PREVALENCE AND ETIOLOGY OF VERTIGO IN ADULT RURAL POPULATION

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ABSTRACT : A survey on 10,000 adults between the age of 20 and 79 years out of a total population of 66,186 persons in rural settlements under the jurisdiction of Union Territory of Chandigarh between June 1993 to June 1995 was conducted to find out the prevalence and various causes of vertigo. In general community, in rural population, we found that more people suffer from non-otologic vertigo rather than otologic vertigo. We found overall prevalence of vertigo in rural adult community to be 0.71%. Vertigo secondary to cardiovascular disease was most common and prevalent in 0.32% of population. Neurologic disease accounted for vertigo in 0.14%, metabolic disease in 0.09% and otologic disease 0.08%. Miscellaneous disorders were present in remaining 0.08% of population studied. To the best of our knowledge this study represents the first population based survey of prevalence of various causes of vertigo in general community in adult rural population.

Key Words : Vertigo, Prevalence, Adult, Rural

INTRODUCTION

Vertigo or dizziness is a condition in which the affected person has a false sense of his own movement or those of his surrounding objects. Due to the multi-causative etiology of vertigo, all patients reporting to various other specialities like medicine, cardiology, orthopedic surgery, neurosurgery, gynecology, psychiatry etc. are not evaluated at one single platform. Consequently, a basic limitation exists in an evaluation of the magnitude of the problem at large. There are few reports in the world literature (Yardley and Owen et al 1998; McNally and Stuart et al 1949; Nsamba C. 1972; Ponniah RD 1977) and none at all in Indian literature on etiology and prevalence generated from retrospective analysis of known cases of vertigo seen in the specialised vertigo clinics run by a handful of tertiary level Otolaryngology units (Sakitani and Honjo et al 1964; Bhatia and Deka 1985; Katsarkas A 1994). As cases of labyrinthine vertigo would predominate in such a setting, the available figures have a poor reliability as a database source of real prevalence of vertigo in the general community because incidence of ear - related vertigo would obviously tend to be exaggerated.

This prompted us to conduct a population based survey on a representative sample of individuals in adult population in rural settlements under the jurisdiction of Union Territory of Chandigarh in order to generate a database on prevalence and etiology of vertigo in general rural community.

MATERIALS AND METHODS

In a survey conducted by department of ENT at Post-Graduate Institute of Medical Education and Research, Chandigarh in urban population in the Union Territory of Chandigarh, (Rattan GD, 1992 - unpublished thesis) , the prevalence in rural area was assumed to be at least 5 per thousand. The sample size was calculated with 0.05 level of significance and 85% power of the test using the technique described by Jayaseelan and Rao (1989) and found to be 9930 in order to detect 0.003 clinically relevant difference.

The Union Territory of Chandigarh has 27 villages under its jurisdiction. The map of Union Territory of Chandigarh was divided into four equal parts. Out of a total population of 66,186 living in rural areas attached to the union territory, 37,986 individuals were in the age group between 20 and 79 years (Negi R. Census of India , 1991). Assuming density of population in 27 villages attached to Union Territory to be homogenous, two villages were selected from each of four parts using principle of random sampling. An estimated 11255 people within the age group of 20 and 79 years lived in these eight villages. Every house of the selected villages was visited by a trained medical graduate and an audiologist to enroll those members of the family into our study who were above 20 years of age. The survey was terminated when the number of the screened persons reached 10,000.

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All individuals were subjected to detailed inquiry for vertiginous symptoms. Those who gave history of vertigo further underwent detailed clinical examination at the Nehru Hospital of PGIMER, Chandigarh including, general physical examination as well as oto-neurological examination. Pure tone audiometry and caloric tests were performed on all subjects. Further audio-vestibular examination which included impedance audiometry, tone-decay test, recruitment, brain-stem evoked response audiometry and electronystagmography were performed wherever required. Other relevant studies such as X-rays, CT-Scan, X-ray skull per-orbital view, serum biochemistry for blood sugar, Glucose Tolerance Test, Renal Function Test, Liver function test and hematological investigations like hemogram were done as and when required. Wherever needed, consultation of relevant departments like neurology, neurosurgery, ophthalmology, medicine, endocrinology, cardiology, orthopaedics and gynaecology were obtained.

RESULTS

A total of 10,000 individuals between the age of 20 and 79 years were enrolled for this study. There were 6504 (65.04%) males and 3496 (34.96%) females. Majority of people were in their third and fourth decade and only 11% in sixth to eighth decades (Table-I). Based on their response to a comprehensible questionnaire, 71 persons were identified with the history of vertigo. There were 56 females (78.8%) and 15 males (21.2%). This would

suggest a prevalence of 0.71% in the general community of rural adult population with .95% confidence interval estimated at 5.45 to 8.75 **per** thousand. The highest prevalence was recorded in the sixth decade (3.52%) followed by the seventh decade (2.17%). In the eighth decade 1.37% people had vertigo. The lowest prevalence (0.15%) was seen in the third decade (table-II). Females outnumbered males in all age groups (table-II).

In 32 out of 71 (45%) patients, vertigo was attributed to the cardiovascular disease with an overall prevalence of 0.32%. The prevalence of vertigo secondary to cardiovascular disease increased as the age increased and recorded 2.18% in the sixth decade which is higher than prevalence of vertigo of any other origin or in any other age group (Table-IV). Females were affected four times more than the males. Commonest cause was hypertension (32.4%) followed by postural hypotension (5.6%). Anaemia was seen in 4.2% cases. Ischaemic heart disease was not found to be a common cause (2.8%) as shown in Table-V.

Fourteen patients suffered vertigo of neurologic origin (19.7%). The highest prevalence was recorded in seventh and fifth decades at 0.54% and 0.29% respectively. Overall prevalence was 0.14% and the commonest cause was cervical spondylosis (15.5%). Two patients (2.8%) were vertiginous due to migraine. Females were two and a half times more commonly affected than males. The prevalence of neurologic disorders ranked next to the cardiovascular disorders as a cause of vertigo.

Table - I
Population Characteristics

Age Group (in years)	Total Rural Population			Population Under Study		
	Males	Females	Total	Males	Females	Total
20-29	11368	6589	17957	2931	1706	4637
30-39	7615	3546	11161	1959	923	2882
40-49	3355	1596	4951	933	440	1373
50-59	1332	791	2123	374	221	595
60-69	746	498	1244	220	148	368
70-79	328	222	550	87	58	145
Total	24744	13242	37986	6504	3496	10000

N.B. : Total rural population = 66186, Total adult (age 20-79 years) rural population = 37986, Total population under study = 10000

Table - II
Overall Age-Wise Prevalence

Age Group (in years)	No of Persons (Total No=10000)			No of Vertigo Cases (Total No.=71)			Prevalence (%)
	M	F	Total	M	F	Total	
20-29	2931	1706	4637	02	05	07	0.15
30-39	1959	923	2882	04	16	20	0.69
40-49	933	440	1373	03	10	13	0.95
50-59	374	221	595	04	17	21	3.52
60-69	220	148	368	02	06	08	2.17
70-79	87	58	145	0	02	02	1.37

M= Male, F=Female

Table - III
Age and Sex Wise, Etiological Spectrum

Age Group (in years)	No. of Persons	Cardio-vascular			Neurologic			Metaboli			Otologic			Miscellaneous		
		M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
20-29	4637	-	3	3	1	1	2	-	-	-	-	-	-	1	1	2
30-39	2882	1	7	8	1	4	5	1	2	3	1	2	3	-	1	1
40-49	1373	2	3	5	1	2	4	-	-	-	-	2	2	-	-	-
50-59	595	2	11	13	1	-	1	1	4	5	-	2	2	-	-	-
60-69	368	1	2	3	-	2	2	-	1	1	-	-	-	1	1	2
70-79	145	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1

M = Male ; F = Female; T = Total

Table - IV
Aetiology Wise Spectrum of Overall Prevalence (%)

Age Group(in years)	No. of Persons	Cardio-vascular	Neurologic	Metabolic	Otologic	Miscellaneous
20-29	4637	0.06	0.04	-	-	0.04
30-39	2882	0.27	0.17	0.10	0.10	0.03
40-49	1373	0.36	0.29	-	0.14	0.14
50-59	595	2.18	0.16	0.84	0.33	-
60-69	368	0.81	0.54	0.27	-	0.54
70-79	145	-	-	-	0.68	0.68
Overall	10000	0.32	0.14	0.09	0.08	0.08

Table - V
Individual Prevalence (%) of Causes of Vertigo (Total No. of Cases 71)

Category	Aetiology	Patient Characteristics			Percentage (%)	Prevalence (%)
		Male	Female	Total		
Cardiovascular	Hypertension	04	19	23	32.4	0.23
	Postural Hypotension	01	03	04	5.6	0.04
	Anaemia	-	03	03	2.8	0.02
	IHD	01	01	02	2.8	0.02
Neurologic	Cervical Spondylosis	04	07	01	15.5	0.11
	Migraine	-	02	11	2.8	0.02
	Seizure	-	01	02	1.4	0.01
Metabolic	Diabetes Mellitus	02	04	06	8.4	0.06
	Cushing's Disease	-	01	01	1.4	0.01
	Hypothyroidism	-	02	02	2.8	0.02
Otologic	BPPV	-	05	05	7.0	0.05
	Meniere's Disease	01	02	03	4.2	0.02
Miscellaneous	Psychogenic	01	02	03	4.2	0.03
	Bronchial Asthma	-	02	02	2.8	0.02
	Acid Peptic Disease	01	-	01	1.4	0.01
	Undiagnosed*	-	02	02	2.8	0.02

* Two patients remained undiagnosed as they failed to attend hospital for evaluation.

Metabolic disorders as a cause of vertigo was seen in only 0.09% population. Diabetes mellitus was leading cause in 8.4% and hypothyroidism in 2.8% of total cases of vertigo (Table-V). Highest prevalence of neurologic vertigo (0.54%) was recorded in the seventh decade (Table-IV).

Benign positional paroxysmal vertigo was seen in 5 patients (7%) and all of them were female (Table V). One was in the eighth decade and two each in the fifth and sixth decade (Table IV). Meniere's disease was noted in three patients. Overall prevalence of true otologic vertigo was 0.08%.

In the miscellaneous group, three patients (4.2%) suffered from psychogenic vertigo and two patients had bronchial asthma while, one patient had acid - peptic disease. Two patients in this group could not be persuaded to undergo detailed investigations. Overall prevalence in the population of vertigo of the miscellaneous group was also 0.08%.

DISCUSSION

Vertigo is often an untreated symptom and is frequently associated with serious handicap and considerable psychological morbidity (Yardley and Owen et al 1998). The exact cause often remains elusive. Usually it begins in the fourth decade and attains its highest prevalence in the sixth decade (McNally and Stuart 1949; Nsamba C 1972; Ponniah RD 1977; Bhatia and Deka 1985).

In this study also, the highest prevalence (3.52%) was found in the sixth decade and lowest prevalence (0.15%) in the third decade, whereas, overall prevalence in adult rural population was found to be 0.71%. Women appear to be affected more than men. Katsarkas (1994) in a study on dizziness in the elderly, reported a prevalence of 63% in women as compared to 37% in men. In another population based study on incidence of benign paroxysmal positional vertigo, 64% of affected patients were women (Froehling and Silverstein 1991). In this study, there were 56 (78.8%) women and 15 (21.2%) men.

Due to multi-causative etiology of vertigo, patients report to various specialities and do not get evaluated at one platform. Indeed most published studies have analyzed prevalence of otologic vertigo based on known cases of vertigo evaluated in specialised vertigo clinics (Sakitani and Honjo et al 1964; Katsarkas A 1994; Bloom and Katsarkas 1989; Wilmot TJ 1974). The figures, therefore, tend to be biased in favour of otologic vertigo. Even population

based studies report on the otologic vertigo only (Sakitani and Honjo et al 1964; Froehling and Silverstein et al 1991; Shojaku and Watanabe et al 1995; Mizukoshi and Watanabe et al 1988). As a result, a statistical database of the prevalence of the multi-causative spectrum of the vertigo in the general population is conspicuous by its absence in the English Literature. Prevalence of otologic vertigo has been quoted to be as high as 2% to 8% (Nsamba C 1972; Ponniah RD 1977). We found the prevalence of otologic vertigo to be 0.08%. Prevalence of benign positional paroxysmal vertigo has been said to range from 0.01% (Mizukoshi and Watanabe et al 1988) to 0.064% (Froehling and Silverstein et al 1991) whereas, in our study it was to be 0.05%.

Cardiovascular disease was the leading cause of vertigo in this study with 32 out of 71 (45%) cases of which hypertension accounted for 23 (32%) cases. Overall prevalence of vertigo due to cardiovascular disease in the general population was found to be 0.32%. Clausen (1978) has quoted Deotzer as having noted in a review of 3600 patients of vertigo that virtually half of these patients suffered from cardiovascular disease. Neurologic disease . ranked next to cardiovascular disease with an overall prevalence of 0.14% in the general population. Cervical spondylosis comprising 11 (15.4%) cases was the second commonest cause of vertigo.

Amongst metabolic disorders associated with vertigo, diabetes mellitus appears to be the leading cause which accounted for 5 (7%) of our cases. In the community, prevalence of metabolic disease as a cause of vertigo was 0.09%.

In a series of 200 cases of vertigo reported by McNally et al, (1949) , two fifth of the patients were found to have organic disease as a possible cause; cardiovascular disease was present in 23.5% patients, central nervous disease in 13.5% patients, meniere's disease in 39% patients and psychosomatic disease in 4% patients. We found psychosomatic disease as a cause of vertigo in 4.2% cases.

In two of our cases, cause of vertigo remained undiagnosed as they could not be persuaded to attend our hospital for further evaluation.

CONCLUSION

A survey on 10000 adults between the age of 20 and 79 years out of a total population of 66186 persons in the

rural settlements under the jurisdiction of Union Territory of Chandigarh revealed an overall prevalence of vertigo to be 0.71%. Most common cause of vertigo was found to be cardiovascular disease (0.32%) followed by neurologic disease (0.14%), metabolic disease (0.09%), and otologic disease (0.08%). Among the miscellaneous group, psychogenic vertigo (0.03%) was most common.

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