

# Functional Movement Disorders in Elderly

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## Abstract

**Background:** Functional movement disorders (FMDs) have been rarely described in the elderly population.

**Methods:** This is a retrospective chart review of elderly patients with FMDs (onset >60 years) attending the movement disorders clinic at a tertiary care teaching institute in India.

**Results:** Out of 117 patients diagnosed with FMD at our center, 18 patients had an onset after the age of 60 years. The male-to-female ratio was 10:8 and the duration of symptoms ranged from 1 day to 5 years. Social (10/18) and physical factors (5/18) with an evident temporal relationship with the onset of FMD were identified in 15 out of 18 patients. Six of them had a past history of depression, anxiety, or other psychiatric illnesses. The tremor was the most frequent phenomenology seen in 11 (61.1%) patients, followed by dystonia in seven (38.8%), choreoballism and tics in two each, and hemifacial spasm and functional gait in one each. Seven patients had more than one phenotype.

**Discussion:** Tremor was the most frequent movement disorder seen in our patients with FMD. Surprisingly, tics ( $n = 2$ ) and choreoballistic ( $n = 2$ ) movements were also found in our patients with FMD, which has not been reported previously in an elderly population. Both physical and social factors were identified preceding the development of FMDs in majority of our patients.

**Keywords:** Functional, movement disorders, elderly, tremor, entrainment.

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## Introduction

Functional movement disorders (FMDs) constitute an important subgroup and accounts for approximately 3% of all movement disorders.<sup>1</sup> They are mostly seen in young adults of age  $\leq 50$  years, and rarely suspected in an elderly population.<sup>2,3</sup> Although some published studies on FMDs have included patients with onset after 60 years of age, there is only one study which has specifically evaluated elderly onset group.<sup>3</sup> In this study, we aimed to characterize the demographic and clinical features including psychosocial or physical risk factors and evaluate the phenomenology of FMDs in the elderly population.

## Methods

This is a retrospective chart review of elderly (onset after 60 years of age) patients with FMDs who attended our movement disorder clinic over a period of 3 years (2015–2018) and were diagnosed based on Fahn and Williams criteria.<sup>4</sup> FMDs were classified as documented, if there was persistent relief by psychotherapy, suggestion, or placebo, which might have

been helped by physiotherapy; or the patient was seen without the movement disorder when believing himself or herself unobserved. FMDs were classified as clinically established, if the movement disorder was incongruent with a classical movement disorder or there were inconsistencies in the examination, plus at least one of the following three: other psychogenic signs, multiple somatizations, or an obvious psychiatric disturbance.

The clinical and demographic features of these patients were extracted from the medical record system using a structured proforma that included phenomenology of FMD, precipitating factors, antecedent illnesses, treatment history, and the final outcomes that were categorized as improved, partially improved, or not improved at 3 months of follow-up. Patients with complete improvement with no relapse at the end of 3 months were categorized as improved and patients who initially improved but had frequent relapses within 3 months were classified as partially improved. Patients categorized as not improved did not show any improvement in symptoms at the end of 3 months of follow-up. Videos of all patients were also evaluated to analyze the abnormal movements and phenomenology. Patients were treated with counseling, cognitive behavioral therapy, and



**Video 1. Functional movement disorder in elderly (case 1–8).** Abnormal movements, variability and distractibility are seen in different patients.

pharmacotherapy with consultation from the department of psychiatry. Data were analyzed using SPSS software version 13 (SPSS Inc., Cary, NC). Values were expressed as means  $\pm$  standard deviations and as percentages and ranges. Frequencies between the various groups were compared using the  $\chi^2$  test, and p-values  $\leq 0.05$  were considered statistically significant (Tables 1 and 2).

### Results

We identified 117 patients with FMDs. Of these, 18 patients (15.3%) had an onset of FMD after 60 years of age. The mean ( $\pm$ SD) age of the patients was 64.77 ( $\pm 2.53$ ) years. The disease duration or the time duration between the onset and diagnosis ranged from 1 day to 5 years (mean  $\pm$  SD; 349.3  $\pm$  427.9 days). The onset was abrupt in seven patients (38.8%) and gradual in 11 (61.1%) patients. The male-to-female ratio was 10:8 (10 males and 8 females). Of the 18 elderly

patients diagnosed with FMD, 8 (44.4%) met the diagnostic criteria for documented (see Video 1) and 10 (55.5%) met the diagnostic criteria for clinically established. Among the different features of the abnormal movement that supported the diagnosis of FMD in our patients, distractibility was the most consistent finding observed in 16 patients (88.8%), while variability was present in 13 (72.2%), suggestibility was present in 9 (50%), and entrainment was present in 5 (27.7%) patients.

The tremor was the most common type of movement disorder present in 11 patients (61%), followed by dystonia present in 7 patients (38.8%). In the tremor group, the body parts most commonly affected were the upper limb in seven patients (38.8%), lower limbs in three patients (16.6%), and head in three patients (16.6%). Other movement disorders present were choreo-ballistic movements ( $n = 2$ ), tics ( $n = 2$ ), hemifacial spasm (HFS) ( $n = 1$ ), and abnormal gait ( $n = 1$ ). In our study, seven patients (38.8%) had more than one type of movement. The most common combination was dystonic tremor ( $n = 4$ ), followed by dystonic tics ( $n = 2$ ).

Fifteen patients (83.3%) had a history of precipitating factors before the onset of abnormal movement. Most commonly reported precipitating event was related to familial and domestic issues ( $n = 8$ , 44.4%), which included familial disputes in four (22.2%), spouse's illness or death in three (16.6%), and death of son in one (5.5%) patient. History of physical trauma was present in four patients, which included road traffic accident with head injury in two patients, accidental fall in one patient, and stroke in one patient. Interestingly, one patient (case 8) developed frequent lip-smacking movement immediately after MRI investigation for her neck pain, where she had experienced severe claustrophobia. Financial difficulties (due to marriage of daughter and loan) precipitated movement disorders in two patients. Six patients (33.3%) reported a history of psychiatric co-morbidities like depression, anxiety, or panic attacks. None of our patient had a history of coexisting psychogenic nonepileptic seizures (PNES).

Complete improvement was seen in eight (44.4%) patients, partial improvement was seen in five (27.7%) patients, and no improvement was seen in five (27.7%) patients.

### Discussion

In the present study, 15.3% patients with FMDs presented at our movement disorder clinic were elderly. Our data suggest that the elderly population is also prone to develop FMDs, although less frequently as compared with the younger population. In a study done by Batla et al., 33 (21%) patients out of 151 developed FMDs after the age of 60 years.<sup>3</sup> In 1995, Factor et al. studied 28 patients with FMD, out of which 6 patients (21.4%) had an onset of disease after 60 years of age.<sup>5</sup> In an international survey of 519 members of the "Movement Disorder Society" probing diagnostic and management issues in FMD, it was found that the extremes of ages were "very influential" for a non-FMD diagnosis.<sup>6</sup> This suggests that there is a lack of awareness for the FMDs among the neurologists that might contribute to the low prevalence of FMDs in this subgroup of population.

We found a slight male preponderance in our study with the male-female ratio being 10:8, which is contradictory to the most of the previous studies on FMDs reporting a female predominance in all the age

**Table 1. Summary of the Demographic and Clinical Characteristics of Elderly Functional Movement Disorder Patients**

	<b>Demographic and clinical characters</b>	<b>Findings</b>
1.	Age range (mean $\pm$ SD)	62–70 (64.77 $\pm$ 2.53) years
2.	Male:female	10:8
3.	Duration	1 day to 5 years (mean $\pm$ SD; 349.3 $\pm$ 427.9 days)
4.	Onset	
	Abrupt	7 (38.8%)
	Gradual	11 (61.1%)
5.	Level of certainty	
	Documented	8 (44.4%)
	Clinically established	10 (55.5%)
6.	Phenomenology	
	Tremor	11 (61.1%)
	Distribution of tremor*	UL (7), LL (3), head (3)
	Dystonia**	7 (38.8%)
	Tics	2 (11.1%)
	Choreoballistic movement	2 (11.1%)
	Hemifacial spasm	1 (5.5%)
	Functional gait	1 (5.5%)
	Multiple types of movements	7 (38.8%)
7.	Precipitating factors	15 (83.3%)
	Physical trauma including stroke	4 (22.2%)
	Familial disputes	4 (22.2%)
	Spouse's illness or death	3 (16.6%)
	Death of son	1 (5.5%)
	Financial burden for marriage of her daughters	1 (5.5%)
	Financial debt (loan)	1 (5.5%)
	Claustrophobia during MRI	1 (5.5%)
	None	3 (16.6%)
8.	Psychiatric comorbidity	6 (33.3%)
9.	Outcome	
	Improved	8 (44.4%)
	Partly improved	5 (27.7 %)
	Not improved	5 (27.7 %)

\*Two patients had tremor at more than one sites (upper and lower limb = 1; head and upper limb = 1).

\*\*Dystonic tremor was present in four (upper limb = 3; head = 1) patients and two patients had tics also.

groups, including elderly population.<sup>6,7</sup> Batla et al. also found a female gender bias (72.7% in the elderly group) in their study.<sup>3</sup> The slight male dominance observed in our study may be emanating from the social rather than biological factors. In the Indian context, with its deeply patriarchal society, there is a gender difference in health expenditures and treatment-seeking behavior among patients. The lower prevalence

of females may also be due to other factors such as lower literacy, misconceptions, and social stigma. This fact is supported by the other Indian studies as well, in which no significant difference was observed in the prevalence of FMD among men and women.<sup>8,9</sup>

Most common phenomenology observed in our study was functional tremor seen in 11 (61.1%) patients. Batla et al. also observed that the

Table 2. Detailed Clinical Features of Elderly Functional Movement Disorder Patients

Serial number	Age/sex	Duration of disease	Documented (D)/clinically established (CE)	Phenomenology	S	D	V	E	Onset	Precipitating cause	Psychiatric comorbidity	Outcome
1	62/M	9 months	D	Rt UL and LL rest tremor	+	+	+		Gradual	Lung lobectomy 1 year back	None	Not improved
2	70/M	1 year	D	Rt LL rest tremor	+	+	+	+	Abrupt	Recurrent stroke, illness of his wife	None	Partly improved
3	66/M	6 months	D	Tics and retrocollis	+	+			Abrupt	Death of his son	None	Improved
4	62/M	7 days	D	Rt torticollis and head tremor	+	+	+		Gradual	Financial debt	Panic attacks	Improved
5	62/M	18 months	D	Tics (shoulder shrugging), platysmal contractin, oromandibular including tongue dystonia	+	+	+		Gradual	Road traffic accident 4 years back	Anxiety	Partly improved
6	63/M	2 years	D	UL dystonia with writer's cramp	+	+	+		Gradual	Familial dispute	Depression	Not improved
7	68/M	5 years	D	Choreobalistic movement	+	+	+		Gradual	None	Anxiety	Not improved
8	65/F	1 day	D	Lip smacking	+	+	+		Abrupt	Calustrophobia during MRI	None	Improved
9	63/F	9 months	CE	Left hemifacial spasm	+	+			Abrupt	Dispute with son	None	Improved
10	65/F	4 months	CE	Rt hand tremor and dystonia	+		+		Gradual	Familial conflict	Depression	Improved
11	68/M	6 months	CE	Head tremor	+				Gradual	Familial dispute	None	Partly improved
12	64/M	8 months	CE	Both LL tremor	+				Abrupt	Wife's death	None	Improved
13	63/F	6 months	CE	Lt hand rest and postural tremors	+	+	+		Gradual	Financial burden for marriage of her daughters	Anxiety	Not improved
14	65/F	1 year	CE	Rt UL choreobalistic movement and functional gait	+	+			Abrupt	None	None	Improved
15	65/F	6 months	CE	Postural hand tremor	+	+	+		Gradual	Husband's death 7 months back	None	Improved
16	69/F	15 days	CE	Head and both hand tremor	+				Abrupt	Accidental fall 5 months back	None	Partly improved
17	62/M	3 months	CE	Rest and postural tremor and dystonia of Lt UL			+		Gradual	Wife's illness	None	Partly improved
18	64/F	2 years	CE	Rest and postural tremor, Lt hand dystonia	+	+	+		Gradual	None	None	Not improved

M, male; F, female; S, suggestibility; V, variability; D, distractibility; E, entrainment; O, onset; Lt, left; Rt, right; UL, upper limb; LL, lower limb; MRI, magnetic resonance imaging.

tremor was the most common (33.3%) movement disorder in the elderly group.<sup>3</sup> Tremor in our patients was most common in upper limb ( $n = 7$ ), followed by lower limb ( $n = 3$ ) and head ( $n = 3$ ). This finding is comparable to that described in the previous reports.<sup>3,5,7</sup>

Dystonia was the second most common phenomenology observed present in seven (38.8%) of our patients. Six patients had a combination of movements like dystonia with tremor in the same segment in four patients and dystonia with tics in two patients. Only one patient had isolated dystonia in the form of right upper limb dystonia which was fixed, present at rest, showing variable resistance to manipulation and disappearing completely during the tasks like writing (see video case 6). The fixed dystonia, although a defining feature in the younger functional dystonia patients, has not been observed in the elderly patients with FMD.<sup>3,10</sup>

Interestingly, two of our elderly patients with FMD (11%) had psychogenic tics. Functional tics are reported rarely as compared to other forms of FMDs. Lang et al. reported that functional tics accounted for only 2% (29/1245) of patients with FMD in their study.<sup>11</sup> It is difficult to differentiate functional tics from organic tics because they share common clinical features like abrupt onset, variability, and aggravation with fatigue or emotional stress. However, there are certain features in the history and examination that can point towards a nonorganic nature of tics, including lack of premonitory sensations, adult onset, absent family history of tics, inability to suppress the movements, and coexistence with other FMDs.<sup>12</sup> Our patients also denied any premonitory urge and claimed an inability to suppress the movement, but when distracted, their movement disappeared completely.

Surprisingly, two of our patients had choreoballistic movement, which has been rarely reported as FMD.<sup>13</sup> One of the patients with choreoballistic movement also had a functional gait disorder. In the study of Batla et al., gait abnormality was reported to be more common in the elderly patients (69.7%) as compared with the younger population (23.7%) ( $p = 0.0001$ ), but none of the patients had choreoballistic movement.<sup>3</sup>

One of our patients had HFS presenting with abrupt onset of left hemifacial twitching following some conflict with son and she also showed inconsistent features like the change in pattern and the reduction of HFS on distraction during the examination. In a study reported by Pandey et al., four (12.1%) adults (all women) had HFS, making it the second most common FMD in adults after tremors.<sup>8</sup> Clinicians should be aware of the clinical findings pointing towards the nonorganic nature of HFS, to avoid unnecessary treatment with botulinum toxin injections or decompression surgery.

FMDs are traditionally thought to arise in the background of psychological stressors leading to unintentionally produced physical symptoms. In keeping with this viewpoint, previous DSM IV criteria mandated the presence of a psychological stressor that precedes the onset of physical symptoms to make a diagnosis of conversion disorder. But, later on, it was realized that the stressor is not always found. Therefore, the psychological stress is no more a prerequisite criterion for functional neurological disorder in DSM-5 criteria.<sup>14</sup> Batla et al. observed that elderly and younger patients with FMD did not differ significantly in terms of the presence of a stressor or precipitating cause. In their study, the onset of

FMD was associated with an identifiable precipitating cause in almost equal number of younger (47.5%) and elderly (48.5%) patients with FMD. Among them, only 14.4% younger and 9.1% elderly patients reported the psychosocial event as a precipitating cause, while physical triggers like infection, trauma, or surgery were found in 33.1% in the younger population and 37.4% in the elderly population. Parees et al. have drawn attention to the occurrence and prospective etiological role of physical events preceding the onset of FMD.<sup>15</sup> In their study of 50 patients with FMD of all age groups, 40 (80%) patients reported a physical event within the 3 months prior to the onset of the FMD. However, this does not underrate the role of past and recent emotional life events in the pathogenesis of FMD as every physical event produces a concomitant psychological experience. In the present study, we observed that 15 patients (83.3%) had a history of stressor preceding the onset of the abnormal movement. Among them, four patients (22.2%) had a history of physical trauma in a close temporal relationship with the onset of FMD in the form of stroke, head injury due to road traffic accident, or accidental fall, while a majority ( $n = 10$ ; 55.5%) of the patients reported familial or financial stressor. One of the major reasons for the psychosocial stress among elderly in our country has been growing trend of nuclear family replacing the age-old joint family system, thus rendering them vulnerable for loneliness and depression.

In our study, only six patients (33.3%) reported a history of psychiatric co-morbidity. This figure is significantly less as compared to the previous studies.<sup>5,9</sup> Batla et al. did not find any significant difference between elderly (66.7%) and younger patients (55.9%) regarding a history of psychiatric comorbidity.<sup>3</sup> Lower incidences in our study can be explained by many reasons. First, our study being a retrospective study, there is always an element of the information bias during data collection. Second, as our data are pertaining to only elderly population, the lower incidence in them may be a repercussion of the lack of awareness in this age group. Third, as also mentioned by Park in her study, the outpatient encounter is quite brief in most of the Asian countries owing to the patient load, making it impossible to interrogate in detail about the psychiatric and other personal history.<sup>7</sup> Interestingly, none of our patients had a history of coexisting PNES, although it is presumed to be a common coexisting functional symptom in the FMD patients. In the study of Batla et al., 66.7% of elderly patients with FMD had PNES.<sup>3</sup>

The certain limitations should be kept in mind before interpretation of the results of our study like the information bias which is inherent to any retrospective study and our center being a tertiary care setting, the results are likely to be influenced by referral biases. Also, our patients were treated with counseling, cognitive behavioral therapy, and pharmacotherapy for variable durations. So, outcome in different patients may have been influenced by not adhering to a set protocol. Despite all these limitations, our study aimed to emphasize on certain noteworthy features of FMDs in the elderly population to raise the awareness and understanding of the same among the neurologists. First, contrary to the old conviction, FMDs are prevalent in the elderly population also, although less as compared with the younger population. Second, it was also observed that psychiatric comorbidity was not that common as reported by the previous studies, but as already mentioned that this

could be a result of information bias during data collection. Third, although the most common phenomenology seen in the younger as well as the elderly population is the tremor, few other FMDs like myoclonus, which are commonly seen in the younger population, were not seen in the elderly population in our study. Lastly, associated features like functional gait abnormality were found to be infrequent in our study, contrary to the existing literature. However, our results should be interpreted with caution as our observations are limited by small sample size.

### Conclusion

Our study emphasizes on the need to keep a balanced index of suspicion while dealing with the elderly population presenting with the movement disorder and not to ignore the features that suggest functional disorder so as to avoid the misdiagnosis of organic disorder and subsequent treatment and concurrently refraining from the overdiagnosis of the same.

### Authors' Contributions

Dr. Anjali Chouksey and Dr. Sanjay Pandey contributed in data collection and manuscript preparation.

- (1) Research Project: A. Conception, B. Organization, and C. Execution
- (2) Statistical Analysis: A. Design, B. Execution, and C. Review and Critique
- (3) Manuscript: A. Writing of the First Draft and B. Review and Critique

A.C.: 1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B

S.P.: 1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B

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