



## Prevalence of catatonic signs and symptoms in an acute psychiatric unit from a tertiary psychiatric center in India

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### ABSTRACT

**Background:** The prevalence of catatonia varies with the setting and type of rating scale used to measure catatonia. Catatonia, initially subsumed under schizophrenia, now is increasingly recognized in association with affective disorders.

**Aim:** We aimed to examine the prevalence of catatonia in an acute psychiatric inpatient unit in a tertiary center in India.

**Methods:** Study subjects (n = 300) were randomly selected from amongst the inpatients over one year and evaluated within 24 h of admission using BFCRS and NCS, besides a sociodemographic and clinical proforma. During the inpatient stay MINI PLUS 5.0 was applied.

**Results:** Among 300 inpatients recruited, 88 (29.3%) demonstrated at least one catatonic sign in either of the rating scales. As per the diagnostic cut-offs defined by BFCRS and NCS, the prevalence of catatonia syndrome was 49 (16.3%) and 32 (10.6%) respectively. The prevalence rates as per ICD-10 criteria and DSM-5 criteria were 19% and 5.3% respectively. The two most frequently noted signs - staring and withdrawal, were not listed as signs in either the ICD-10 or DSM V. The prevalence of catatonic symptoms was different in psychotic disorders in contrast to affective disorders. Severity of catatonia was associated with younger age, lesser duration of primary illness and prior episodes of catatonia.

**Conclusions:** The prevalence of catatonia varies from 5.3% to 19% based on the criteria used. Identification warrants use of structured instruments. Catatonia is more severe in the initial years of illness, those with prior episodes of catatonia and in the younger age group.

### 1. Introduction

The concept of catatonia was initially described as the phenomenon of sudden reduction in the mental activity by French alienists Pinel, Esquirol and Georget and described as separate entity by Karl Ludwig Kahlbaum in his monograph 'Die Katatonie oder das Spannungsrresein.' (Van Der Heijden et al., 2005). The phenomenon of catatonia has undergone significant nosological change, which includes the original description by Kahlbaum as a separate clinical entity followed by clubbing of catatonia under the construct of schizophrenia by Kraepelin (Fink et al., 2010). It was only in 1970s and '80s that catatonia was recognized in mood disorders in DSM III (Tandon et al., 2013). In addition to the above, recent advances in research have indicated a distinct pathophysiology and neurobiological underpinnings to catatonia (Walther et al., 2016), (Plevin et al., 2018). Given the above, many catatonia researchers have argued that catatonia should be assigned a

separate diagnostic entity similar to delirium. In DSM-5, catatonia was not given the status of separate diagnostic class, but there were significant changes from the previous revision.

International Pilot Study of Schizophrenia (IPSS) has shown that the rate of catatonic schizophrenia is more in developing countries (11%). A study conducted in India and Wales found that the prevalence was 13.5% in India whereas it was 9.6% in Wales (Chalasan et al., 2005). Deinstitutionalization, introduction of antipsychotics and under-diagnosis have been reported as reasons for the lower rates of catatonia compared to the past (Van Der Heijden et al., 2005). Catatonia rate also varies based on the setting of the evaluation with 31% noted in drug naive first episode non-affective psychosis, 17.8% in child and adolescent setting, 8.9% and 39.6% in geriatric setting and 10.5% in medical setting (Peralta et al., 2010; Ghaziuddin et al., 2012; Cuevas-Esteban et al., 2017; Smith et al., 2012). Catatonia was initially thought to be more prevalent in schizophrenia related disorders, however over the

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last few decades the prevalence rate of catatonia is being reported as more in affective disorders (Bräunig et al., 1998). Studies conducted in general hospital psychiatry setting in India have found prevalence of catatonia to be 9.45% and 10% (Grover et al., 2015; Sarkar et al., 2016). The reported rates also vary based on the method of evaluation of catatonia, as there are no common accepted guidelines to evaluate catatonia (Sarkar et al., 2016; Sienaert et al., 2011). A recent meta-analysis showed pooled prevalence of 9.0% (Solmi et al., 2017). The varied findings, limited consensus and advances in neurobiological research in catatonia, warrant the urgent need to understand the reasons for the above that would allow for consistent and systematic identification of catatonia. In this study, we have examined the prevalence of catatonia using two rating scales in an acute psychiatric inpatient unit.

## 2. Methods

This prospective study was conducted between October 2017 to September 2018 in National Institute of Mental Health and Neurosciences (NIMHANS), located in Bangalore, India. It is a tertiary care neuropsychiatric center with 650 in-patient psychiatric beds. The inpatients comprise of individuals across the diagnostic spectrum. Inpatient admissions occur directly from outpatient services, emergency psychiatry services or from transfers from other clinical specialties like neurology and neurosurgery. On an average there are 10 admissions into the adult psychiatric inpatient unit per day and around 6000–6500 admissions per year. There were 6500 acute psychiatry admissions during the study period. To ensure that sample recruited would represent the actual inpatient population, sample size was calculated estimating prevalence of catatonia in psychiatric inpatients at 10% as observed in previous studies, with a precision of 3–4% using statistical method (Naing et al., 2006). With the same, sample size for the study was calculated to be 300. The patients were selected based on a random number generated each day, from amongst the patients admitted daily. Patients were recruited after obtaining informed consent from the patient or from the care-giver if the patient did not have the capacity to give consent. If consent was not obtained for the random patient selected, next patient in the random number list was selected. This method was chosen to ensure that a representative sample of acute inpatients were selected in a manner that would minimize any selection bias.

Evaluation was conducted within 24 h of admission to the acute inpatient unit to minimize the effects of treatment, using semi structured proforma and structured tools to evaluate catatonia. This included, the semi structured proforma that included information about sociodemographic and clinical details. Following this the MINI PLUS 5.0 was applied to diagnose the patient as per DSM IV and ICD-10. Two structured catatonia rating scales, Bush Francis Catatonia Rating Scale (BFCRS) and Northoff Catatonia rating Scale (NCS) were applied (Bush et al., 1996; Northoff et al., 1999). BFCRS is the most widely used Catatonia rating scale, and NCS (40 items) has an inclusive approach towards item selection drawing from the works of prominent researchers in the area (Sienaert et al., 2011). Additional information including diagnosis made by treating team, family history, medical history, history of catatonia in the past, and current medications were obtained from the patient medical records by the primary author (BAS) 1 month after discharge to minimize bias. The data was analyzed using a licensed Statistical Package for Social Sciences (SPSS) version 25. Interrater reliability exercise was conducted between the first author and one psychiatrist for 25 cases selected randomly. The same patient was rated independently by the first author (BAS) and the psychiatrist with in a time span of 15 min. Interrater reliability was calculated using intraclass correlation coefficient (ICC). Institute ethical committee clearance was obtained to conduct the study.

**Table 1**

Diagnostic break up of the total sample (n = 300) and in the catatonic group (n = 88).

S. No	Diagnostic class	Number in the total sample, n = 300 (%)	Number in the catatonic group, n = 88 (%)
1	Psychotic spectrum disorders -	128 (42.7)	46 (52.3)
	Schizophrenia	66 (22.0)	24 (27.3)
	Schizophrenia	9 (3.0)	3 (3.4)
	Schizoaffective disorders	12 (4.0)	6 (6.8)
	Schizoaffective disorders	4 (1.3)	0 (0)
	Brief Psychotic disorder	32 (10.7)	12 (13.6)
	Delusional disorder	5 (1.7)	1 (1.1)
	Psychosis NOS		
2	Others		
	Affective spectrum disorders -	131 (43.7)	30 (34.1)
	Affective spectrum disorders -	35 (11.7)	10 (11.4)
	Major depressive disorder	89 (29.7)	20 (22.7)
3	Bipolar disorder	7 (2.3)	0 (0)
	Others		
	Neurotic disorders -	14 (4.7)	2 (2.3)
4	Obsessive compulsive disorder	8 (2.7)	2 (2.3)
	Obsessive compulsive disorder	6 (2)	0 (0)
5	Others		
	Alcohol use disorders	16 (5.3)	2 (2.3)
6	Idiopathic Catatonia	3 (1.0)	3 (3.4)
	Organic disorders	3 (1.0)	2 (2.3)
7	Postpartum psychosis	3 (1.0)	2 (2.3)
	Intellectual disability disorder	2 (0.6)	1 (1.1)

## 3. Results

The study sample included 300 patients admitted across all the inpatient wards. There were 161 (53.7%) females and 139 (46.3%) males in the study sample. The mean age of the sample was  $34.98 \pm 11.81$  years and included patients in the range of 18–81 years. In terms of socioeconomic status, 170 (56.7%) patients belonged to lower socioeconomic status and 130 (43.3%) patients belonged to middle socioeconomic status. Median duration of the primary psychiatric illness was 36.0 months (Range: 1–384 months). Mean age of onset of the primary psychiatric illness was  $28.97 \pm 11.48$  years. 54 patients (18.0%) had comorbid medical illness. Among the 300 patients recruited, the predominant diagnosis were psychotic spectrum disorders (128, 42.6%) and affective spectrum disorders (131, 43.6%). Here, psychotic spectrum refers to schizophrenia, schizoaffective, brief psychotic disorder, psychosis NOS and delusional disorder. Affective spectrum includes bipolar affective disorder and depressive disorders. The remaining patients belonged to other diagnosis as mentioned in the Table 1. Among the 300 patients, 43 (14.3%) patients had received lorazepam and 9 (3.0%) patients received ECT before examination for the study. 24 (8.0%) patients had exhibited catatonic signs in the past. Interrater reliability for both BFCRS and NCS with ICC (Intraclass Correlation Coefficient) value of 0.98 and 0.93 respectively indicated adequate inter-rater reliability. When catatonic signs or syndrome were identified by the researcher in a recruited patient, the treating clinician was immediately notified of the same for further care.

Among the 300 patients recruited for the study, 88 (29.3%) showed at least one catatonic sign in either of the rating scales. The prevalence of at least one catatonic sign as per BFCRS and NCS was 80 (26.7%) and 86 (28.7%) respectively. Among the 88 patients who showed at least one catatonic sign, 49 (55.7%) patients were females and 39 (44.3%) were males. The mean age in this group was  $32 \pm 12.11$  years and the median duration of the primary psychiatric illness was 24 months (Range: 1–300). Among these, 14 (15.9%) patients had co-morbid medical illness and another 14 (15.9%) patients had catatonic signs in the past. In the catatonic group, the predominant diagnoses were psychotic spectrum disorder (46, 52.3%) and affective spectrum disorder

**Table 2**  
Correlation of clinical variables with BFCRS scores.

Age in years	Pearson's r	-.165
	Sig. (2-tailed)	.004
Age of onset (in years)	Pearson's r	-.040
	Sig. (2-tailed)	.488
Duration of illness (in months)	Pearson's r	-.228
	Sig. (2-tailed)	.000
Past catatonic signs	Pearson's r	.223
	Sig. (2-tailed)	.000
	Sig. (2-tailed)	

(30,34.1%), further illustrated in Table 1. The mean duration of primary psychiatric illness was significantly less in the catatonic group (37.57 ± 57.20 months) compared to the non-catatonic group (77.82 ± 77.84; p = 0.001). The catatonic group had significantly lower mean age in years (31.9 ± 11.02) compared to non-catatonic group (35.68 ± 11.85; p = 0.02). Correlation analysis showed that younger the age, the more severe were the catatonic signs (r = -0.16; p = 0.004). Earlier in the course of the primary psychiatric illness, severity of the catatonia was more (r = -0.22; p = 0.000). The presence of catatonic signs in the past were positively correlated with severity of the catatonia in the present admission (r = 0.22; p = 0.000). This is summarized in Table 2.

The most frequent signs in BFCRS were staring (43; 52.5%), withdrawal (36; 45%), mutism (32; 40%), posturing/catalepsy (28; 35%), excitement (20; 25%), stupor/immobility (18; 22.5%) and rigidity (18; 22.5%). We did not find combativeness in our sample. In NCS, the frequent signs were withdrawal/autism (33; 38.4%), flat affect (32; 37.2%), mutism (31; 36.0%), posturing (22; 25.6%) and rigidity (19; 22.1%). We did not find festination, athetotic movements, dyskinesia, muscular hypotonus, compulsive emotions, compulsive behavior and loss of initiative in our sample.

As per the diagnostic cut-off defined by BFCRS and NCS, the prevalence of catatonia syndrome was 49 (16.3%) and 32 (10.6%) respectively. Presence of two signs from amongst the first 14 items in BFCRS and presence of one symptom from each of the motor, affective and behavioral categories of the NCS are diagnostic cutoffs for the respective scales. As illustrated in Table 3, when considering the catatonia syndrome, the most frequent catatonic signs in BFCRS were withdrawal (32; 65.3%), staring (31; 63.3%), mutism (30; 61.2%), posturing/catalepsy (27; 55.1%), stupor (17; 34.7%), rigidity (16; 32.7%) and excitement (14; 28.6%). Whilst with respect to NCS, when considering the catatonia syndrome, the most frequent signs were withdrawal (23; 71.9%), mutism (21; 65.6%), posturing (20; 62.5%), staring (19; 59.4%), flat affect (16; 18.8%), rigidity (14; 43.8%) and catalepsy (11; 34.4%) as summarized in Table 3.

Out of the 128 patients with psychotic spectrum disorder, 46 (35.9%) patients had at least one catatonic sign and among the 131 patients with affective spectrum disorder, 30 (22.9%) had at least one catatonic sign. Between the spectrum disorders, Stereotypies, gegenhalten, waxy flexibility, automatic obedience, and autonomic abnormality as measured in both rating scales were noted only in the psychotic spectrum and were absent in the affective spectrum. Perseveration was noted in 5 (10.9%) patients with psychotic spectrum disorder while in affective spectrum disorder only 1 (3.3%) had perseveration. Withdrawal, posturing, staring and rigidity was noted more frequently in psychotic spectrum disorder compared to affective spectrum disorder as measured by both scales. Excitement was significantly present more often in affective spectrum disorders (p = 0.03) while, mutism and withdrawal were significantly in higher frequency in the psychotic spectrum disorders (p = 0.02).

Among the 49 patients having catatonia syndrome as per BFCRS, 27 (55.1%) patients had psychotic spectrum disorders while 16 (32.7%) had affective spectrum disorders and 2 (4.1%) patients each in

**Table 3**  
Frequencies of BFCRS / NCS items in the catatonic syndrome patients.

Sl. No	Catatonic signs and symptoms*	Frequency as per BFCRS (n = 49) (%)	Frequency as per NCS (N = 32) (%)
1	Mannerism	2 (4.1)	2 (6.3)
2	Stereotypy	6 (12.2)	4 (12.5)
3	Festination	NA	0 (0.0)
4	Athetotic movements	NA	0 (0.0)
5	Dyskinesias	NA	0 (0.0)
6	Gegenhalten	5 (10.2)	7 (8.1)
7	Posturing	27 (55.1)	20 (62.5)
8	Catalepsy	NA	11 (34.4)
9	Flexibilitas cerea	4 (8.2)	4 (12.5)
10	Rigidity	16 (32.7)	14 (43.8)
11	Muscular hypotonus	NA	0 (0.0)
12	Tone alterations	NA	2 (6.3)
13	Akinesia	NA	1 (3.1)
14	Compulsive emotion	NA	0 (0)
15	Emotional lability	NA	0 (0)
16	Impulsivity	8 (16.3)	6 (18.8)
17	Aggression	NA	1 (3.0)
18	Excitement	14 (28.6)	6 (18.8)
19	Affect-related behavior	NA	2 (6.0)
20	Flat affect	NA	16 (50.0)
21	Affective latence	NA	0 (0)
22	Anxiety	NA	1 (3.1)
23	Ambivalence (ambitendency)	9 (18.4)	8 (25.0)
24	Staring	31 (63.3)	19 (59.4)
25	Agitation	NA	5 (15.6)
26	Grimacing	4 (8.2)	1 (3.1)
27	Verbigerations	2 (4.1)	2 (6.3)
28	Perseveration	4 (8.2)	5 (15.6)
29	Compulsive speech	NA	2 (6.3)
30	Abnormal speech	NA	1 (3.1)
31	Automatic obedience	1 (2.0)	1 (3.1)
32	Echolalia/Echopraxia	2 (4.1)	2 (6.3)
33	Mitgehen	8 (16.3)	6 (18.8)
34	Compulsive behaviour	NA	0 (0)
35	Negativism	8 (16.3)	6 (18.8)
36	Withdrawal	32 (65.3)	23 (71.9)
37	Mutism	30 (61.2)	21 (65.6)
38	Stupor	17 (34.7)	5 (15.6)
39	Loss of initiative	NA	0 (0)
40	Vegetative/autonomic abnormality	5 (10.2)	5 (15.6)
41	Grasp reflex	1 (2.0)	NA
42	Combativeness	0	NA

postpartum psychosis and organic disorder categories. Two (4.1%) patients had catatonia without any primary psychopathology. Among the 32 patients who had catatonia syndrome as per NCS diagnostic cut-off, 21 (65.6%) patients had psychotic spectrum disorder, 7 (21.9%) patients had affective spectrum disorder, 2 (6.3%) patients had postpartum psychosis, 1 (3.1%) patient had idiopathic catatonia and 1 (3.1%) patient had organic disorder.

We also applied the DSM 5 and ICD 10 diagnostic criteria in the same sample and the prevalence rate was 5.3% and 19.0% respectively (The ICD-10 Classification of Mental and Behavioural Disorders Clinical descriptions and diagnostic guidelines, 2019; American Psychiatric Association, 2013).

#### 4. Discussion

The prevalence of catatonia syndrome in this study was 19% with ICD-10 diagnostic criteria and with BFCRS, NCS and DSM-5 criteria it was 16%, 10% and 5% respectively. This variation in the rate of catatonia in the same population is due to the different diagnostic cut-offs of: one out of seven signs (ICD-10), two out of first 14 signs (Bush Francis Catatonia Screening Instrument: BFCRS), one each from the 3 groups (NCS) and 3 out of 12 signs (DSM-V). In a similar study conducted in India, the diagnostic pickup was maximum with BFCRS

(10.3%) followed by ICD-10 (10.3%) and DSM-5 (6.9%) (Sarkar et al., 2016). This variation could possibly be explained by the fact that the two commonest catatonic signs noted in our study, staring and withdrawal (as per BFCRS and NCS), are not listed as catatonic signs in the ICD-10. Additionally, the larger sample size of our study could have allowed for these differences. Catatonia syndrome in our study was over-represented in psychotic spectrum disorders in comparison to affective spectrum disorders. This is consistent to a study from western India which also reported that catatonia syndrome was more common in the schizophrenia (13.6%) than in bipolar disorder (6.6%) (Seethalakshmi et al., 2008). It is pertinent to note at this point, that a study from a tertiary hospital in north India reported that even while using broad definitions of catatonic symptoms, only 3.9% of the 332 schizophrenia patients were observed to have catatonic symptoms (Sood, 2019). Previous studies examining the prevalence of catatonia have shown that prevalence ranges from 7% to 18% and there is difference in prevalence rate based on the method of evaluation and setting of the study (Chalasanani et al., 2005; Abrams and Taylor, 1976; Rosebush et al., 1990; Lee et al., 2000; Ungvari et al., 2010; Van Der Heijden et al., 2005; Bush et al., 1996). The prevalence was more in acute inpatient care and emergency settings (Lee et al., 2000). In this study too, we have examined catatonic signs within 24 h of admission i.e., in the acute phase of the illness. However, compared to the similar studies that have evaluated catatonic syndrome among in-patients in the acute phase of the illness, the prevalence rate in our study was higher (Seethalakshmi et al., 2008; Sarkar et al., 2016). The larger sample size (N = 300) and longer study period (12 months) possibly allows for more generalizability to psychotic and affective spectrum disorders. In a recent meta-analysis, the mean prevalence rate was 9.0% and the prevalence rate in various studies conducted between 1935 to 2016 ranged from 0.1% to 71 percent. The prevalence rate of at least one catatonic sign and symptom in the current study was 29.33%. The prevalence rate of at least one catatonic sign and symptom as per BFCRS was 26.66% and as per NCS was 29.33%. This variation in prevalence in the same population between two rating scales is because NCS has 40 catatonic signs which includes almost all the 23 signs given in BFCRS and it includes 13 affective signs which are not in BFCRS. A previous study conducted in a psychiatric intensive ward that used the BFCRS showed that 77.7% had at least one catatonic sign (Stuivenga and Morrens, 2014). Looking at the prevalence of at least one catatonic sign is important in many ways because - 1) there are no common agreed criteria for catatonia, 2) there are different diagnostic cut-offs used by different scales and classificatory systems, 3) there are studies showing different diagnostic cut offs for the same instrument, 4) catatonia is significantly under diagnosed in the clinical setting.

The most common catatonic signs noted in BFCRS were staring in 43 (52.5%), withdrawal in 36 (45.0%), and as per NCS were withdrawal/autism in 36 (41.9%) staring in 33 (38.4%), mutism in 31 (36.0%), posturing in 22 (25.6%) and rigidity in 19 (22.1%). Previous studies also show similar findings in terms of common catatonic signs (Chalasanani et al., 2005; Grover et al., 2015). The frequency of the same catatonic sign was different in two scales due to the different definitions for the same catatonic sign in the two scales. For example, the rate of staring was 52.5% in BFCRS and 38.4% in NCS as NCS uses a more stringent criteria to define staring (minimum 20 s without blinking) as compared to BFCRS (poor eye contact and at least 10 s without blinking) (Bush et al., 1996; Northoff et al., 1999). Interestingly, despite variations in these definitions, staring, withdrawal, mutism and posturing were within the top five commonest signs in our group on both, the BFCRS and NCS. The high frequency of the above also gives insights into role of the GABAergic system in the pathophysiology of catatonia (Ellul and Choucha, 2015; Plevin et al., 2018).

The two most frequently noted signs in our study, staring and withdrawal, were the same in BFCRS (52.5%; 45.0%) and NCS (38.4%; 41.9%), but not listed as signs in either the ICD-10 or DSM-5. Staring has been reported as one of the most prevalent catatonic signs and its

inclusion in diagnostic criteria has been therefore deemed necessary (Wilson et al., 2015).

Younger age group, shorter duration of primary psychiatric illness and prior episodes of catatonia are associated with a greater severity of catatonic syndrome. The presence of these features necessitate evaluation for catatonic signs.

The concept of idiopathic catatonia, where patient presents with only catatonia without any primary psychiatric symptoms has been described in literature (Benegal et al., 1993) and in our study 3 patients (2%) out of the 46 patients had idiopathic catatonia. Catatonia in postpartum women has been reported to be as high as 20% (Nahar et al., 2017); in the current study we identified 2 of 3 postpartum women who had catatonic signs. In this study, catatonic signs were also noted in organic conditions (2%) and as reported in a meta-analysis the prevalence of catatonia was most common in medical settings than psychiatric settings (Solmi et al., 2017). Strengths of the study include random selection of patients and statistical calculation of sample size to represent the actual population, systematic examination of catatonic signs and symptoms using two standard rating scales and excellent inter-rater reliability for the scales. Limitations are - the study did not include patients from the emergency psychiatric services and consecutive admissions during the study period were not evaluated for catatonic signs. The study has not examined the association of medications with catatonic signs. It is also possible that some catatonic signs may have resolved in some patients because of them having received lorazepam or ECT, despite the examination within 24 h of admission into inpatient units, although the same would possibly suggest the existence of higher prevalence rates of catatonic signs and syndrome in our study population, given the benefits of lorazepam and ECT in catatonia.

## 5. Conclusions

This study shows that catatonic syndrome prevalence rates vary from 5 to 19% in the same population based on tools or classificatory system criteria used. Critically, objective tools, such as the BFCRS, may identify signs not listed in classificatory system criteria but are common in the acute setting. This could lead to the presence of catatonic syndrome being overlooked in acutely ill psychiatric patients, thereby affecting timely management. Younger age, shorter primary psychiatric illness duration and prior episodes of catatonia may also result in more severe catatonic syndromes and may be possible indicators for evaluating such patients in detail for catatonic syndrome. The need for uniform definitions of catatonic signs, uniform diagnostic criteria for catatonia would allow for its accurate detection and treatment as well as enhance the understanding of the pathophysiological basis of catatonia.

## Author's contribution

All authors have made substantial contributions to all of the following: (1) the conception and design of the study, acquisition of data, analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

## Financial disclosure

None.

## Data sharing statement

Deidentified individual participant data will not be made available.

## Declaration of Competing Interest

None.

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