

# Evaluation of Catatonia with Different Assessment Scales in Psychiatry and Neurology



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## ABSTRACT

**Objective:** Catatonia is a syndrome that can be missed in clinical settings. Diagnosis of catatonia is important because the condition can be reversible and is associated with severe complications. This study aims to screen patients with catatonia admitted to a university hospital's psychiatry and neurology services, examine their characteristics, and compare the coverage of different catatonia scales.

**Method:** During a consecutive 20 months-long study period, the Turkish adaptations of the Bush-Francis Catatonia Rating and the KANNER scales, were administered in psychiatry and neurology inpatient units and patients on the waiting list for psychiatric hospitalization. The participants were also evaluated with DSM-5 criteria. In addition, the sociodemographic and clinical characteristics of the patients in the psychiatric group were compared.

**Results:** A total of 214 patients were evaluated. Twenty-eight (13.1%) screened positive for catatonia, and 23 (82.1%) were diagnosed with catatonia according to DSM-5 criteria. KANNER and Bush-Francis identified the same patients as having catatonia. In addition to schizophrenia and mood disorders; neurodevelopmental disorder, encephalitis, postpartum psychosis, obsessive-compulsive disorder, delirium, cerebrovascular disease, functional neurological symptom disorder have also been found to be associated with catatonia. The most common complication was urinary tract infection. Life-threatening complications were also observed.

**Conclusion:** Overlooking catatonia may have dire consequences. Adhering solely to the DSM-5 criteria may miss some patients with catatonia. Widely and efficiently using standardized catatonia scales can improve detection capacity and enhance the management of morbidity and mortality.

**Keywords:** Catatonia, Psychiatric Status Rating Scales, Diagnosis, Neurology, Mental Disorders, Mood Disorders, Neurodevelopmental Disorders, Psychotic Disorders, Schizophrenia

## INTRODUCTION

Catatonia is a psychiatric syndrome first described in 1874. This syndrome is characterized by disturbances in motor functions in addition to mood and thought disorders. It is characterized by symptoms and signs such as mutism, negativism, posturing, rigidity, and staring. Catatonia can be observed in various psychiatric disorders such as major depression, bipolar affective disorder, schizophrenia, and organic disorders, as well as in various neurological and internal diseases (Francis 2010, Tandon et al. 2013).

Catatonia is generally reversible when treated with benzodiazepines and electroconvulsive therapy (ECT). However, if not diagnosed and treated promptly, it can lead to serious medical complications. Awareness among clinicians about catatonia affects the prognosis of the illness (Clinebell et al. 2014), and with the help of valid and reliable assessment scales, catatonia can be more easily detected. In their study using the Bush-Francis Catatonia Rating Scale (BFCRS), which is widely regarded as the gold standard for catatonia assessment, Wortzel and colleagues (2021) revealed significant shortcomings in the ability of psychiatrists, psychiatry

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educators, and medical students to recognize catatonia. In their study, 482 participants could correctly answer only 55% of the test questions and could identify 69% of the BFCRS items. An important conclusion that can be drawn from this study is that continuous education is necessary for the application of standardized catatonia scales.

Since catatonia can lead to various complications, it is crucial to promptly diagnose this condition and provide appropriate treatment. Immobility and refusal to eat/drink observed in catatonia patients can lead to complications such as dehydration, malnutrition, deep vein thrombosis, pulmonary embolism, pneumonia, decubitus ulcer, other infections, and muscle contractures (Clinebell et al. 2014, Rasmussen et al. 2016). Moreover, in prolonged catatonia cases, sudden deaths can occur, especially after the second week (Rajagopal 2007, Yazıcı 2018). While various studies report varying rates, it is believed that catatonia is present in 7-38% of patients treated in psychiatric inpatient units and emergency departments and in more than 10% of patients admitted to psychiatric wards (Fink and Taylor 2009). In a meta-analysis conducted by Solmi and colleagues (2018), the average prevalence of catatonia among patients with various psychiatric or medical illnesses was reported to be 9.2%.

In this study, we planned to screen and examine catatonia in a university hospital's psychiatry and neurology inpatient unit patients and compare different tools that can be used for this purpose. To that end, two standardized catatonia scales and DSM-5 were used. In addition, sociodemographic and clinical features, along with complications associated with catatonia, were also examined.

## METHODS

This study is based on the dissertation of the first author, Dr. Ibrahim Mert Erdogan. The first publication based on this dissertation was previously published in the Turkish Journal of Psychiatry (Erdogan et al. 2022). In our study, the aim was to evaluate all patients admitted to the Hacettepe University Faculty of Medicine's psychiatry and neurology inpatient units for catatonia over a consecutive one-year period from the beginning of the study. However, due to the COVID-19 pandemic and hospital regulations, there were changes in the sample and duration of the study. All patients who were admitted to or put on the waiting list for the psychiatry inpatient unit and all patients admitted to the neurology inpatient unit between December 2019 and March 2020 were invited to participate in the study. Patients who signed the informed consent form were included in the study. Among the 225 patients invited to the study, 11 did not provide consent to participate. The sample included a total of 214 patients, consisting of 141 psychiatric patients and 73 neurology patients. Age, gender, and main diagnosis

information were collected for all patients and presented in Table 1. More detailed sociodemographic and clinical data were collected for patients admitted to or on the waiting list for the psychiatry inpatient unit, and these data are presented in Table 2. In addition, the number of days spent with catatonia and the status of complications were collected by reviewing the discharge summaries and clinical observations of patients who screened positive for catatonia.

Patients who had some neurological conditions that could prevent them from being accurately evaluated for certain catatonia symptoms were evaluated for other catatonia symptoms. For example, patients with aphasia were not scored for mutism, but other catatonia symptoms were examined in these patients.

This study is a cross-sectional descriptive study. The design and purpose of the study were evaluated and approved by the Hacettepe University Non-Interventional Clinical Research Ethics Committee (Registration number: GO 19/423). The study was conducted according to the Declaration of Helsinki.

The statistical analysis was conducted using the SPSS 23 software package (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.). Descriptive statistics were presented as counts and percentages for categorical variables and as mean  $\pm$  standard deviation for numerical variables. The significance level was set at  $p < 0.05$ .

### Scales and Criteria Used

**Bush Francis Catatonia Rating Scale:** In the assessment of catatonia, this is the most widely used scale worldwide, with the highest number of validity and reliability studies conducted. This scale, developed by George Bush and his colleagues, incorporates catatonia features from classification systems such as DSM and ICD, in addition to the definitions of researchers like Kahlbaum and Kraepelin. This scale consists of 23 items, and each item is scored on a scale of 0 to 3 points. The scale is supported by a standardized examination (Bush et al. 1996, Sienaert et al. 2011). The first 14 items in the scale make up the screening section of the scale. In the screening section, items are indicated as "present" or "absent". It is believed that the presence of 2 or more of these items for 24 hours or longer facilitates the detection of catatonia in patients. It has been reported that both the screening section and the section covering non-screening items of the scale demonstrate high reliability among assessors (Bush et al. 1996, Bush et al. 1997, Sienaert et al. 2011). The Turkish validity and reliability study of this scale has been previously published in the Turkish Journal of Psychiatry (Erdogan et al. 2022).

**Table 1.** Sociodemographic and Clinical Characteristics of the Sample

	Total Sample (n=214)	Patients Who Screened Positive for Catatonia (n=28)
Characteristics		
Male/Female	102/112	18/10
Age±Standard Deviation, Years	44.1±18.6	39.75±19.7
Main Diagnosis	149	25
Psychiatric Disorders		
Psychotic Disorders		
Schizophrenia	40	8
Schizoaffective Disorder	37	7
Postpartum Psychosis	2	0
	1	1
Mood Disorders		
Major Depression	64	11
Bipolar Affective Disorder	30	2
	34	9
Anxiety Disorders		
General Anxiety Disorder	2	0
Specific Phobia	1	0
Obsessive Compulsive Disorder	1	0
	5	1
Neurodevelopmental Disorders		
Attention Deficit/Hyperactivity Disorder	6	3
Autism Spectrum Disorder	1	0
Tic Disorders	5	3
	1	0
Somatic Symptom and Related Disorders		
Functional Neurological Symptom Disorder	13	1
Factitious Disorder	12	1
Anorexia Nervosa	1	0
	5	0
Substance-Related Disorders		
Alcohol Use Disorder	5	0
Opioid Use Disorder	4	0
Borderline Personality Disorder	1	0
	2	0
Neurocognitive Disorders		
Alzheimer's Disease	6	1
Frontotemporal Lobar Degeneration	4	0
Delirium	1	0
General Psychiatric Examination	1	1
	1	0
Neurologic Diseases		
Cerebrovascular Diseases	65	3
Neuromuscular Disorders	10	1
Demyelinating Disorders	9	0
Headache	13	0
Extrapyramidal and Movement Disorders	2	0
Polyneuropathies and Peripheral Nervous System	14	0
Epilepsy	7	0
Autoimmune Encephalitis	3	0
Optic Neuritis	5	2
	2	0

**Table 2.** Comparative Sociodemographic and Clinical Characteristics of Patients Admitted to or Put on the Waiting List for the Psychiatry Inpatient Unit Who Screened Positive and Negative for Catatonia

	Patients Who Screened Positive for Catatonia (N=26)	Patients Who Screened Negative for Catatonia (N=115)	Rate of Screened Positive for Catatonia (%)	p value
Gender				0.245
Female	9(34.6%)	57(49.6%)	13.6	
Male	17(65.4%)	58(50.4%)	22.7	
Main Diagnosis				
Psychotic Disorders	8(30.8%)	30(15.4%)	21.1	0.631
Mood Disorders	11(42.3%)	55(28.2%)	16.7	0.610
-Bipolar Affective Disorder	9(34.6%)	25(21.7%)	26.5	0.179
-Major Depression	2(7.7%)	30(26.1%)	6.3	0.027
Neurodevelopmental Disorders	3(11.5%)	3(2.6%)	50.0	0.072
Autoimmune Encephalitis	1(3.8%)	1(0.9%)	50.0	0.065
Other	3(11.4%)	25(21.7%)	10.7	0.215
Age				0.321
18-39	17(65.4%)	58(50.4%)	22.7	
40-64	6(23.1%)	45(39.1%)	11.8	
65<	5(19.2%)	12(10.4%)	29.4	
Education				0.726
Undereducated	1(3.8%)	6(5.2%)	14.3	
Elementary	8(30.8%)	25(21.7%)	24.2	
High school	12(46.2%)	53(46.1%)	18.5	
Higher education	5(19.2%)	31(27%)	13.9	
Marital Status				0.172
Single	17(65.4%)	53(46.1%)	24.3	
Married	8(30.8%)	45(39.1%)	15.1	
Divorced	1(3.8%)	13(11.3%)	7.1	
Widowed	0(0%)	4(3.5%)	0	
Employment				0.434
Unemployed	16(61.5%)	78(67.8%)	17.0	
Employed	7(26.9%)	17(14.8%)	29.2	
Student	1(3.8%)	11(9.6%)	8.3	
Retired	2(7.7%)	9(7.8%)	18.2	
Smoking				0.766
Non-smoker	15(57.7%)	50(43.4%)	21.1	
Smoker	11(42.3%)	65(56.5%)	14.5	
Alcohol Use				0.311
No	24(92.3%)	98(85.2%)	20.1	
Yes	2(7.7%)	17(14.8%)	10.5	
Family History of Psychiatric Disorders				0.512
No	13(50%)	70(60.9%)	15.7	
Yes	13(50%)	45(39.1%)	22.4	
-Mood Disorders	2(46.2%)	19(42.2%)	38.7	
-Psychotic Disorders	1(3.8%)	11(24.4%)	8.3	
Medical History				0.941
Not determined	14(53.8%)	61(53%)	18.7	
Determined	12(46.2%)	54(47%)	18.2	
-Past history of Catatonia	5(19.2%)	0(0%)	100.0	0
-Hypertension	4(15.4%)	18(15.7%)	18.2	0.973
-Diabetes Mellitus	2(7.7%)	11(9.6%)	15.4	0.761
-Hypothyroidism	1(3.8%)	10(8.7%)	9.1	0.368
-Asthma/COPD	0(0%)	9(7.8%)	0	0.051
-Coronary Artery Disease	3(11.5%)	5(4.3%)	37.5	0.190

**Table 3.** Sociodemographic and Clinical Characteristics of Patients Who Screened Positive for Catatonia in the Scale Assessment

Patients age/ gender/main diagnosis	BFCRS Screening	KANNER Screening	DSM-5	Treatments	Days Spent with Catatonia	Complication Status	Symptoms
22/M/OCD	+	+	+	LOR, ECT, IVIG	60	Epileptic seizure	Catalepsy, immobility, stupor, mutism, negativism, posturing, stereotypy, staring, withdrawal, ambitendency, perseveration, incontinence (psychogenic)
25/M/SCH	+	+	+	LOR, ECT	150*	-	Catalepsy, waxy flexibility, posturing, rigidity, automatic obedience
42/F/SCH	+	+	+	LOR, ECT	7	-	Catalepsy, waxy flexibility, mutism, staring, automatic obedience, mitgehen
18/M/AE	+	+	-	LOR, ECT, IVIG, rituximab	20	Neuroleptic malignant syndrome	Excitement, echopraxia, impulsivity, perseveration, combativeness
19/M/SCH,AE	+	+	+	LOR, ECT, IVIG, rituximab	42	-	Catalepsy, waxy flexibility, mutism, negativism, mannerism, stereotypy, echolalia, staring, impulsivity, automatic obedience, mitgehen, autonomic abnormality
42/F/BAD	+	+	+	LOR, ECT	7	-	Mutism, negativism, mannerism, immobility, staring, withdrawal, automatic obedience
22/M/SCH	+	+	+	LOR	15	-	Negativism, stereotypy, grimacing, withdrawal
41/M/OSD	+	+	+	LOR	2	-	Waxy flexibility, immobility, stupor, excitement, mutism, negativism, posturing, mannerism, stereotypy, staring, verbigeration, rigidity, withdrawal, grasping, perseveration, combativeness
81/M/MD	+	+	+	LOR, ECT	35	Pneumonia, malnutrition, urinary tract infection	Mutism, negativism, grimacing, immobility, rigidity, withdrawal, gegenhalten
18/M/SCH	+	+	+	LOR, ECT	21	Acute renal failure	Catalepsy, waxy flexibility, immobility, stupor, mutism, negativism, posturing, staring, automatic obedience, ambitendency
24/M/BAD	+	+	+	LOR, ECT	3	-	Catalepsy, waxy flexibility, immobility, stupor, mutism, negativism, stereotypy, staring, verbigeration, rigidity, withdrawal, mitgehen, grasping
25/M/BAD	+	+	+	LOR	5	-	Catalepsy, waxy flexibility, immobility, stupor, excitement, negativism, posturing, mannerism, stereotypy, grimacing, echolalia, staring, verbigeration, rigidity, withdrawal, impulsivity, mitgehen, gegenhalten, grasping, perseveration, combativeness
51/F/BAD	+	+	+	LOR	3	-	Mutism, negativism, mannerism, stereotypy, echolalia, verbigeration, withdrawal, mitgehen, gegenhalten
61/F/BAD	+	+	+	LOR, ECT	16	-	Mutism, negativism, mannerism, echolalia, withdrawal
30/M/SCH	+	+	+	LOR, ECT	15	-	Catalepsy, waxy flexibility, mutism, mannerism, echolalia, staring, verbigeration, withdrawal, impulsivity, automatic obedience, mitgehen, ambitendency
32/F/BAD	+	+	+	LOR	5	-	Excitement, mutism, negativism, stereotypy, immobility, staring, verbigeration, combativeness
39/F/BAD	+	+	+	LOR, ECT	3	Urinary tract infection, malign catatonia	Catalepsy, excitement, posturing, immobility, staring, rigidity
25/K/PPP	+	+	+	LOR, ECT	4	Deep vein thrombosis	Stupor, mutism, posturing, immobility, staring, withdrawal, flaccidity
28/M/MD	+	+	-	LOR	1	-	Excitement, negativism, staring, verbigeration, impulsivity, perseveration
65/M/SCH	+	+	+	LOR	2	-	Catalepsy, immobility, stupor, mutism, negativism, posturing, staring, withdrawal, incontinence (psychogenic)
36/M/FNSD	+	+	-	Memantine	14	-	Mutism, staring, automatic obedience
35/F/BAD	+	+	+	LOR	10	-	Mutism, negativism, posturing, immobility, staring, withdrawal, automatic obedience
31/F/ASD	+	+	-	LOR, ECT	10	Urinary tract infection	Echolalia, staring, verbigeration, impulsivity, automatic obedience, mitgehen, perseveration
46/M/BAD	+	+	+	LOR	4	-	Catalepsy, excitement, negativism, posturing, verbigeration, impulsivity, automatic obedience, combativeness
74/F/AE	+	+	+	-	17	-	Excitement, negativism, echolalia, verbigeration, automatic obedience, gegenhalten, grasping, perseveration
81/M/CVD	+	+	+	-	5	Decubitus ulcer, urinary tract infection, delirium	Immobility, stupor, mutism, grimacing, staring, rigidity, withdrawal, grasping, autonomic abnormality
26/M/ASD	+	+	-	LOR	20*	-	Excitement, stereotypy, echolalia, staring, verbigeration, withdrawal, impulsivity
74/M/Delirium, Pneumonia	+	+	+	-	10	Malnutrition, sepsis	Waxy flexibility, stupor, mutism, immobility, withdrawal, gegenhalten, autonomic abnormality

M: Male, F: Female, ASD: Autism Spectrum Disorder, OCD: Obsessive-Compulsive Disorder, AE: Autoimmune Encephalitis, SCH: Schizophrenia, BAD: Bipolar Affective Disorder, MD: Major Depression, PPP: Postpartum Psychosis, FNSD: Functional Neurological Symptom Disorder, CVD: Cerebrovascular Disease, LOR: Lorazepam, ECT: Electroconvulsive Therapy, N/A: Not available.

\*: It has been determined in the file reviews of these patients that catatonic symptoms persisted, and they also screened positive for catatonia in their final assessments.

**Table 4.** Symptoms of Patients Who Screened Positive for Catatonia in the Scale Assessment But Were not Diagnosed with Catatonia According to DSM-5

Patients Age, Gender, Main Diagnosis	DSM-5	Scales
18, Male, Autoimmune Encephalitis	Agitation, echopraxia	Excitement, echopraxia, impulsivity, perseveration, combativeness
28, Male, Major Depression	Agitation, negativism	Excitement, mutism, staring, verbigeration, negativism, impulsivity, perseveration
36, Male, Functional Neurological Symptom Disorder	Mutism	Mutism, staring, automatic obedience
31, Female, Autism Spectrum Disorder	Echolalia	Excitement, echolalia, staring, verbigeration, impulsivity, automatic obedience, mitgehen
26, Male, Autism Spectrum Disorder	Stereotypy, echolalia	Excitement, staring, echolalia, stereotypy, verbigeration, withdrawal, impulsivity

**KANNER Scale:** This scale, developed by Brendan Carroll and his colleagues, is the most recently developed scale for assessing catatonia. While initially developed to evaluate catatonia in autism, it now has a broader range of applications. It consists of three sections. The first section is used as the screening section, and if 2 or more items are detected in this section, the second and third sections of the scale are administered. In the second section, the 18 symptoms are scored on a scale of 0-8, while in the third section, the 12 items are rated on a scale of 0-1 (Carroll et al. 2008). The Turkish validity and reliability study was conducted in conjunction with the Bush-Francis Catatonia Rating Scale (Erdoğan et al. 2022).

**DSM-5 Catatonia Diagnostic Criteria:** In the DSM-5, published by the American Psychiatric Association in 2013, catatonia is included as a specifier that can be added to 10 major diagnoses. It is seen as a partially independent syndrome but has not been added as a separate diagnosis. To diagnose catatonia, it is specified that at least 3 of the 12 criteria for catatonia must be present.

In our study, the Bush Francis Catatonia Rating Scale, the KANNER Scale, and the DSM-5 Catatonia Diagnostic Criteria were administered to patients by the first author.

## RESULTS

The majority of the sample (n=141, 65.89%) consisted of patients with psychiatric disorders. Of the patients who had two or more symptoms on both the Bush-Francis Catatonia Rating Scale and the KANNER Scale's screening section and screened positive for catatonia, 25 had psychiatric disorders, and 3 had neurological diseases. In the assessment with both scales, catatonia was identified in 28 patients (13.1%). Both the BFCRS and KANNER Scales identified the same patients as having catatonia. Clinical data related to these patients are presented in Table 3. Additionally, among patients with psychiatric disorders (n=3), and among those with neurological diseases (n=2), sub-threshold symptoms were

detected, even though they screened negative for catatonia in the scale assessment.

Complications associated with catatonia were observed in nearly 30% (n=9) of the patients who screened positive for catatonia in the scale assessment. While urinary tract infection (n=4) was the most common complication associated with catatonia, life-threatening complications such as malignant catatonia and neuroleptic malignant syndrome were also observed. In the entire sample, a diagnosis of catatonia according to DSM-5 was given to 16.3%, and among the 28 patients who screened positive for catatonia, 82.1% received a diagnosis of catatonia according to DSM-5, while it was not diagnosed in 5 patients.

The clinical data for these patients and their symptoms are provided in Table 4. Four of these patients had psychiatric disorders, and one had a neurological condition. Among the 3 patients who screened positive for catatonia in the scale assessment, a diagnosis of neurodevelopmental disorder was made, but only 1 of them received a diagnosis of catatonia according to DSM-5.

## DISCUSSION

This study aimed to screen and evaluate patients admitted to the psychiatry and neurology inpatient clinics of a university hospital for catatonia using two standardized scales and DSM-5 Diagnostic Criteria for Catatonia. Both the BFCRS and KANNER Scales were compared with the DSM-5 Diagnostic Criteria for Catatonia. The findings indicated that the number of patients who screened positive for catatonia in the scale assessments was higher than those diagnosed with catatonia according to DSM-5. This suggests that the DSM-5 Catatonia Diagnostic Criteria are more restrictive compared to standardized catatonia scales and are in line with previous literature (Wilson et al. 2015, Sarkar et al. 2016). One reason for this limitation may be that the DSM-5 criteria do not include significant items such as staring, verbigeration, and automatic obedience (see Table 4). Additionally, although

the sample size in this study is not adequate, it can be said that the catatonia frequency determined by the scales, 13.1%, and according to DSM-5 criteria, 10.7%, is consistent with previous studies (Solmi et al. 2018).

The Bush-Francis Catatonia Rating Scale and the KANNER Scale have previously been used in only one study with patients in a persistent vegetative state (Lin et al. 2020). In our study, both the BFCRS and the KANNER Scale identified the same patients as having catatonia, even in cases where a diagnosis of catatonia according to DSM-5 criteria had not been made. This finding demonstrates that standardized catatonia scales can detect catatonia beyond the scope of DSM-5 and can provide clinical utility. Among patients who screened positive for catatonia in the scale assessments but did not receive a catatonia diagnosis according to DSM-5, only one did not benefit from the provided treatments, and the catatonia syndrome persisted. In the context of neurodevelopmental disorders, it is evident that the DSM-5 diagnostic criteria are insufficient. Furthermore, it is noteworthy that a patient diagnosed with autoimmune encephalitis in our sample, despite not meeting the criteria for catatonia according to DSM-5, displayed an exceptional response to benzodiazepine treatment and electroconvulsive therapy (ECT).

In our sample, it is observed that a patient with functional neurological symptom disorder screened positive for catatonia in the scale assessments. Historically, Eugen Bleuler argued that catatonic symptoms do not arise from psychosis but are related to psychodynamic conflicts. He viewed symptoms such as mutism, negativism, and rigidity as exaggerated manifestations of intense emotional states (Fink and Taylor 2003, Yazıcı 2018). In the literature, catatonia has been previously associated with conversion disorders (Wiener and Pauline 1990, Roi et al. 2020, Singh et al. 2022). However, it can be said that the literature relating catatonia to conversion disorder and functional movement disorders is relatively limited, and it is currently considered as 'catatonia-like behavior.' In this context, not diagnosing catatonia according to DSM-5 for this patient can be seen as a strength rather than a limitation. However, when viewed in its entirety, we believe that the adverse consequences of missing the catatonia diagnosis would be far more serious than the outcomes of an incorrect catatonia diagnosis. We also observed that the patient diagnosed with functional neurological symptom disorder responded very well to lorazepam treatment.

Catatonia is partially recognized as an independent syndrome in the DSM-5. One of the changes made in the transition from DSM-IV to DSM-5 was the addition of a new category to facilitate the rapid diagnosis and specific treatment of catatonia in severe cases where an underlying diagnosis is not immediately apparent. This change can be considered as an attempt to streamline the diagnosis of catatonia. However, in the DSM-5, catatonia is not presented as a stand-alone

diagnosis. The DSM-5 Psychotic Disorders Working Group has proposed several reasons for this, including the more consistent longitudinal course of the primary diagnoses where catatonia is observed, the significant increase in the rate of additional diagnoses if catatonia were to be recognized as a separate disorder, and the presence of some variations in catatonia observed in various illnesses (Tandon et al. 2013).

In our study, it was observed that the female gender was predominant in the entire sample (51.6%). In comparison, the male gender was found to be significantly higher among patients who screened positive for catatonia (64.3%) and those diagnosed with catatonia according to DSM-5 (60.9%). Most of the patients who screened positive for catatonia and/or diagnosed with catatonia according to DSM-5 were in the age group of 18-39, single, high school graduates, and unemployed. The literature does not report any specific demographic risk factors conclusively linked to catatonia. However, in this study, having a history of catatonia in the past emerged as the sole statistically significant risk factor for the development of catatonia in psychiatric patients.

In our study, it was observed that neurodevelopmental disorders, encephalitis, and postpartum psychoses were also associated with catatonia in addition to schizophrenia and mood disorders, which were frequently associated with catatonia. In the literature, especially in Leo Kanner's studies, the relationship between neurodevelopmental disorders and catatonia is noticeable (Carroll et al. 2008). Postpartum psychoses are increasingly reported to be associated with catatonia and autoimmune encephalitis (Bergink et al. 2015, Nahar et al. 2017). Furthermore, there is increasing evidence that catatonic symptoms are quite frequent, especially in anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis (Mythri and Mathew 2016, Espinola-Nadurille et al. 2019). We believe that future studies will elucidate the relationship between these diseases and catatonia and this may contribute to the development of new treatment options for catatonia.

It is well known that there are overlapping symptoms between catatonia and autism spectrum disorders, such as mutism, negativism, echolalia, posturing, grimacing, stereotypies, mannerisms, and agitation (Dhossche et al. 2006, Vaquerizo-Serrano et al. 2022). The emergence of new symptoms or significant worsening of existing symptoms are important features used to detect catatonia in autism spectrum disorders (Vaquerizo-Serrano et al. 2022). In patients with autism spectrum disorder, it has been suggested that catatonia does not respond significantly to benzodiazepines and that they are more likely to benefit from ECT (Wachtel et al. 2018). In our study, newly developed or exacerbated symptoms in autism spectrum disorders were evaluated in favor of catatonic symptoms. Among the 3 patients who passed the catatonia screening, one patient responded well to lorazepam,

one patient responded well to lorazepam and ECT, while one patient did not benefit from these treatments.

Another disorder having overlapping symptoms with catatonia is delirium. Catatonia can be associated with many medical conditions and the same medical conditions are also associated with delirium (Fink and Taylor 2003). Since catatonia and delirium share many clinical features, catatonia may be misdiagnosed as delirium, but both conditions may be present at the same time (Tachibana et al. 2022). It is important to make this distinction since benzodiazepines used in the treatment of catatonia may worsen delirium and antipsychotics used in delirium may worsen catatonia (Oldham and Lee 2015). In clinical practice, however, most cases are difficult to differentiate and how to assess overlapping symptoms is the main issue (Penland et al. 2006, Tachibana et al. 2022). Oldham and Lee (2015) stated that catatonia can be easily overlooked in delirium and clinicians should be careful not to miss it. In both cases, we believe that it would be appropriate to treat the underlying cause and to apply the lorazepam test when catatonia is suspected. Although benzodiazepines are known to worsen the delirium course, they may improve symptoms in some patients and catatonia may be the main diagnosis in these patients.

In our study, one-third of catatonia patients had medical complications, some of which could be life-threatening. Although it is known that a wide range of complications are observed in catatonia (Worku et al. 2015), the studies about the frequency of these complications in the literature are insufficient. In one study, it was reported that medical complications were quite common in catatonia (46%) (Jaimes-Albornoz and Serra-Mestres 2015). Delirium, urinary tract infection, pneumonia, and dehydration have been suggested as the most common complications in different studies (Worku et al. 2015, Espinola-Nadurille et al. 2016). In our study, the most common complication was also found to be urinary tract infection. It was followed by delirium, malnutrition, malignant catatonia, pneumonia, acute renal failure, seizure, deep vein thrombosis, sepsis, and decubitus ulcer, most of which may be secondary to immobility and dehydration.

The Turkish validity and reliability studies of the Bush-Francis Catatonia Rating Scale and KANNER scales were conducted by the same researchers in Turkey. Convergent and criterion validity revealed that there was a high correlation between the screening sections of both scales and between the total score of the BFCRS and the scores of the 2nd and 3rd sections of the KANNER Scale. Moreover, it was reported that a total score of  $\geq 6$  in BFCRS, a score of  $\geq 15$  in KANNER Scale second section, or a score of  $\geq 1$  in third section can be used with high accuracy to diagnose catatonia according to DSM-5. It was found that the internal consistency of both scales and interrater reliability of most of the scale items were high (Erdoğan et al. 2022).

The main limitations of this study are the small sample size, the limited number of patients included from non-psychiatry services due to COVID-19 restrictions, and the lack of detailed demographic and clinical characteristics in the neurology group. In addition, the fact that drug side effects were not evaluated and the cross-sectional design of the study can be stated as other limitations.

In conclusion, catatonia is a common syndrome with life-threatening complications. The widespread and effective use of standardized catatonia scales in clinical practice will increase the diagnostic capacity of clinicians and improve the morbidity and mortality associated with catatonia.

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