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Prevalence of spontaneous dyskinesia in first episode, drug naive schizophrenia, and its relation to the positive and negative symptoms of schizophrenia

Abstract

Aims and objectives: This study aims to assess the prevalence of abnormal involuntary movement in never medicated patients with schizophrenia and to find its relation with demographic variables, and with the positive and negative symptoms of schizophrenia; this study also aims to assess the topography of the dyskinesia. **Methodology:** Socio-demographic data of 100 consecutively selected patients who fulfilled the ICD-10 Diagnostic Criteria for Research were collected in a 12-month period. These patients were rated with the Positive And Negative Syndrome Scale (PANSS) and Abnormal Involuntary Movement Scale (AIMS). Patients were labeled as having spontaneous dyskinesia if they fulfilled the criteria of Schooler and Kane which needs a score of two (mild) in at least two areas or score of three (moderate) or four (severe) in one area. **Results:** Fifty two per cent of the study samples were male and 48% were female with mean age of 30.72 years with standard deviation of 8.7 years. Sixteen per cent of the patients had dyskinesia when examined with AIMS. However, only 14% fulfilled the Schooler and Kane's criteria for spontaneous dyskinesia. A strong correlation was found between the presence of dyskinesia and negative symptoms of schizophrenia. 57.1% of these 14 patients had dyskinesia located in their oral and facial region. Seventy one per cent of these patients with dyskinesia had no awareness of their involuntary movements. **Conclusions:** Spontaneous dyskinesia, negative symptoms, and lack of awareness of the abnormal involuntary movement can be taken as one of the presenting symptoms of schizophrenia.

Keywords: Schizophrenia. Dyskinesia. Abnormal Involuntary Movement. Positive and Negative Symptoms.

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Introduction

Schizophrenia is a clinical syndrome of variable, but profoundly disruptive psychopathology that involves cognition, emotion, perception, and other aspects of behaviour. Indian writings of more than 3,500 years ago describe an illness in which the afflicted wander about naked, their body smeared with mud and excreta, and ate gluttonously when food was offered.[1]

Delineation of schizophrenia from other mental illnesses is attributed to Kraeplin. For this he used a longitudinal approach, based on the course and outcome of the illness over extended period of time. He grouped demence precoce, hebephrenia, catatonia, and dementia paranoides under 'dementia praecox'.

Eugene Bleuler, in 1911 used the term 'schizophrenia' replacing 'dementia praecox'. He defined schizophrenia on the basis of symptomatology and course when he wrote as follows…

"By the term dementia praecox or schizophrenia, we designate a group of psychoses whose course is at the time chronic, at times marked by intermittent attacks and which can stop or retrograde at any stage, but does not reached restitutio ad integrum. The disease is characterized by specific type of alteration of thinking, feeling and relation to the external world which appears no where else in this particular fashion".[2]

In 1899, Kraeplin classified schizophrenia into hebephrenic, catatonic, and paranoid, and later Bleuler added simple schizophrenia as a fourth type. International Classification of Disease tenth edition has retained all these and also includes undifferentiated and residual schizophrenia.

One of the methods of subtyping schizophrenia that has been proved to be useful was proposed by Crow in 1980. Crow postulated two schizophrenic syndromes, both of which reflect relatively independent dimensions of pathology but which can coexist in a patient. Type I is characterised by positive symptoms which means exaggeration of function or is a behaviour "that normal people do not have". It includes hallucination, delusion, thought disorder, acute onset of illness, good response to neuroleptics, no intellectual impairment,

and a putative dopamine pathophysiology. Type II syndrome is characterised by negative symptoms which describe a deficit or absence of a function, or signal, a vacuum, a state of "not having a behaviour that normal people have". It includes avolition, alogia, affective flattening, emotional blunting, poverty of speech, social withdrawal, chronic course, variable occurrence of intellectual impairment, and a pathologic process that involves cell loss and structural change in the brain.[3]

Since the original Crow hypothesis, numerous studies have been done to seek correlations between negative symptoms and brain structural abnormality, and most of them found a significant relationship.[4,5]

Schizophrenia affects one per cent of the world's population. The effect of the illness is severe and usually long lasting. The mainstay of treatment is antipsychotic drugs and their therapeutic efficacy is well-established, both for the treatment of acute symptoms and relapse prevention.[6] Unfortunately they are also associated with a broad range of side effects, the most prominent of which is abnormal involuntary movements. An alternative perspective is that abnormal involuntary movements are not simply a side effect of treatment but may be at least partially, an inherent part of the illness.[7]

Reports of abnormal involuntary movement in schizophrenia date almost from the first description of the disorder itself. Long before the introduction of chlorpromazine in 1952, Kraeplin gave a vivid description of involuntary movements in patients with schizophrenia. He wrote…

"The spasmodic phenomena in the musculature of the face and of speech which often appear are extremely peculiar disorders. Some of them resemble movements of expression wrinkling of the forehead, distortion with the tongue… but besides we observe specially in the lip muscles, fine lighting-like or rhythmical twitching which in no way bear the stamp of voluntary movements…"[8]

Retrospective review of the medical records of the schizophrenic patients from the pre-neuroleptic era by Fenton *et al.*[9] revealed a prevalence of abnormal movements between 15% and 23% depending on the stringency used for labeling the case with spontaneous dyskinesia.

So giving neuroleptics as the reason for the abnormal movements may blind us to find the risk factors for the development of tardive dyskinesia. The studies done to find these risk factors are mainly confounded by the true prevalence of spontaneous dyskinesia.[7,10] It has been recognised that to accurately estimate the risk of neuroleptic induced dyskinesia, the expected rate of spontaneous dyskinesia must be subtracted from the observed prevalence of movement disorder in the clinical population under study.[7,10,11]

Description of the abnormal movements in non-treated schizophrenics resembles the complex patterns of tics and mannerism rather than of those seen in classical tardive dyskinesia.[12] This abnormal spontaneous movements include making faces, myoclonic twitches on the face, grimaces, abnormal movement of the tongue, chewing, sucking, protruding tongue, jerking or tilting the head, rapid blinking of the eyelids, continuous squinting, fluttering eyelids, raising eyebrows, rhythmical or jerky movements of the limbs.[9] Their regularity and uniform nature assist in distinguishing them from the non-uniform, irregular movements found in tardive dyskinesia.[13]

The pathophysiology involved in the development of spontaneous dyskinesia is not clear. It is regarded as a component of type II schizophrenia and its genesis is considered to be the result of compensatory increase in dopamine in the striatal circuits of the mesolimbic system due to low dopamine activity in the prefrontal cortex. Recent magnetic resonance imaging studies, though inconclusive, suggest some striatal pathology. Genetic studies has also shown that dopamine receptor gene Ser9Gly polymorphism is associated with increased risk for spontaneous dyskinesia as well as tardive dyskinesia. As regard to the cause of tardive dyskinesia, the theories which are given for explanation include dopamine supersensitivity, glutamatergic exicitotoxicity, and free radical damage.[12,14]

As described by Granacher,[13] the classical sign of tardive dyskinesia is a triad of cheek-face-tongue movement, often called the bucco-lingual masticatory syndrome. This triad can include lip smacking, chewing, tongue thrusting or protruding, lateral jaw movements, and sucking maneuvers. As with most abnormal involuntary movements, these are worsened with emotional stress or made more active during movements of other parts of the body such as during walking. They disappear entirely during sleep. In addition to the oral movements, tardive dyskinesia can display choreiform movements of the hands and feet, athetoid movements of the extremity, dystonic posturing of the neck and trunk, and even diaphragmatic asynchrony affecting respiratory exchange.

The prevalence of spontaneous dyskinesia in normal population is less than one per cent.[15] Studies done so far to find the prevalence of spontaneous dyskinesia in drug naïve schizophrenics have shown different results. McCreadie and Ohaeri[16] reported that none of their Nigerian patients with schizophrenia had dyskinesia and Moussaoui *et al.*,[17] in their Moroccan sample found 28% of the neuroleptic-naïve patients having dyskinesia.

Studies done in India have also shown variations in the prevalence of dyskinesia. McCreadie *et al.*[18] reported a prevalence of 38% in never medicated patients but their sample consisted of elderly chronically ill patients with a mean age of 65 years. The same group again reported a prevalence of 57% in a younger age group with a mean age of 52 years.[19]

As most of the studies on spontaneous dyskinesia done are from the southern part of India, we tried to find its prevalence in our set-up. Assam, one of the states of the Northeast India has a mixed population of different ethnicity and cultures, and patients coming to Gauhati Medical College and Hospital (GMCH) can be said to be representative of the population of the Northeast.

This study was designed to find the prevalence of spontaneous dyskinesia, in never medicated schizophrenic patients coming for the first time to GMCH for treatment. Of

particular interest to this study was to correlate the presence of abnormal involuntary movement with the positive and negative syndrome of schizophrenia and to locate the topography of the movements.

Aims and objectives

1. To find the prevalence of spontaneous dyskinesia in the schizophrenic patients who have never received neuroleptics
2. To determine the topography of dyskinesia
3. To determine the relation of spontaneous dyskinesia with positive and negative syndrome of schizophrenia.

Materials and method

Geographical area

The study was conducted on patients attending GMCH, Department of Psychiatry, both in the outpatient clinic as well as in the ward before the administration of any drug. GMCH, one of the premier medical colleges of Assam, used to be the tertiary referral centre of the entire lower Assam region when this study was conducted. Besides catering to the need of the referral cases, this institution also serves a huge number of primary cases. The easy availability of the services offered by the hospital draws in people from all the strata of the community from the city of Guwahati and its surroundings.

Subject selection

The study sample comprised of hundred consecutively selected subjects attending the outpatient clinic or admitted in the ward through the outpatient clinic and from the emergency department who fulfilled the inclusion and the exclusion criteria.

Study period

The study period was one year long, starting from the month of July 2007 to June 2008.

Ethical clearance

The study had been approved by the Institutional Ethical Committee of GMCH.

Consent

Informed consent was taken from the patients or their primary caregiver if the patient was unable to give the consent. Assurance of confidentiality and option to decline to participate was also given.

Inclusion criteria

1. Patient presenting for the first time to the psychiatric service of our hospital and fulfilling the criteria for schizophrenia as per ICD-10 classification of mental and behavioral disorders: diagnostic criteria for research (ICD-10 DCR)[20]
2. Patient who never received any neuroleptic either in any private setup or by any indigenous methods
3. Patients between the age of 18 and 65 years.

Exclusion criteria

1. Patient with a history of head injury, space occupying lesion, central nervous system (CNS) infection, thyroid and parathyroid condition
2. Patients with dementia, delirium, mental retardation
3. Patients on any drugs for any medical conditions known to cause movement disorders
4. Patients with comorbid substance abuse or substance dependence disorder as diagnosable by the ICD-10 DCR

Method

Patient attending the outpatient clinic or admitted in the ward were assessed and diagnosed as per the ICD-10 DCR. And if the cases met the required inclusion and exclusion criteria, they were included in the study after the informed consent was taken.

Socio-demographic data were obtained from the patients and their informants using a pre-made questionnaire. The patients were then administered the Positive and Negative Syndrome Scale (PANSS)[21] and the Abnormal Involuntary Movement Scale (AIMS).[22]

Materials

Positive and negative syndrome scale

The PANSS was developed by Kay, Fiszbein, and Opler in 1987.[21] It was developed specifically to address the psychometric limitations. The PANSS measurement derives from behavioural information plus a 35-45 minutes clinical interview. This is followed by seven-point ratings on 30 symptoms, for which each item and each level of symptom severity are defined. The ratings provide summary scores on a seven-item positive scale, seven-item negative scale, 16-item general psychopathology scale, and a composite (positive minus negative) index.

The seven positive items include delusions, conceptual disorganisation, hallucinatory behaviour, excitement, grandiosity, suspiciousness- persecution, and hostility. The seven negative items include blunted affect, emotional withdrawal, poor rapport, passive/apathetic social withdrawal, difficulty in abstract thinking, lack of spontaneity and flow of conservation, and stereotyped thinking. In addition to the seven positive and negative items, 16 symptoms that cannot be linked decisively to either syndrome are included and comprise a general psychopathology scale.

Scores for the positive, negative, and general psychopathology scales are arrived at by summation of ratings across the component items. Therefore the potential ranges are seven to 49 for positive and negative scales, and 16 to 112 for general psychopathology scale. The composite scale is scored by subtracting the negative from the positive scale score. This produces a bipolar index -42 to +42 which is a difference score that reflects the degree of predominance of one syndrome in relation to the other and may serve purpose of classification.

Typing the patients was done as mentioned by Kay *et al*., [21] which utilises the difference score from the composite scale. Patients with a positive composite scale

score valence are classified as 'positive subtype' and those with negative valence are classified as 'negative subtype'.

Abnormal involuntary movement scale

The AIMS was developed by the National Institute of Mental Health for use in evaluating the presence and severity of choreoathetoid and others movements consistent with tardive dyskinesia. While originally developed as a research tool, the AIMS is the most widely recommended examination for dyskinesia in clinical practice.[22]

The examination of patients using AIMS consists of two parts, a formal part in which the patient performs a series of maneuvers and an informal part in which the patient is observed without knowing that a movement evaluation is taking place. The AIMS examination has seven specific body areas:

- Facial and oral movements: Muscles of facial expression, lips and peri-oral area, jaw and tongue
- Extremity movements: Upper extremity (arms, wrists, hands, fingers) and lower extremity (leg, knees, ankles, toes)
- Trunk movement: Neck, shoulders, hips.

The abnormal involuntary movement is scored as follows: zero=none, one=minimal may be extremely normal, two=mild, three=moderate, four=severe.

A total AIMS score or the severity of the abnormal movements is obtained by adding scores on each of the seven areas. Besides measuring the abnormal involuntary movements, it has also one sub-scale which measures the incapacitation due to dyskinesia and patient's awareness of the abnormal movements.

Schooler and Kane criteria

For labeling the case as having spontaneous dyskinesia, the Schooler and Kane criteria was used which needs a score of two (mild) in at least two areas or a score of three (moderate) or four (severe) in one area.[23]

Tools for assessment of demographic variables

A questionnaire was prepared for the collection of the socio-demographic data from the patient. The questionnaire collected information in the following areas- age, gender, religion, occupation, locality, socioeconomic status, marital status, and education of the patient. The socioeconomic status subcategories were defined as per the groups defined by the National Council of Applied Economic Research, New Delhi. [Appendix] The same questionnaire also collected information from the patient or the informant about the duration of illness and to rule out any exposure to neuroleptics.

Study design

This study was a cross-sectional study where the patients presenting to the psychiatric services of our hospital were assessed with the pre-made questionnaire and if they fulfilled the ICD-10 DCR then they were included in the study. A detailed history was taken to rule out exposure to any neuroleptic. They were then assessed with PANSS to find symptom type and AIMS to find the presence and severity of dyskinesia. Patients were labeled as having spontaneous dyskinesia if they fulfilled the criteria of Schooler and Kane. The different socio-demographic and clinical variables were compared to see if they have any significant association with abnormal involuntary movement and the symptom type.

Statistical analysis

The socio-demographic data were shown using the descriptive statistical methods. Comparison of the categorical and nominal variables were done using Chi-square test or Fisher's exact test as per the requirement of the method. The parametric variables were analysed using analysis of variance (ANOVA) or correlation methods as per the requirement. To measure the predictability of a variable keeping abnormal involuntary movement dichotomised as present or absent as the dependent variable, regression analysis was also done as secondary analysis.

Results

We found that out of the 14 patients with dyskinesia fulfilling Schooler and Kane criteria, eight (57.1%) had abnormal involuntary movement located in their oral and facial region, this was followed by two patients (14.3%) having dyskinesia of the extremity. Two patients (14.3%) had abnormal movement in both facial-oral and trunk regions and one (7.1%) had facial-oral and extremity dyskinesia. One (7.1%) of the patients had dyskinesia of the trunk and extremity (Figure 1). None of the patients had independent trunk dyskinesia.

Significant percentage of age groups 26-35 and 36-45 years showed positive symptoms. Negative symptom had inverse relation with age (Chi-square value=8.498, degree of freedom [df]=3, $p<0.05$). No significant differences were found between the age groups regarding the PANSS score (Table 1).

Distribution according to the duration and presence or absence of abnormal involuntary movement is presented in Table 2. Though Chi-square test showed no significant differences between duration and presence of abnormal involuntary movement (Chi-square value=8.116, df=4, $p=0.087$); Spearman rho test revealed a significant correlation between abnormal involuntary movement and duration ($p=0.014$, 2-tailed).

Chi-square test showed significant association between the marital status and symptom subtype (Chi-square value=6.539, df=2, $p<0.05$). Keeping composite index (CI) as dependent variable, Kruskal-Wallis Test ranked the group of single as highest having negative symptom which was followed by the group of separated/divorced/widowed (Table 3).

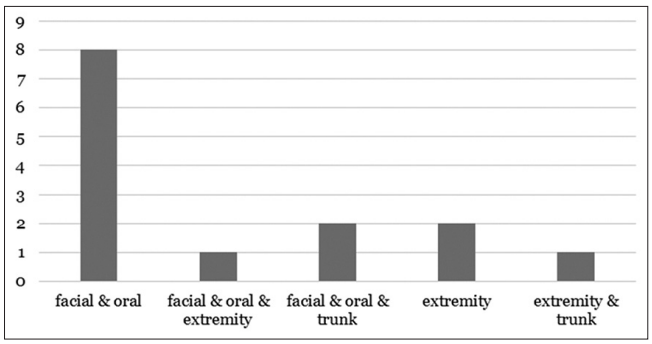

Figure 1: Topography of the abnormal involuntary movements in the 14 patients who met the Schooler and Kane criteria

Table 1: Distribution of age group as per symptom type

		Composite Index (CI)		Total
		Positive PANSS	Negative PANSS	
18 to 25 years	N	11	20	31
	% within age	35.5	64.5	100.0
	% within CI	20.0	44.4	31.0
	% of total	11.0	20.0	31.0
26 to 35 years	N	25	18	43
	% within age	58.1	41.9	100.0
	% within CI	45.5	40.0	43.0
	% of total	25.0	18.0	43.0
36 to 45 years	N	12	5	17
	% within age	70.6	29.4	100.0
	% within CI	21.8	11.1	17.0
	% of total	12.0	5.0	17.0
46 to 55 years	N	7	2	9
	% within age	77.8	22.2	100.0
	% within CI	12.7	4.4	9.0
	% of total	7.0	2.0	9.0
Total	N	55	45	100
	% within age	55.0	45.0	100.0
	% within CI	100.0	100.0	100.0
	% of total	55.0	45.0	100.0

ANOVA in the different age groups					
	Sum of squares	df	Mean square	F	Significance
Positive PANSS score (between groups)	475.835	28	16.994	0.610	0.927
Negative PANSS score (between groups)	774.059	28	27.645	1.160	0.302

PANSS: Positive and negative syndrome scale, ANOVA: Analysis of variance, df: Degree of freedom

Table 2: Distribution according to the duration and presence or absence of abnormal involuntary movement

Duration		Abnormal involuntary movement		Total
		Present	absent	
1 month to<3 months	N	0	15	15
	% within duration	0.0	100.0	100.0
3 months to<6 months	N	2	11	13
	% within duration	15.4	84.6	100.0
6 months to<12 months	N	0	10	10
	% within duration	0.0	100.0	100.0
12 months to 24 months	N	2	19	21
	% within duration	9.5	90.5	100.0
>24 months	N	10	31	41
	% within duration	24.4	75.6	100.0
Total	N	14	86	100
	% within duration	14.0	86.0	100.0

Significant association was found between type of accommodation and symptom subtype (p-value<0.05). 58.1% of the subjects residing in their own house were having predominantly positive symptoms and 75% of subjects living in rented house were having negative symptoms (Table 4).

Table 3: Distribution of marital status with symptom type

Marital status		Composite index (CI)		Total
		Positive symptom	Negative symptom	
Single	Count	24	31	55
	% within marital status	43.6	56.4	100
	% within CI	43.6	68.9	55
Married	Count	24	10	34
	% within marital status	70.6	29.4	100
	% within CI	43.6	22.2	34
Separated/divorced/widowed	Count	7	4	11
	% within marital status	63.6	36.4	100
	% within CI	12.7	8.9	11
Total	Count	55	45	100
	% within marital status	55	45	100
	% within CI	100	100	100

Table 4: Type of accommodation and symptom type

		Composite index (CI)		Total
		Positive PANSS	Negative PANSS	
Self-owned	N	50	36	86
	% within type of accommodation	58.1	41.9	100.0
	% within CI	90.9	80.0	86.0
	% of total	50.0	36.0	86.0
Rented	N	3	9	12
	% within type of accommodation	25.0	75.0	100.0
	% within CI	5.5	20.0	12.0
	% of total	3.0	9.0	12.0
Company provided	N	2	0	2
	% within type of accommodation	100.0	0.0	100.0
	% within CI	3.6	0.0	2.0
	% of total	2.0	0.0	2.0
Total	N	55	45	100
	% within type of accommodation	55.0	45.0	100.0
	% within CI	100.0	100.0	100.0
	% of total	55.0	45.0	100.0

PANSS: Positive and negative syndrome scale

Fisher's exact test revealed a significant association between the symptom type and the presence of abnormal involuntary movement (p=0.001). Significant correlation had been found between the total AIMS score and both positive and negative syndrome scale scores. The AIMS total score was inversely related to the positive symptom score and directly related to the negative symptom score. One way-ANOVA was done keeping AIMS score as dependent variable and positive PANSS score and negative PANSS score as independent variable. The result showed that there was significant group difference in the negative symptom score (Table 5). Chi-square test showed no significant association between the presence and absence of AIM and the general psychopathology score (Chi-square value=3.489, df=24, p-value>0.05). One-way ANOVA also showed that the mean AIM score was not dependent on the general psychopathology score (p-value>0.05).

Pearson's test of correlation did not reveal any significant correlation between the scores of awareness and distress due to dyskinesia and AIMS total score (p>0.05). Linear regression was done to see the effect of duration of illness, general psychopathology score, positive and negative PANSS score on the severity of awareness and distress due to dyskinesia. No significant effect was seen (Table 6).

Table 5: Symptom type and AIM

Distribution according to presence and absence of AIM and composite index (CI)					
			CI		Total
			Positive PANSS	Negative PANSS	
AIM	Present	Count	2	12	14
		% within AIM	14.3	85.7	100.0
		% within CI	3.6	26.7	14.0
	Absent	Count	53	33	86
		% within AIM	61.6	38.4	100.0
		% within CI	96.4	73.3	86.0
Total		Count	55	45	100
		% within AIM	55.0	45.0	100.0
		% within CI	100.0	100.0	100.0

Correlation between PANSS and AIMS scores					
			Positive PANSS	Negative PANSS	AIMS
Spearman rho	Positive PANSS	Correlation coefficient	1.000	−0.134	−0.178
		Significance (2-tailed)		0.182	0.076
		N	100	100	100
	Negative PANSS	Correlation coefficient	−0.134	1.000	0.373*
		Significance (2-tailed)	0.182		0.000
		N	100	100	100
	AIMS	Correlation coefficient	−0.178	0.373*	1.000
		Significance (2-tailed)	0.076	0.000	
		N	100	100	100

ANOVA between groups						
		Sum of squares	Degree of freedom	Mean square	F	Significance
Positive PANSS score	Between groups	140.905	3	46.968	1.949	0.127
	Within groups	2313.095	96	24.095		
	Total	2454.000	99			
Negative PANSS score	Between groups	587.938	3	195.979	10.014	0.000
	Within groups	1878.702	96	19.570		
	Total	2466.640	99			

*Correlation is significant at the 0.01 level (2-tailed), AIM: Abnormal involuntary movement, PANSS: Positive and negative syndrome scale, AIMS: Abnormal involuntary movement scale, ANOVA: Analysis of variance

Discussion

Hundred first episode drug naïve schizophrenic patients were included in the study after they fulfilled the inclusion and exclusion criteria. The patients were assessed with the PANSS to determine their psychopathology and to find out their symptom type, i.e. to know whether they were having predominantly positive symptoms or predominantly negative symptoms. Patients were examined with the AIMS for the presence of spontaneous dyskinesia. Statistical analysis was done for the patients who fulfilled the Schooler and Kane criteria.

Out of these 100 neuroleptic naïve patients, 52% were male and 48% were female. Their mean age was 30.72 years with a standard deviation (SD) of 8.704 years. Majority of the patients (43%) were from 26 years to 35 years age group.

Fifty five per cent of the patients were having predominantly positive symptoms and 45% were having negative symptoms. The mean positive symptom score was 21.20 with SD of 4.979 and the mean negative symptom score was 21.44 with SD of 4.992.

The prevalence of spontaneous dyskinesia found in our study was 14% which is in contrast to what McCreadie *et al.*[18] reported in their study of Indian patients with schizophrenia. They reported a prevalence of 38% in their never medicated group with schizophrenia but these patients were chronically ill elderly people with a mean age of 68 years; so this difference may be due to the confounding effect of ageing in their result. The effect of increase in prevalence with increasing age was reported by Wolff and

Table 6: Awareness and distress due to dyskinesia

	Frequency	Per cent
No awareness	10	71.4
Aware, no distress	2	14.3
Aware, mild distress	2	14.3
Total	14	100.0

Awareness and distress score					
	N	Minimum	Maximum	Mean	Standard deviation
Distress and awareness	14	0	2	0.43	0.756

Relationship of awareness and distress due to dyskinesia and various predictors

Model summary

Model	R	R square	Adjusted R square	Standard error of the estimate
1	0.514 (a)	0.264	−0.063	0.779

a: Predictors (constant): General psychopathology score, duration, positive PANSS score, negative PANSS score

ANOVA (b)

Model		Sum of squares	Degree of freedom	Mean square	F	Significance
1	Regression	1.963	4	0.491	0.808	0.550 (a)
	Residual	5.465	9	0.607		
	Total	7.429	13			

a: Predictors (constant): General psychopathology score, duration, positive PANSS score, negative PANSS scorem, b: Dependent variable: Distress

Coefficients (a)

Model		Unstandardised coefficients		Standardised coefficients	t	Significance
		B	Standard error	Beta		
1	(Constant)	0.280	1.752		0.160	0.877
	Duration	0.011	0.007	0.466	1.602	0.144
	Positive PANSS	−0.020	0.050	−0.146	−0.409	0.692
	Negative PANSS	−0.038	0.062	−0.279	−0.611	0.556
	General psychopathology score	0.023	0.044	0.218	0.520	0.616

a: Dependent variable: Distress, ANOVA: Analysis of variance, PANSS: Positive and negative syndrome scale

O'Driscoll,[15] after they reviewed substantial number of literature on spontaneous dyskinesia.

Our finding is also different to what Bhatia *et al.*[24] reported where they found a prevalence of 28.7% of involuntary movement in their study of Indian and Israeli patients; but again their result was confounded by the use of antipsychotics by their patients. The patients in our study who fulfilled the criteria for spontaneous dyskinesia had a mean age of 27.50 years which suggest that though increase age and neuroleptic treatment may be some of the risk factors, but the presence of the spontaneous movement is not dependent on these two factors.

In another study done on Nigerian schizophrenic patients, McCreadie and Ohaeri[16] reported that none of their never-medicated patients had dyskinesia but with small number of never medicated subjects (N=12), the chance of type II error (false negative) is probable and if they would have assessed with a large sample size, their result might have been different.

Our finding on the prevalence of spontaneous dyskinesia is in line to what Gervin *et al.*[25] reported. They found a prevalence of 10.2% and their sample was more representative as the centre where the study was done, serves a defined geographic area. Fenton *et al.*,[9] in their review of medical records of patients from the pre-neuroleptic era reported a prevalence of 28% of some form of movement disorders and a 15% of definite movement disorder.

The comparison of socio-demographic factors between the groups with and without abnormal involuntary movement was done. Studies have reported that patients with spontaneous dyskinesia have fewer years of education and are generally from poor socioeconomic status,[25,26] but we found no such association with spontaneous dyskinesia; the reason may be that most of the patients were from rural background and were self-employed as daily wage earner or cultivator who were generally more concerned for daily living and their economic condition did not allow them for better and higher education. The effluent population with higher education usually seek treatment from the private hospitals because of better accommodation facilities there; so this group of the population was not adequately represented here. If adequate sample would have been from all the groups, we might have got the association.

Our sample had majority (43%) of the patients from the age group of 26 to 35 years which was followed by 31% from the age group of 18 to 25 years. The percentage of patients from age group of 36 to 45 years and 46 to 55 years were 17% and nine per cent respectively. There were no patients in the age group of 55 to 60 years. The higher representation of a younger age group in our study is probably because of the fact that schizophrenia is prevalent in the young adults. Our sample consisted of newly diagnosed and never medicated schizophrenic patients, and no differences between the groups were found; but a significant but modest correlation was found between the duration of illness and presence of abnormal involuntary movement. If our sample had more patients with longer illness, we might have got the difference between the two groups of with and without dyskinesia. However our finding supports the previous observations that chronicity of symptoms has a strong association with spontaneous dyskinesia as reported by Khot and Wyatt,[11] and Fenton *et al.*[9]

No association was found between spontaneous dyskinesia and the different subtypes of schizophrenic diagnosis, viz. paranoid, hebephrenic, undifferentiated, and residual schizophrenia. We did not get patients with other subtypes of schizophrenic diagnosis though we did get patients with catatonia but they were not assessed as the assessment required for this study needed some degree of cooperation from the patients which would not be expected from these patients prior to the initiation of treatment.

Our study found a significant association of some of the socio-demographic factors and symptom types. It was seen that most patients who were unmarried were having predominant negative symptoms and most patients who were married were showing predominantly positive symptoms; this group of married patients were followed by the divorced or separated or widowed group in terms of positive symptoms predominance. The socio-demographic variable, type of accommodation of the patients was also showing significant association with the symptom type- 58.1% and 41.9% of the patients living in their own house were showing positive and negative symptoms respectively whereas 75% of the patients living in rented house and 100% of the patients living in company provided quarters were showing negative symptoms.

In our study we also found that majority of patients with the diagnosis of hebephrenia were showing predominantly negative symptoms and all the patients with the diagnosis of residual schizophrenia were showing negative symptoms. A significant association was found between symptom type and abnormal involuntary movement. Spearman rho test of correlation showed that both the symptom types had significant correlation with abnormal involuntary movement. The positive symptom had negative correlation with the spontaneous dyskinesia and negative symptom had positive correlation. Our finding is in concordance with what Liddle *et al.*,[27] Fenton *et al.*,[9] and Chatterjee *et al.*[28] have found in their study of never medicated patients.

The hypodopaminergia in the dorsolateral prefrontal cortex responsible for the negative symptoms has previously been found to be tightly linked and predictive of exaggerated striatal dopamine function similar to the hypothesis of hypersensitivity to dopamine after long use of neuroleptics resulting in tardive dyskinesia. Our finding validates the notion that spontaneous dyskinesia is an inherent part of the illness and represents a subtype of schizophrenia with dyskinesia and prominent negative symptom as a part of the symptomatology. The negative correlation with positive symptom can be explained by the fact that the positive symptom is itself negatively associated with the negative symptom,[4] so that it can be said than an association with value of zero or no association cannot be seen due to failure to reach the statistical significance.

Association of dyskinesia with positive symptoms has also been reported by Waddington *et al.*[29] and O'Gureje,[30] suggesting that dyskinesia is seen only in chronically ill medicated patients but our non-medicated patients were mostly young adults and most of the patients were assessed within few months of their covert symptoms; so the explanation suggested by these studies does not implies to our study. Other explanation which can negate their conclusion is that they were assessing patients with positive symptoms who were more likely to receive medication as elderly patients with marked negative symptoms, such as social withdrawal and poor rapport were selected out due to their lack of feel to take medical help for their illness or might be due to early death resulted for lack of personal care.

Out of the 14 patients who had spontaneous dyskinesia, we found that ten (71.4%) had no awareness, two (14.3%) had awareness but no distress, and equal percentage (14.3%) had awareness but mild distress. Most of the studies[31,32] reported that majority of the patients were unaware of the dyskinesia. Our finding goes in line with other reports; Caracci *et al.*[33] found that 75% of the patients with dyskinesia they had examined lacked partial or complete awareness and only 25% were aware of their abnormal involuntary movement.

Various explanations has been given to explain this lack of awareness like psychological denial,[34] cognitive impairment,[35] and due to lack of emotional awareness.[36] We did not find any relation between the degrees of awareness and severity of dyskinesia.

Summary and conclusion

This study was undertaken to find out the prevalence of spontaneous dyskinesia in drug naïve schizophrenic patients attending the psychiatric services of GMCH, to find the correlation of dyskinesia with the positive and negative symptoms, and also to find the topography of the abnormal involuntary movements. We found the prevalence of the spontaneous dyskinesia to be 14% when the criterion of Schooler and Kane was applied. Two patients (two per cent) who had mild movement in one body area only were excluded from the analysis.

The presence of abnormal involuntary movement and its severity was positively correlated with the negative symptoms and its total score as measured by the PANSS score. However, we also found that its presence and severity was negatively associated with positive symptoms. The topography of the abnormal involuntary movement was located in the oral and

facial regions of the body in majority of the patients. This was followed by involvement of the extremity. None of the patients showed dyskinesia in the trunk independently rather its presence in the trunk was associated with involvement of the other two regions.

We did not find any significant association between the presence of dyskinesia and the socio-demographic variables. As regard to the clinical variables, duration of illness showed a trend favouring dyskinesia but it failed to reach the significance level. Among the different variables, we found that the diagnosis of hebephrenia was strongly associated with negative symptoms. Majority of the patients who were unmarried were having predominantly negative symptoms. Among the 14 patients with dyskinesia, about two-thirds (71.4%) lacked awareness of their abnormal involuntary movements and half of the patients who were aware felt no distress.

Based on the findings of this study it can be said that spontaneous dyskinesia, negative symptoms, and lack of awareness of the abnormal movements can be grouped as one of the presenting features of the illness. Chronicity of the illness and increasing age may act synergistically with the pathophysiological process involved in the development of dyskinesia. As patients with spontaneous dyskinesia are unlikely to complain of their abnormal movements, clinicians must evaluate the patients for any abnormal movements before initiating the treatment as these patients are more likely to develop tardive dyskinesia and methods need to be developed for increasing the awareness of the patients so that they can actively participate in the effective management of this illness.

Our study has several limitations. The patients coming to our study centre is not representative of the whole schizophrenic population as the effluent part prefers going to private practitioner or private setup where they get better accommodation facilities. In our study, observer's bias was also not ruled out.

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Appendix

National Council of Applied Economic Research, New Delhi (1999-2000) guidelines for Socio-Economic Status as per annum income:

Income group	Rupees per annum
Lower	Up to 40,000
Lower middle	40,001 – 80,000
Middle	80,001 – 1,20,000
Upper middle	1,20,001 – 1,60,000
High	Above 1,60,000