainstem lesions, cerebellum, cerebrum or related pathways) balance disorders (2-3). Dizziness is defined as a sensation of disturbance in the orientation of place or space without any aberrant movement sensations (1). Dizziness may present as the complaints of lightheadedness, pre-syncope (feeling faint), and disequili-brium (disorder of balance). The spectrum of dizziness is associated with cardiovascular, neuropathic, neuro-muscular, or psychosomatic disease (4).

Approximately 25% of patients with dizziness have symptoms of vertigo (3). The incidence of vertigo is estimated to be 3% in adults each year. The ratio between men and women is 1 : 2.7. Based on age, vertigo occurs three times more often in the elderly than in young adults (3,5).

Vertigo has an impact on health care morbidity and economic burden.3 Vertigo patients are searching for medical consultation (70%), asking for a sick leave (41%), having problems with daily activities (40%), and not leaving the house (19%) (5). Morbidity impacts, such as time lost due to absence from work, increased risk of falling (up to 6.5 times), and risk of recurrence (46%), will arise if the problem is not addressed (6).
The purpose of this study was to describe the profile of vertigo patients at the Neurotology Clinic, Dr. Soetomo General Academic Hospital, Surabaya, for 2 years (2017 to 2019) based on age, gender, hearing loss and vertigo diagnosis.

MATERIALS AND METHODS

This study was a retrospective descriptive study. Sample consisted of all patients with a diagnosis of vertigo taken

from medical records at Neurotology Outpatient Clinic, Dr. Soetomo, General Academic Hospital, Surabaya, Indonesia, from January 2017 to December 2019. The variables studied were demographic data, vestibular examination, audiometry, and vertigo diagnosis. Inclusion criteria were patients with a diagnosis of vertigo based on the International Classification of Diseases 10th Revision (ICD-10), ie. Meniere's disease (H81.0), BPPV (H81.1), vestibular neuritis (H81.2), other peripheral vertigo (H81.3), vertigo of central origin (H81.4), disorder of vestibular function, unspecified (H81.9) as well as dizziness and giddiness (R42). Exclusion criteria were those with incomplete data, both regarding identity and vestibular test examination.

This study had obtained ethical feasibility from ethics commission of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. Data were collected and processed using IBM SPSS Statistics 23 program and processed descriptively.

This study was approved by Research Ethics Committee, Dr Soetomo Hospital No 1910/KEPK/III/2020.

RESULTS

New patients who searched for treatment at Neurotology Outpatient Clinic, Dr. Soetomo General Academic Hospital were as many as 781 patients A total of 123 patients (15.75%) met the inclusion criteria for vertigo in this study.

Gender distribution

Of the total 123 vertigo patients, a number of 101 patients (72.93%) had peripheral vertigo, 10 (8.13%) central vertigo, and 11 (8.94%) dizziness. Peripheral vertigo disorder was found in 18 patients (14.63%) with BPPV, 8 people (6.50%) with vestibular neuronitis, 46 people (37.40%) with other peripheral vertigo, and 19 people (15.45%) with disorder of vestibular function, unspecified (Table I). The gender of vertigo patients in this study were 42 (34.15%) males and 81 (65.85%) females (Table I). The ratio of males to female patients in this study was 1 : 1.93.

Table I: Gender distribution

ICD 10	Diagnosis	N(%)	Males	Females
H81.0	Meniere's disease	11(8.94%)	5(45.45%)	6(54.55%)
H81.1	BPPV	18(14.63%)	6(33.33%)	12(66.67%)
H81.2	Vestibular neuritis	8(6.50%)	2(25.00%)	6(75.00%)
H81.3	Other peripheral vertigo	46(37.40%)	14(30.43%)	32(69.67%)
H81.4	Vertigo of central origin	10(8.13%)	3(30.00%)	7(70.00%)
H81.9	Disorder of vestibular function, unspecified	19(15.45%)	7(36.84%)	12(63.16%)
R42	Dizziness & giddiness	11(8.94%)	5(45.45%)	6(54.55%)
TOTAL		123(100%)	42(34.15%)	81 (65.85%)

Age distribution

The youngest age of the sample in this study was 17 years old and the oldest 80 years old. The mean age of vertigo patients in this study was 48.46 ± 14.592 years. Age distribution of vertigo patients was divided into several age groups (Table II).

Table II: Age distribution

Age (years)	≤20	20-30	31-40	41-50	51-60	61-70	>70	Mean (years)	SD (years)
H81.0	0(0.00%)	1(9.09%)	2(18.18%)	6(54.55%)	0(0.00%)	2(18.18%)	0(0.00%)	46.27	13.016
H81.1	0(0.00%)	1(5.56%)	1(5.56%)	4(22.22%)	6(33.33%)	4(22.22%)	2(11.11%)	55.56	13.578
H81.2	0(0.00%)	0(0.00%)	2(25.00%)	0(0.00%)	2(25.00%)	2(25.00%)	2(25.00%)	57.25	14.130
H81.3	2(4.35%)	5(10.87%)	12(26.09%)	10(21.74%)	9(19.57%)	6(13.04%)	2(4.35%)	44.87	15.083
H81.4	0(0.00%)	1(10.00%)	110.00%)	3(30.00%)	4(40.00%)	1(10.00%)	0(0.00%)	48.10	12.124
H81.9	1(5.26%)	1(5.26%)	4(21.05%)	4(21.05%)	6(31.58%)	3(15.79%)	0(0.00%)	46.32	14.154
R42	0(0.00%)	2(18.18%)	0(0.00%)	3(27.27%)	3(27.27%)	3(27.27%)	0(0.00%)	51.73	14.927
N (%)	3(2.44%)	11(8.94%)	22(17.89%)	30(24.39%)	30(24.39%)	21(17.07%)	6(4.88%)	48.46	14.592

Distribution of the types of hearing loss

The results of audiometry were as follows: normal hearing in 60 right ears (48.78%) and 58 left ears (41.15%), Conductive hearing loss (CHL) in 11 right ears (8.94%) and 4 left ears (3.25%), Sensorineural hearing loss (SNHL) in 25 right ears (20.33%) and 28 left ears (22.76%), MHL in 11 right ears (8.94%) and 17 left ears (13.82%). No audiometric data were found in 16 pairs of ears (13.01%) (Table III).

Distribution of hearing loss location

Vertigo patients in this study who had unilateral hearing loss were 29 (23.58%) and the bilateral one was 33 patients (26.83%) (Table IV)

Hearing threshold

Audiometric examination in vertigo patients can also determine the Pure Tone Average (PTA) or the average hearing threshold for each right and left ear. Mean PTA value of vertigo patients with normal hearing was 18.29 ± 4.24 dB in right ear and 17.55 ± 4.13 dB in left ear, while the mean PTA in vertigo with hearing loss was 52.54 ± 29.93 dB in right ear and 55.96 ± 28.01 in left ear (Table V).

DISCUSSION

In this study, there were 123 vertigo patients (15.57%) out of a total of 781 patients seeking treatment at the Neurotology Outpatient Clinic, Dr. Soetomo General

Table III: Distribution of the types of hearing loss in right and left ears

*		Normal	CHL	SNHL	MHL	No data
h81.0	AD	5(45.45%)	1(9.09%)	3(27.27%)	2(18.18%)	0(0.00%)
	AS	3(27.27%)	0(0.00%)	6(54.55%)	2(18.18%)	0(0.00%)
h81.1	AD	8(44.44%)	1(5.56%)	5(27.78%)	1(5.56%)	3(16.67%)
	AS	6(33.33%)	1(5.56%)	5(27.78%)	3(16.67%)	3(16.67%)
h81.2	AD	3(37.50%)	0(0.00%)	1(12.50%)	1(12.50%)	3(37.50%)
	AS	2(25.00%)	0(0.00%)	1(12.50%)	2(25.00%)	3(37.50%)
h81.3	AD	25(54.35%)	6(13.04%)	7(15.22%)	2(4.35%)	6(13.04%)
	AS	27(58.70%)	1(2.17%)	9(19.57%)	3(6.52%)	6(13.04%)
h81.4	AD	3(30.00%)	1(10.00%)	3(30.00%)	2(20.00%)	1(10.00%)
	AS	4(40.00%)	1(10.00%)	3(30.00%)	1(10.00%)	1(10.00%)
h81.9	AD	10(52.63%)	2(10.53%)	5(26.32%)	1(5.26%)	1(5.26%)
	AS	10(52.63%)	1(5.26%)	3(15.79%)	4(21.05%)	1(5.26%)
r42	AD	6(54.55%)	0(0.00%)	1(9.09%)	2(18.18%)	2(18.18%)
	AS	6(54.55%)	0(0.00%)	1(9.09%)	2(18.18%)	2(18.18%)
Total	AD	60(48.78%)	11(8.94%)	25(20.33%)	11(8.94%)	16(13.01%)
	AS	58(47.15%)	4(3.25%)	28(22.76%)	17(13.82%)	16(13.01%)

Table IV. Distribution of hearing loss locations

ICD-10	Normal		Unilateral		Bilateral	
	N	(%)	N	(%)	N	(%)
h81.0	2	18,18	4	36.36	5	45.45
h81.1	6	33,33	2	11.11	7	38.89
h81.2	1	12,50	3	37.50	1	12.50
h81.3	22	47,83	8	17.39	10	21.74
h81.4	1	10,00	5	50.00	3	30.00
h81.9	8	42,11	5	26.32	5	26.32
r42	5	45,45	2	18.18	2	18.18
Total	45	36,59	29	23.58	33	26.83

Academic Hospital, Surabaya, Indonesia. Previous studies also reported that the prevalence of vertigo in patients treated at an ENT outpatient clinic was 18% (7). Another investigator in 2018 also reported a frequency of vertigo of 15% and 12%, respectively, in otorhinolaryngology and neurology outpatient clinics (8).

In our clinic, patients with complaints of dizziness or vertigo, underwent vital sign checking, complete physical ENT examination, including otoscopy, as well as vestibular examination (Romberg, Sharpened Romberg, GANS sensory organization performance, Fukuda stepping test, head impulse test, Dix Hallpike, and cerebellar coordination test). The patients were further tested for audiology examination if they suffered hearing loss recently or simultaneously due the vertigo attacks. Non-vestibular vertigo diagnosed when all the tests were negative. Vestibular vertigo was differentiated between BPPV and non-BPPV based on the vestibular examination results, and the treatment was given appropriate to the diagnosis. The patients were further referred to an ENT specialist for the management of peripheral vertigo, and a neurologist for central vertigo.

Gender in this study showed that there were more female than male patients, ie. 81 females (65.85%) and 42 males (34.15%) (Table 1). Previous research also found that from 101 vertigo patients who were treated at OPD, 35 (31.65%) were male patients and 66 (65.35%) female patients (8).

The distribution of diagnoses according to ICD-10 in this study showed that as many as 101 patients (72.93%) had peripheral vertigo, 10 patients (8.13%) had central vertigo, and the remaining 11 patients (8.94%) had dizziness. This was not much different from a previous study, where peripheral vertigo was diagnosed as much as 78.23% while central vertigo was 22.77% (8).

The most frequent diagnosis of peripheral vertigo was other peripheral vertigo in 46 patients (37.40%), followed by disorder of vestibular function, unspecified in 19 patients (15.45%), BPPV in 18 (14.63%), Meniere's disease in 11 patients (8.94%), and the rest were vestibular neuritis in 8 patients (6.50%) (Table I). These figures were different from previous studies where BPPV was the most common cause of peripheral vertigo, which was 28.4% of the patients (9). The difference was because in this study patients with vertigo with any other cause (such as cerumen, otitis media, or other ear disorders), other than Meniere's disease, BPPV, and vestibular neurinitis, were diagnosed as other peripheral vertigo, characterized by negative Dix-Hallpike test result.

Table V: PTA distribution in right and left ears

ICD 10	Right Ear Audiogram						Left Ear Audiogram					
	Normal Hearing (PTA)			Hearing Loss (PTA)			Normal Hearing (PTA)			Hearing Loss (PTA)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
h81.0	6	17.92	2.92	5	63.75	34.85	5	17.30	3.80	6	75.00	37.72
h81.1	8	19.06	3.12	7	40.18	7.37	7	18.39	2.57	8	41.88	14.16
h81.2	3	17.08	3.15	2	35.63	0.88	2	17.50	5.30	3	63.92	33.42
h81.3	25	17.81	4.23	15	45.90	27.46	30	17.39	4.48	10	39.50	12.75
h81.4	3	15.83	3.82	6	81.67	36.86	4	18.75	2.70	5	65.50	41.12
h81.9	11	20.23	4.29	7	56.36	36.61	11	16.89	5.08	7	75.00	17.60
r42	6	17.92	7.01	3	40.00	10.90	7	17.93	4.19	2	35.00	1.77
Total	62	18.29	4.24	45	52.54	29.93	66	17.55	4.13	41	55.96	28.01

A total of 10 patients (8.13%) were diagnosed with cental vertigo, 4 patients with vestibular schwanomma, 2 patients with cerebelar lesion, 2 patients with vascular related complaints, 1 patient was epileptogenic, and 1 patient had head-trauma related vertigo. MRI findings in central vertigo patients showed that 4 were positive of CPA tumor. The patients diagnosed with vestibular schwanomma had unilateral severe hearing loss, while cerebral lesion patients had bilateral hearing loss.

Vertigo patients in the emergency room had acute and more severe symptoms (10). Another study found that inpatients with vertigo were diagnosed with Posterior Circulation Ischemia (59.89%), BPPV (16.04%), Meniere's disease (1.6%), and sudden hearing loss (1.07%) (11). In this study, most of the vertigo patients had an age range of 41-60 years, with a mean of 48.46 ± 14.592 (Table 2). This was in accordance with a previous study which reported that the highest incidence of vertigo was at the age of 40-49 years (12).

The most common hearing loss in vertigo patients was SNHL type (25 right ears or in 20.33% and 28 left ears in 22.76%) (Table 3). A previous study had shown that disorders that accompany SNHL-type hearing loss included Meniere's disease, vestibular neuritis, labyrinthitis, sudden deafness, and acoustic neurinoma. On the other hand, vertigo that accompanies CHL and MHL types of hearing loss can be caused by several diseases, including complications from otitis media, otosclerosis, or abnormalities in the middle ear. (12)

A number of 45 patients with vertigo (36.59%) had normal hearing, 29 patients (23.58%) had unilateral hearing loss and 33 (26.83%) had bilateral hearing loss (Table 4). A previous study had also found that 30-60% of patients with Sudden Sensorineural Hearing Loss (SSHL) suffered from vestibular disorders in addition to cochlear dysfunction (13).

The mean PTA value of vertigo patients with normal hearing was 18.29 ± 4.24 dB in right ear and 17.55 ± 4.13 dB in left ear. The mean PTA vertigo with hearing loss was 52.54 ± 29.93 dB in right ear and 55.96 ± 28.01 in left ear (Table 5). A previous study found that 58.39% of 149 Unilateral SNHL patients experienced vertigo, with PTA 88.81±21.74 dB, 80.03±24.76 dB, 90.00±22.21 dB, and 93.45±19.81 dB, respectively at low, moderate and high frequencies (13). PTA rates differed because the study included only patients with SNHL.

CONCLUSION

The majority of patients were diagnosed with other peripheral vertigo. There were more female patients than male patients. The patients were mostly between 41-60 years old. The majority of vertigo patients had normal hearing. The most common hearing loss was SNHL type with mean PTA of 52.54 dB in right ear and 55.96 dB in left ear.

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