

Original Article

Tremors and its determinants: A 7-years study at a secondary care hospital

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Abstract

Objective: To evaluate the cause, frequency and determinants of tremors at secondary care settings.

Methods: A hospital based cross-sectional study for seven years (2002-2009) was carried out at Sindh Govt. Hospital (SGH) Liaqatabad No.10, Karachi. Sample size was 403 and sampling technique was Convenience sampling. A data collection form was designed and all essential variables were recorded regarding age, gender, residence, complaints and their duration, education status, profession, co-morbid and investigations performed. The results were analyzed using SPSS 16.0.

Results: Out of 403 patients 247 (61.5%) were males and 156 (38.5 %) were females. The mean age of the patients was 55.9 ± 14.2 years. The male to female ratio was 2: 1.6. Enhanced physiological tremor was the most frequent diagnosis. Among whom, females of 40-60 years were mostly affected. Essential tremors were mainly coarse in amplitude, whereas commonest fine tremors were diagnosed as Enhanced Physiological tremor.

Conclusion: Evaluation of patients with tremors showed males to be more affected with essential tremors being the commonest encountered. Orthostatic tremor was rare. Essential tremors were diagnosed by exclusion.

Keywords: Tremor, Comorbidity, Essential tremor, Orthostatic, Karachi (JPMA 61:896; 2011).

Introduction

Tremor is an involuntary movement characterized by rhythmic oscillations of a part of the body, which may be more prominent during rest or with movement. It is caused by either alternating or synchronous contractions of antagonistic muscles. Latent tremors are present in most normal individuals but manifest clinically in the form of exaggerated physiologic tremor.¹

Tremors can be classified in various ways e.g. depending upon severity (mild, moderate, and severe), depending on the amplitude (fine, course, flapping), position (resting, kinetic, contraction, postural, intentional), etiology (Essential, Parkinson's, Enhanced Physiological, dystonic, psychogenic, cerebellar etc.).²

Prevalence data on essential tremor are surprisingly difficult to interpret, with estimates between 0.08-220 cases/1000 persons. As the most common movement disorder in the United States, essential tremor occurs across the adult age spectrum, with an overall estimated prevalence similar to that of angina, chronic heart failure, and stroke.³ Surprisingly little is known about the etiology and pathophysiology of essential tremor, which is characterized by pathologic tremor affecting mainly the upper extremities followed by the head and voice. Mortality remains unaffected, and functional and psychosocial disability ranges from minimal to severe. In the elderly, essential tremor may be inaccurately attributed to Parkinsonism or dismissed as an insignificant clinical finding. Appropriate diagnosis is paramount to manage symptoms and improve quality of life.

The objective of this study was to evaluate the cause and determinants of tremors at secondary care settings. The burden of tremors at secondary care settings has also been evaluated. This study is unique in the sense that it is done for the first time in Pakistan covering important variables related with different types of tremors.

Methods

A hospital based cross-sectional study was carried out at Sindh Govt. Hospital (SGH) Liaqatabad No.10, Karachi, with the catchment population of 1.5 million, with patients coming from adjoining areas, Azizabad, Karimabad, Hussainabad, F.B. area and Joharabad. Sample size was 403 and sampling technique was Convenience sampling. Study duration was 7 years, carried out from year 2002 to 2009.

Patients diagnosed as a case of tremors with any category or characteristics and tremors present for 3 months or more were included. Paediatric patients with tremors, patients with movement disorders for less than 3 months, Diabetics with evidence of peripheral neuropathy, clinically anaemic patients, patients with recent accidents and major surgeries and history of alcoholism in any form and quantity

were excluded.

All information was collected and enrolled by relevant medical officers and concerned specialists. A data collection form was designed and all essential variables were recorded regarding age, gender, residence, complaints and their duration, education status, profession, co-morbid and investigations performed. Association between rate of progression/age of onset and anatomic distribution of tremors were also studied in selected cases.

A detailed history comprising of presenting complaints with duration, past medical history including drugs and their dosage, family history with family tree, personal and socio-economic history was noted. In selected cases detail psychiatric history, and in females of fertile age groups relevant gynaecology and obstetrics history were taken. Detail history of the tremors was also asked .e.g., how they had started, duration, unilateral or bilateral, other parts involved or not, and how these tremors are affecting their daily pursuits.

A thorough general physical examination including systemic and detail neurological survey and specific clinical assessment of tremors was done including amplitude, character, effect of different positions and severity and anatomical distribution. Relevant investigations were carried out in selected patients and all the information was recorded including the most probable diagnosis. The management plan was advised and followed up every month.

Data analysis was performed with statistical software SPSS-16 and expressed as mean values with standard deviation and 95% confidence interval. All data was handled with full confidentiality and verbal informed consent was taken from all patients.

To carry out this study permission was taken from the ethical review committee of the institution.

Results

Among total of 403 patients 247 (61.5%) were males and 156 (38.5 %) were females. The mean age of the patients was 55.9 ± 14.2 (range: 31-88 years). The male to female ratio was 2: 1.6. Patients with tremors attending the OPDs were 57.5 per year. The duration of symptoms in years was 19.5 ± 17.4 . Among 403 patients, 328 (81 %) noted bilateral involvement, 31 (8 %) were found to be unilateral, while 44 (11 %) started as unilateral but on further follow-up involved the other hand. The severity of the tremors were 117 (29 %) mild (not much affecting the daily life), 237 (59 %) moderate (affecting their daily pursuits) and 49 (12 %) severe (crippling situation). The family history was positive in 94 (23.3%) patients, in which first degree relatives (e.g. parents, siblings and first cousins) were 63 (67 %) and second degree relatives (e.g. second cousins) were 31 (37 %). The history of

Table-1: Demographic data.

	Male (n=247)	Female (n=156)	Total (n=403)
Age Group			
<40	31	15	46
40-60	109	108	217
>60	107	33	140
Address			
Rural	84	19	103
Urban	163	137	300
Education			
Illiterate	84	59	143
Primary school	34	62	96
Secondary school	129	35	164
Employment Status			
Employed	190	59	249
Unemployed	57	0	57
Housewife	0	97	97
Family History of Tremors			
Nil	174	130	304
1st degree relatives	47	18	65
2nd degree relatives	26	8	34

Table-2: Clinical diagnosis of tremor.

years		Age group		
		<40 years	40-60 years	> 60
		Count	Count	Count
Enhanced Physiological tremor	male	23	67	6
	female	13	83	2
Essential tremor	male	2	16	89
	female	0	9	27
Parkinson's disease	male	0	5	10
	female	0	3	3
Dystonia	male	0	1	1
	female	0	3	0
Psychogenic tremor	male	3	5	0
	female	1	8	0
Cerebellar disease	male	1	9	1
	female	0	1	1
Peripheral neuropathy	male	2	3	0
	female	0	0	0
Post CVA	male	0	3	0
	female	0	0	0
Orthostatic tremor	male	0	0	0
	female	1	1	0

Table-3: Inter-Relationships of Different Varieties of Tremors. (n= 403).

Etiological Classification	Classification according to Amplitude		Resting	Classification as related to Position of Tremors			
	Fine	Coarse		Kinetic	Postural	Contraction	Intentional
Essential tremor	23	111	21	97	01	04	--
Parkinson's disease	6	13	16	02	01	--	--
Enhanced Physiological tremor	159	37	41	98	33	21	03
Orthostatic	---	---	--	02	--	--	--
Psychogenic	15	2	02	07	05	03	--
Tobacco	2	1	01	02	--	--	--
Cannabis	---	1	01	--	--	--	--
Heroin	7	1	03	02	01	01	--
Peripheral neuropathy	3	2	02	02	01	--	--
Epilepsy	---	1	01	--	--	--	--
Post CVA	2	1	02	01	--	--	--
Cerebellar disease	0	11	02	01	02	--	06

addiction was found to be in 182 (45.2%) patients, among them cigarette smokers 69 (38 %), pan-eaters/gutka-93 (51 %), heroin-8 (4 %), naswar-11 (6 %) and cannabis-1 (0.5 %) (Table-1).

Enhanced physiological tremor was the most frequent diagnosis. Among whom, females of 40-60 years were mostly affected. None of the females had tremors due to peripheral neuropathy or post cerebro-vascular accidents. Orthostatic tremor was the rarest diagnosis among females. Essential tremors were the commonest diagnosis among males (Table-2).

Essential tremors were mainly coarse in amplitude, whereas commonest fine tremors were diagnosed as Enhanced Physiological tremor. Classification as related to position of tremors: resting, kinetic and postural were the main finding, whereas intentional tremor was the rarest finding (Table-3).

Discussion

Tremors are the commonest movement disorders found in any clinical settings.¹ Although studies were conducted at G.P Clinics, Primary Care and Tertiary Care specialist Clinics, work has not been done effectively at secondary care hospitals which are the "Bridges" between primary and tertiary levels and are covering extra-ordinary numbers of population.

The commonest type of tremors found in this study was enhanced physiological rather than essential, which is comparable to the study done by Kelsbe G, and his colleagues in 2008 who found that the commonest type of tremor in primary care was Enhanced Physiological.⁴ The monthly turnout of the patient with tremors at our centre was found to be 4.79 in overall patients of 20,000.

Although mild tremors do manifest as the age grows

but old age itself does not cause the tremors. Senile tremors are misnomer and now regarded as variant of the essential tremors.⁵ In this study the average age for essential tremors was 58.5 years. The youngest patient was 31 years and the oldest was 88 years. This is comparable to the study done by Elan, Blair and Liva in 2000,⁶ who found the median age of onset was 49.5 years. The severity of the tremors increases with advancement of age but frequency decrease.⁷ In our study, the age of onset for Enhanced physiological tremor was comparatively younger than essential tremor, which may be comparable to the study by Wenning and his co-workers in 2005, who observed the prevalence of age in essential tremors to be higher in comparison to other types of tremors.⁸

Males were affected almost twice as more than females in this study which is against the finding of the studies done by Ahmad⁹ and William.¹⁰ They found no sexual propensity in different types of tremors. Probably in our society because of the males predominance, they visit the primary to tertiary care centers regularly and at early onset of symptoms. Tremors in females usually are related to the generalized weakness and age and often neglected in our societies. Female population were more affected with Enhanced physiological and psychogenic tremors in comparison to males, which are comparable to the results obtained in the study done by Jankovic and Fahn.¹¹

There is no marked genetic influence found related with all types of tremors. Although 23.32 % had a positive family history in essential tremors, in contrast to work done by Bain and co-workers in 1994, who found 50-60 % genetic association.¹² This discrepancy occurs probably because of racial and environmental factors which are more operative than genetic influence in our societies. Furthermore most of the studies published to date are based on community surveys, while this study was done at outpatient basis. There were 2 subjects out of 19 in Parkinsonian group who had family history and both of them later developed kinetic and postural components suggestive of essential tremors.

Majority of essential tremors i.e. > 83% were found to be coarse in nature and 75% of them were of Kinetic (Action) moiety. This is comparable with the study done by Hubble and his colleagues in 1997 who found the same result.¹³ Parkinsonian tremors were found to be 69 % coarse and 84 % resting which is comparable to the study done by Jankovic and co-workers in 1999 who found the same character of these tremors in most of the cases.¹⁴ Enhanced physiological tremors manifest as 81% fine, 21 % resting, 50% kinetic, 17 % postural and 11% contraction which are very similar to the study done by Jankovic and Fahn in 1980 who found that these tremors were dominantly of

fine and kinetic in character.¹¹

Most of the tremors in our study involved the hands and wrist (>80%), followed by head, face and voice (laryngeal) tremors. Essential tremors receptive areas increase as the age advanced and virtually can involve any voluntary muscle groups. We found that cerebellar tremors can also involve head and neck if they became severe. These facts are supported by the studies done by Louis and co-workers in 1998.¹⁵

Co-morbid condition played a minor role in the causation of most of the tremors except in Enhanced physiological tremors, where they have a key role. IHD, diabetes and Hypertension were the main associated illnesses found with essential tremors and all of them are common in old ages. These findings are supported by the study done by Louis, Marder and Cote in 1995.¹⁶ Physiological tremors occur in every normal individual but have no clinical significance.¹⁷ It is rarely visible to the eye and may be heightened by strong emotions, metabolic derangements, poisoning, drugs and endocrine disturbances. It can be seen in all voluntary muscles but more commonly involving upper limbs and can be detected by extending the arms and placing a piece of paper on the top of the hands.¹⁸ An enhanced physiological tremor is "accentuation" of physiological tremors to more visible levels.¹⁹ We found definite causes in 196 subjects in this study. The major illnesses causing the Enhanced physiological tremors were anxiety, depressive illnesses, hyperthyroidism and drugs. These results are supported by the study carried out in 1961 by Marshall.²⁰ These Enhanced physiological tremors occur probably due to mechanical and central component influenced by sympathetic out flow.²¹ The role of addiction as initiating cause, predisposing and/or exaggerating factor for tremors is well established.⁴ In our study, we found that those who were addicted to nicotine in any form (Smoking, Pan-eating or Naswar[chewable tobacco]) developed essential tremors relatively at younger age group. These findings are supported by the study done by Deuschl Bain and Brin in 1998 who observed the nicotinic effects on essential tremors.²² Diamorphine HCL (heroin) addicted people developed complex tremors (sometimes rest other times action or postural or orthostatic) in this study supported by work done by Hallet in 1991.² All tremors due to cerebellar diseases were presented as unilateral, severe and dominantly intentional in nature in this study. All patients showed signs of in-coordination with dysarthria and nystagmoid movements. The etiology of these tremors in this study were evaluated by MRI/CT and found to be multiple sclerosis, CVA and cerebellar abscess in order of frequency. These findings are supported by the study done by Geny and his co-workers in 2004, who found the causes of cerebellar tremors synonymous with our study.²³

Psychogenic tremors in our study were presented in relatively younger persons, predominantly in females and postural and kinetic in nature with unusual temporal profiles, inconsistent with ability to perform certain daily pursuits in spite of tremors. All tremors were associated with some conversion disorders. These findings are consistent with the study done by Koller and his colleagues in 1989.²⁴

All of the dystonic tremors were associated with writer's cramp involving the dominant hand in our study and these findings are supported by the study done by Jedynak, Bannet and Agid in 1991.²⁵ We found 4(3%) cases out of 134 essential tremors who later developed Parkinsonian tremors and bradykinesias, which supports the findings achieved in the study done by Julian and co-workers in 2005.²⁶

Conclusion

The study concluded that males had a pre-dominance in developing tremors. Essential tremors were found to involve mostly males and were diagnosed by exclusion.

Limitations:

This was a descriptive, single centre study. Due low statistical power and small sample size in relation to disease burden, inferential statistics was not performed. Our objective was not to test hypothesis in this survey. Rather a large multi centre based studies are required to prove relationship of tremors with family history, age and gender.

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