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Validity and Reliability Study of Turkish Version of Clinical Assessment Interview for Negative Symptoms (CAINS)

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ABSTRACT

Introduction: This study aims to translate and investigate the validity and reliability of the Turkish version of the Clinical Assessment Interview for Negative Symptoms (CAINS), which has additional features compared to other scales in assessing negative symptoms in patients with schizophrenia.

Methods: The Turkish version of CAINS was constructed upon an initial translation to Turkish, and an English back translation of the scale was later conducted. The patients diagnosed with schizophrenia (n=79) according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) diagnostic criteria were administered the Turkish version of CAINS, the Positive and Negative Syndrome Scale (PANSS), the Scale for the Assessment of Negative Symptoms (SANS), the Scale for the Assessment of Positive Symptoms (SAPS), the Calgary Depression Scale for Schizophrenia (CDSS), the Clinical Global Impression Scale (CGI), the Global Assessment of Functioning Scale (GAF) and the Simpson-Angus Extrapyramidal Side Effects Assessment Scale (SAS). In addition, two interviewers assessed the video recordings of 11 patients for reliability analysis.

Results: Inter-rater reliability was found to be high (intraclass correlation coefficient (ICC): 0.831). Exploratory and confirmatory factor analyses indicated that Cronbach's alpha was 0.956 for the full scale, and the two-dimensional structure explained the scale better. In convergent validity analyses, CAINS overall scores correlated significantly with the SANS total score (r=0,932) and PANSS negative score (r=0,902). In discriminant validity analyses, CAINS overall scores markedly correlated with the SAPS total (r=0,615), PANSS positive (r=0,497) and PANSS general psychopathology (r=0,737) scores. Additionally, when CGI and GAF scores were considered covariant, the significant correlation of CAINS total scores with the SANS total and PANSS negative scores continued; however, the correlation with PANSS positive score was prominently reduced, and the correlation with PANSS general psychopathology disappeared.

Conclusion: The Turkish version of the CAINS appears to be a valid and reliable tool with strong psychometric properties in a sample consisting of patients with schizophrenia.

Keywords: Negative symptoms, rating scale, reliability, validation

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INTRODUCTION

Negative symptoms in schizophrenia are characterized by affective slumber, alogia (loss of thought), anhedonia (loss of pleasure), avolition (loss of will), and anti-sociality (loss of social relationship) (1–3) and pose a significant obstacle to improvement in the general functionality of patients (2). Many studies suggest that negative symptoms do not respond well to available treatment options. In most studies, the effectiveness of treatments for negative symptoms was not significant, according to a meta-analysis (4). More detailed, valid, and reliable measurement tools are required to detect changes in negative symptoms in order to develop new treatment interventions. The Scale for the Assessment of Negative Symptoms (*SANS*) and the Positive and Negative Syndrome Scale (*PANSS*), which are among the first-generation scales developed to measure negative symptoms, have many limitations (2,5). First, the SANS and PANSS contain many items that are incompatible with the current understanding of the structure of negative symptoms. As an example, the PANSS Negative Symptoms subscale includes cognitive items such as trouble in abstract thinking and stereotyped thinking, whereas the SANS (2) includes inappropriate effects and distractibility. Secondly, the SANS and PANSS do not cover all domains of negative symptoms, as currently understood. The PANSS does not include a measure of anhedonia, while the SANS includes a measure of anhedonia but does not distinguish between consummatory (*the fullness of pleasure*) and anticipatory (*having expectations*) aspects of pleasure, the latter of which is more strongly associated with schizophrenia (6). Finally, current measurement tools focus on outward behaviors rather than investigating the internal experience of motivation and pleasure, reflecting a measure of functioning rather than

Highlights

- **There is a need for new rating tools for the assessment of negative symptoms in schizophrenia.**
- **The Turkish version of the Clinical Assessment Interview for Negative Symptoms (CAINS) is valid and reliable.**
- **The Turkish version of CAINS can be used for detailed assessment of negative symptoms.**

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negative symptoms themselves (5). Considering all these inadequacies in existing measurement tools, Blanchard et al. developed the Clinical Assessment Interview for Negative Symptoms (*CAINS*) in 2011, which allows for a valid and reliable assessment interview that can be used in clinical and research settings. The Turkish validity and reliability study of the Brief Negative Symptom Scale (BNSS), which is considered as one of the second-generation scales along with CAINS and has a shorter administration time but less detail in evaluating patient symptoms than CAINS, was previously conducted. (7).

The Clinical Assessment Interview for Negative Symptoms is an assessment tool consisting of 13 items in total, lasting an average of half an hour and administered in a semi-structured interview format. This scale includes Motivation/Pleasure (*Clinical Assessment Interview for Negative Symptoms-Motivation and Pleasure*-CAINS Map, which includes items on entertainment, social and occupational expected pleasure, and motivation) and Expression (*Clinical Assessment Interview for Negative Symptoms-Expression*-CAINS Exp, which includes vocal prosody, facial gestures, and speech) subscales (8). In a psychometric study in which the final form was given to the scale, it was found that its internal consistency, concordance, and discriminant validity were good, and test-retest reliability and inter-rater reliability were high (9).

The Clinical Assessment Interview for Negative Symptoms has so far been translated into Chinese (10), German (11), Spanish (12), Korean (13), Serbian (14), Bosnian (15), French (16), and Swedish (17) and validity/reliability studies have been conducted. Furthermore, a validity study was conducted on schizophrenia patients in the local English-speaking population in Singapore (18).

In this study, CAINS was translated and adapted into Turkish, and the validity and reliability of the Turkish form of the scale were evaluated in a sample of schizophrenia patients.

METHOD

Participants

The study included 79 patients who met the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria for schizophrenia and agreed to participate between July 2019 and January 2020, including inpatients (n=25) in Adana Dr. Ekrem Tok Psychiatric Hospital wards and outpatients (n=54) who applied to the outpatient clinic or were followed up as outpatients in the hospital's Community Mental Health Centers. Patients younger than age 18 and older than age 65, patients with a history of brain trauma or neurologic disease, and patients with alcohol or substance abuse in the 12 months before study participation were excluded.

The study protocol was approved by the local research ethics committee (Adana City Hospital Clinical Research Ethics Committee) (Decision No: 477, Date: 19.06.2019). In accordance with the current version of the Declaration of Helsinki, all patients were given detailed information about the research protocol and written informed consent were obtained from them.

Process

Before beginning the Turkish validity and reliability study regarding the scale used for the study, an e-mail was sent to the researchers who created the scale to obtain their permission. The scale was translated into Turkish by researchers (SS and EAY) with advanced English language skills. After the translation had undergone the appropriate revisions, it was translated back into English by a specialist in academic and medical translations and compared to the original text. The back translation into English was then sent to another translator who is a professional in medical and academic translations for comparison with the original English form. The evaluation was completed, feedback was received, and corrections were made within the framework of the suggestions made to avoid confusion with this comparison. After going through all these stages, CAINS was administered to the patients in an interview lasting approximately 30 minutes. Patients were administered the Turkish version of CAINS, PANSS, SANS, the Scale for the Assessment of Positive Symptoms (SAPS), the Calgary Depression Scale for Schizophrenia (CDSS), the Clinical Global Impression Scale (CGI), the Global Assessment of Functioning Scale (GAF) and the Simpson-Angus Extrapyramidal Side Effects Assessment Scale (SAS). All scales chosen for reliability and validity assessment and mentioned in the relevant sections are scales for which reliability and validity studies have been previously conducted in Turkish (19–29). The administration of these scales, which were administered simultaneously with CAINS, was completed in approximately two hours with 5 to 10-minute breaks in between.

The assessors (SS and ŞCG) participated in the online training for *CAINS*, reviewed the scale and manual, conducted a joint assessment by watching and scoring the video interviews, and gained competence to administer the scale.

Reliability

The interviews of 11 patients who consented to the video recording were video recorded by the researcher (SS) who made the first assessment and scoring, and the same patients were also assessed and scored by the other researcher (ŞCG). Thus, *inter-rater reliability* was evaluated.

Statistics

Statistical analyses were performed using IBM Statistical Package for Social Sciences (SPSS) program version 23.0 and AMOS 22.0 package programs. Numeric variables were presented as mean ± standard deviation and categorical variables were presented as numbers and percentages. Internal consistency was shown by Cronbach's alpha coefficient. Item analyses were performed, and item-total correlations and Cronbach's alpha coefficients were given when the item was deleted. Construct validity was assessed by exploratory and confirmatory factor analysis. In exploratory factor analysis, the principal components method was used as the factor extraction method and the varimax method was used as the factor rotation method. Kaiser Meier Olkin sampling adequacy and Barthlett sphericity test assumptions were controlled before performing exploratory factor analysis. In confirmatory factor analysis, each dimension was taken as a latent variable and each item as an observed variable. The following fit indices and cut-off points were used to assess model fit: Relative chi-square (χ^2/df <2), scaled fit index (NFI >0.90), comparative fit index (CFI >0.90), Tucker-Lewis Index (TLI >0.90), root mean error of approximation (RMSEA <0.10) (30). The intraclass correlation coefficient (ICC) and Spearman correlation coefficient were used to assess the reliability of tests taken after one another. Using the Spearman correlation coefficient, concurrent validity was assessed.

RESULTS

Demographic and Clinical Characteristics of the Sample

Demographic and Clinical data are shown in Table 1. The sample is predominantly male (81%). The overall severity of the disease as measured by the CGI ranges from 0 to 7 points (mean: 4.2).

CAINS structure

As shown in Table 2, as a result of the exploratory factor analysis, it was found that the two-factor structure explained 75.42% of the total variance. When the internal consistency results are analyzed, it is observed that the Cronbach's alpha value of the first factor is 0.941, the Cronbach's alpha

Table 1. Sociodemographic characteristics (n=79)

		Number	Percentage
Sex	M	64	81.0
Occupation	Retired	14	17.7
	Worker	4	5.1
	Public servant	2	2.5
	Student	5	6.3
	Currently Unemployed	54	68.4
Marital status	Single	50	63.3
	Widow	10	12.7
	Married	19	24.1
		Mean+SD	**Minimum-Maximum**
Age		39.3±13.3	19 – 67
Age of disease onset		24.2±6.8	15 – 48
Duration of disease		15.1±12.1	1 – 47
Education duration		9.7±3.6	0–15
Simpson_total (SAS)		2.9±4.5	0–18
Calgary_total (CDSS)		3.3±3.6	0–18
CGI		4.2±1.2	0–7
GAF		55.1±12.8	20–80
PANSS_positive_total		15.1±5.6	7–32
PANSS_negative_total		22.6±6.8	12–43
PANSS_general psychopathology_total		40.3±11	23–72
PANSS total		78.0±20.9	46–133
SAPS hallucinations		5.3±5.1	0–22
SAPS_delusions		9.2±6.2	1–27
SAPS_strange_behaviors		5.6±3.7	0–19
SAPS_positive_structural thought disorder		10.3±6.6	0–33
SAPS_total		30.4±18.5	3–92
SANS_affective_flattening		17.6±5.7	10–33
SANS_alogia		10.6±4.4	3–22
SANS_unwillingness		9.6±3.6	3–18
SANS_anhedonia		16.5±4.3	9–25
SANS_attention		6.7±3.2	0–14
SANS_total		61.1±19	32–112

CDSS: Calgary Depression Scale in Schizophrenia; CGI: Clinical General Rating Scale; PANSS: Positive and Negative Syndrome Scale; GAF: General Assessment of Functioning Scale; M: Male; SANS: Scale for the Assessment of Negative Symptoms; SAPS: Scale for the Assessment of Positive Symptoms; SAS: Simpson Angus Extrapyramidal Symptoms Assessment Scale; SD: Standard Deviation.

value of the second factor is 0.935, and the Cronbach's alpha value of the whole scale is 0.956 and the internal consistency is at a particularly satisfactory level.

As shown in Table 3, confirmatory factor analysis assessed the four-factor structure previously proposed in the original study and the Swedish form and the two-factor structure proposed in the French, Chinese, and Korean forms. According to the fit indices obtained, it was found that the 2-factor structure explained the scale better.

Internal Consistency

As shown in Table 4, according to the results of the item analysis, the item-total score correlation of all items analyzed by Pearson correlation coefficient is at a satisfactory level. Moreover, Cronbach's alpha coefficients were similar for all items when the item was deleted.

Reliability

As shown in Table 2, the reliability of the scale is at a satisfactory level according to the test-retest (inter-rater reliability) results.

Table 2. Exploratory factor analysis, internal consistency, and test-retest (inter-rater) reliability results

	Factor 1	Factor 2	Total
CAINS 1	0.629		
CAINS 2	0.611		
CAINS 3	0.574		
CAINS 4	0.594		
CAINS 5	0.74		
CAINS 6	0.734		
CAINS 7	0.789		
CAINS 8	0.832		
CAINS 9	0.837		
CAINS 10		0.844	
CAINS 11		0.843	
CAINS 12		0.859	
CAINS 13		0.863	
Explained variance ratio	66.24%	9.18%	
Scale Score	19.8±7.3 (8–36)	6.6±3.6 (2–16)	26.4±10.2 (11–51)
Cronbach alpha	0.941	0.935	0.956
Test-retest (inter-rater) correlation (Spearman correlation coefficient)	0.759	0.855	0.745
Test-retest (inter-rater) correlation (ICC)	0.688 (0.212 – 0.904)	0.864 (0.591 – 0.961)	0.831 (0.509 – 0.951)

CAINS: Clinical Assessment Interview for Negative Symptoms; ICC: Intraclass Correlation Coefficient.

Table 3. Confirmatory factor analysis results

	Cmin/df	RMSEA	NFI	CFI	TLI
4-factor model	1.776	0.100	0.903	0.954	0.940
2-factor model	1.726	0.096	0.906	0.957	0.944

CFI: Comparative fit index; Cmin/df: Minimum difference/degree of freedom; NFI: Normed fit index; RMSEA: root mean error of approximation; TLI: Trucker-Lewis index

Table 4. Item analysis results

	Scale mean after item removal	Item-total correlation	Cronbach alpha after item removal
CAINS 1	24.92	0.834	0.951
CAINS 2	24.34	0.899	0.949
CAINS 3	24.54	0.750	0.954
CAINS 4	23.96	0.747	0.953
CAINS 5	24.18	0.779	0.952
CAINS 6	23.23	0.613	0.956
CAINS 7	24.56	0.858	0.950
CAINS 8	24.52	0.777	0.952
CAINS 9	23.89	0.693	0.954
CAINS 10	24.61	0.856	0.950
CAINS 11	24.87	0.761	0.952
CAINS 12	24.63	0.807	0.951
CAINS 13	25.06	0.709	0.954

CAINS: Clinical Assessment Interview for Negative Symptoms

Validity

As shown in Table 5, the correlation of CAINS with other scales is observed.

In terms of concurrent validity, CAINS total score correlated with the SANS total score (r=0.932, p<0,01) and PANSS negative total score (r=0.902, p<0,01). As shown in Table 6, there is a significant correlation between the two sub-dimensions of CAINS and the sub-dimensions of SANS.

In terms of discriminant validity, CAINS total score correlated with SAPS total score (r=0.615, p<0.01), PANSS positive (r=0.497, p<0.01), and PANSS general psychopathology (r=0.737, p<0.01) subscale scores. Significant correlations with CAINS subscales are also present as shown in Table 6. However, the CAINS total score (as well as the scores of its two subscales) also correlated with CGI and GAF scores. As shown in Table 6, when CGI and GAF are evaluated as covariates, it is revealed that CAINS total score maintains its significant correlations with the SANS total score and PANSS negative subscale scores, while its correlation with PANSS positive subscale is still maintained, albeit significantly decreased, and its correlation with PANSS general psychopathology is lost.

Clinical Assessment Interview for Negative Symptoms total and two subscales show a significant correlation with CDSS in terms of depressive symptoms. There are also significant correlations with SAS. When CGI

Table 5. Correlation of CAINS with other scales

	CAINS dimension 1	CAINS dimension 2	CAINS total
CGI	0.835**	0.713**	0.845**
GAF	-0.882**	-0.716**	-0.880**
Simpson_total (SAS)	0.515**	0.507**	0.547**
Calgary_total (CDSS)	0.339**	0.296**	0.349**
PANSS_positive_total	0.511**	0.407**	0.497**
PANSS_negative_total	0.836**	0.877**	0.902**
PANSS_general psychopathology total	0.713**	0.651**	0.737**
PANSS total	0.779**	0.719**	0.805**
SAPS_hallucinations	0.364**	0.280*	0.346**
SAPS_delusions	0.489**	0.438**	0.499**
SAPS_strange_behaviors	0.662**	0.670**	0.702**
SAPS_positive_normal_thought	0.625**	0.524**	0.635**
SAPS_total	0.602**	0.538**	0.615**
SANS_affective_flattening	0.781**	0.940**	0.865**
SANS_alogia	0.725**	0.881**	0.808**
SANS_unwillingness	0.847**	0.770**	0.862**
SANS_anhedonia	0.927**	0.793**	0.942**
SANS_attention	0.580**	0.510**	0.594**
SANS_total	0.879**	0.896**	0.932**

*p<0.05
**p<0.01
CAINS: Clinical Assessment Interview for Negative Symptoms; CDSS: Calgary Depression Scale in Schizophrenia; CGI: Clinical General Rating Scale; GAF: General Assessment of Functioning Scale; PANSS: Positive and Negative Syndrome Scale; SANS: Scale for the Assessment of Negative Symptoms; SAPS: Scale for the Assessment of Positive Symptoms; SAS: Simpson Angus Extrapyramidal Symptoms Assessment Scale.

Table 6. Correlation of CAINS with SAS, CDSS, SANS, SAPS, and PANSS (with CGI and GAF as covariates)

	CAINS dimension 1	CAINS dimension 2	CAINS total
Simpson_total (SAS)	0.135	0.138	0.165
Calgary_total (CDSS)	0.159	-0.020	0.102
PANSS_positive_total	-0.073	-0.353**	-0.230*
PANSS_negative_total	0.470**	0.774**	0.723**
PANSS_general psychopathology total	0.091	0.006	0.067
PANSS total	0.212	0.170	0.235*
SAPS_hallucinations	-0.162	-1.879	-0.273*
SAPS_delusions	-0.048	-0.175	-0.122
SAPS_strange_behaviors	0.004	0.033	0.019
SAPS_positive_normal_thought	-0.219	-0.251*	-0.281*
SAPS_total	-0.160	-0.272*	-0.251*
SANS_affective_flattening	0.391**	0.866**	0.714**
SANS_alogia	0.281*	0.757**	0.581**
SANS_unwillingness	0.331**	0.366**	0.419**
SANS_anhedonia	0.691**	0.411**	0.695**
SANS_attention	0.127	0.209	0.195
SANS_total	0.481**	0.781**	0.734**

*p<0.05
**p<0.01
CAINS: Clinical Assessment Interview for Negative Symptoms; CDSS: Calgary Depression Scale in Schizophrenia; PANSS: Positive and Negative Syndrome Scale; SANS: Scale for the Assessment of Negative Symptoms; SAPS: Scale for the Assessment of Positive Symptoms; SAS: Simpson Angus Extrapyramidal Symptoms Assessment Scale.

and GAF were evaluated as covariates, the correlation of CAINS total score with both scales (CDSS and SAS) disappeared (Table 6).

DISCUSSION

The findings of this study suggest that the Turkish version of the CAINS scale is a reliable and valid scale for measuring negative symptoms in schizophrenia, as in the original scale study published by Kring et al. in 2013 (9).

A comparison of the demographic characteristics of the study sample with the original scale study (9) demonstrated that the proportion of males was significantly higher in the Turkish scale study (81% vs. 57%) and the proportion of single/never married patients was lower in terms of marital status (63% vs. 73%). Furthermore, it is noteworthy that the average age (39×47) and education level (9.7×12.6 years) were lower, paid employment status (25.3%×24%) was similar, and in terms of ethnicity, the Caucasian race is more prevalent (100%×40%) in the Türkiye study. Looking at the general sociodemographic characteristics

of the samples, it is worth noting that the Türkiye study included patients who were younger, less educated, and mostly male.

In the comparison of the clinical characteristics of the study sample with the original scale study (9), it is observed that patients in the Turkish scale study had slightly higher scores for both depression (mean CDSS scores 3.3×2.7) and general severity of the disease (mean PANSS total score 78× mean BPRS total score 40/mean PANSS total score 70, equivalent to BPRS and PANSS equipercentile linkage) (31).

The inter-rater reliability of the Turkish version of the CAINS was found to be between 0.71–0.94 and at a satisfactory level for the total score and both subscales of the scale, as shown in Table 5. These findings are similar to the ICC values of 0.93 for the Motivation/Pleasure subscale and 0.77 for the Expression subscale in the original scale study (8).

In terms of validity, as expected in the Turkish version of the CAINS scale, CAINS total score correlated significantly with the SANS and PANSS negative subscale. The PANSS negative subscale has a stronger correlation with the CAINS-Expression subscale (r=0,87) than with the CAINS-Motivation and Pleasure subscale (r=0,83), which can be explained by the fact that this scale lacks an item that directly measures the absence of motivation and anhedonia. Furthermore, the finding that CAINS total score was significantly correlated with PANSS positive and general psychopathology scores is in line with the findings in the original form of the scale (9), Serbian (14), Korean (13), and Spanish (12). Unexpectedly, the CAINS scale was also sensitive to positive symptoms and symptoms related to general psychopathology in schizophrenia in both the original study and the present study. Kring et al. (2013) found that the CAINS Motivation/Enjoyment subscale correlated with the positive symptoms (r=0.31) and agitation (r=0.18) subscales of the Brief Psychiatric Rating Scale (BPRS) (9). Additionally, Kring et al. (2013) found that the CAINS Motivation/Enjoyment subscale showed a stronger relationship with the social (r=-0.42), family (r=-0.43), independent living (r=-0.26) and occupational (r=-0.29) functioning subscales of the Role Functioning Scale (RFS) compared to the negative symptoms subscale of the BPRS (9). In the Turkish version of the CAINS scale study, in parallel with these findings, it was found that both the CAINS total score and both CAINS subscales were correlated with PANSS positive, PANSS general psychopathology, SAPS positive, CGI, and GAF scores, as shown in Table 6. Similar to the original scale study, these findings in the Turkish version of the CAINS scale suggest that the overall severity and functionality levels of the disease may have a confounding effect on discriminant validity. Statistically controlling the general severity of the disease and levels of functioning, the CAINS total score remained correlated with negative symptoms, lost its correlation with symptoms of general psychopathology, and significantly decreased its correlation with positive symptoms, which, though not conclusive, supports this view.

In this study, the correlation of CAINS total score with CDSS scores measuring symptoms of depression may be explained by the fact that CAINS is sensitive to primary and secondary negative symptoms, e.g., psychomotor retardation and loss of facial emotional expression due to depressed mood. However, this correlation lost its significance when the overall severity and functioning levels of the disease were controlled, indicating a possible relationship between the level of depression and the overall severity and functioning levels of the disease.

It is commonly accepted that symptoms of Parkinsonism are an important confounding factor in the measurement of negative symptoms. In contrast to the original scale (9), CAINS total and subscale scores correlated with SAS in our study. However, this correlation disappeared when the overall severity of the disease and level of functioning was controlled, suggesting that there is still a possible relationship between the level of Parkinsonism symptoms and the overall severity of the disease and level of functioning.

As a result of the factor analysis, it was determined that the CAINS Turkish form has a two-factor structure including the Motivation/Pleasure and Expression dimensions, as in the original English form of CAINS (8,9), and the German (11), Chinese (10), Spanish (12), Korean (13) and French forms (16).

Given the study's limitations, despite the fact that the sample size (n=79) met the minimum 5:1 ratio of the number of subjects and the number of test items sufficient for PCA (Principal Component Analysis), it did not meet the 10:1 ratio, which is a more conservative approach (32). Although inter-rater reliability was evaluated in the reliability analysis of the study, the fact that *intra-rater reliability* was not evaluated constitutes another limitation of the study.

In conclusion, the CAINS-Turkish form was found to have strong psychometric properties in a sample of schizophrenia patients, as well as being a valid and reliable scale, in this study. When the Turkish version is compared with the original scale, it is observed that the discriminant validity with positive symptoms, general psychopathology, and depression symptoms is weaker. It was thought that the differences between the samples of the original scale study and the Turkish scale study in terms of sociodemographic characteristics, disease severity, and level of functioning may affect this finding.

Ethics Committee Approval: The study protocol was approved by the local research ethics committee (Adana City Hospital Clinical Research Ethics Committee) (Decision No: 477, Date: 19.06.2019).

Informed Consent: In accordance with the current version of the Declaration of Helsinki, all patients were given detailed information about the research protocol and written informed consent were obtained from them.

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REFERENCES

1. Blanchard JJ, Cohen AS. The structure of negative symptoms within schizophrenia: implicating for assessment. Schizophr Bull. 2006;32(2):238–245. [Crossref]
2. Kirkpatrick B, Fenton WS, Carpenter Jr WT, Marder SR. The NIMH-MATRICS consensus statement on negative symptoms. Schizophr Bull. 2006;32(2):214–219. [Crossref]
3. Blanchard JJ, Kring AM, Horan WP, Gur R. Toward the next generation of negative symptom assessments: the collaboration to advance negative symptom assessment in schizophrenia. Schizophr Bull. 2011;37(2):291–299. [Crossref]
4. Fusar-Poli P, Papanastasiou E, Stahl D, Rocchetti M, Carpenter W, Shergill S, et al. Treatments of negative symptoms in schizophrenia: meta-analysis of 168 randomized placebo-controlled trials. Schizophr Bull. 2015;41(4):892–899. [Crossref]
5. Garcia-Portilla MP, Garcia-Alvarez L, Saiz PA, Al-Halabi S, Bobes-Bascaran MT, Bascaran MT, et al. Psychometric evaluation of the negative syndrome of schizophrenia. Eur Arch Psychiatry Clin Neurosci. 2015;265:559–566. [Crossref]
6. Gard DE, Kring AM, Gard MG, Horan WP, Green MF. Anhedonia in schizophrenia: distinctions between anticipatory and consummatory pleasure. Schizophr Res. 2007;93:253–260. [Crossref]
7. Nazlı IP, Ergül C, Aydemir Ö, Chandhoke S, Üçok A, Gönül AS. Validation of Turkish version of brief negative symptom scale. Int J Psychiatry Clin Pract. 2016;20(4):265–71. [Crossref]
8. Horan WP, Kring AM, Gur RE, Reise SP, Blanchard JJ. Development and psychometric validation of the Clinical Assessment Interview for Negative Symptoms (CAINS). Schizophr Res. 2011;132:140–145. [Crossref]

9. Kring AM, Gur RE, Blanchard JJ, Horan WP, Reise SP. The Clinical Assessment Interview for Negative Symptoms (CAINS): final development and validation. Am J Psychiatry. 2013;170:165–172. [Crossref]
10. Chan RCK, Shi C, Lui SSY, Ho KKY, Hung KSY, Lam JWS, et al. Validation of the Chinese version of the Clinical Assessment Interview for Negative Symptoms (CAINS): a preliminary report. Front Psychol. 2015;6:7. [Crossref]
11. Engel M, Fritzsche A, Lincoln TM. Validation of the German version of the Clinical Assessment Interview for Negative Symptoms (CAINS). Psychiatry Res. 2014;220:659–663. [Crossref]
12. Valiente-Gomez A, Mezquida G, Romaguera A, Vilardebo I, Andres H, Granados B, et al. Validation of the Spanish version of the Clinical Assessment for Negative Symptoms (CAINS). Schizophr Res. 2015;166(1-3):104–109. [Crossref]
13. Jang SK, Park SC, Choi KH, Yi JS, Park JK, Lee JS, et al. Validation of the Korean version of the Clinical Assessment Interview for Negative Symptoms. Psychiatry Investig. 2017;14(4):413–419. [Crossref]
14. Ristic I, Jerotic S, Zebic M, Savic B, Vukovic V, Russo M, et al. Factorial structure of the Serbian version of the Clinical Assessment Interview for Negative Symptoms –evidence for three factors of negative symptoms. Front Psychol. 2020;11:570356. [Crossref]
15. Kulenovic AD, Mesevic ES, Ribic E, Repisti S, Radojicic T, Jovanovic N. Factor structure and internal consistency of the Clinical Assessment Interview for Negative Symptoms (CAINS) on a sample of persons with psychotic disorders in Bosnia and Herzegovina. J Neural Transm. 2022;129:905–911. [Crossref]
16. Laraki Y, Lebrun C, Merenciano M, Eisenblaetter M, Attal J, Macgregor A. Validation of the French clinical assessment interview for negative symptoms in a sample of stable French individuals with schizophrenia. Front Psychiatry. 2022;13:836600. [Crossref]
17. Bengtsson J, Boden R, Neider D, Cernvall M. A blinded validation of the Swedish version of the Clinical Assessment Interview for Negative Symptoms (CAINS). Nord J Psychiatry. 2022;76(1):44–51. [Crossref]
18. Rekhi G, Ang MS, Yuen CKY, Ng WY, Lee J. Assessing negative symptoms in schizophrenia: Validity of the clinical assessment interview for negative symptoms in Singapore. Schizophr Res. 2019;206:177–182. [Crossref]
19. Kay SR, Fiszbein A, Opler LA. The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull. 1987;13(2):261–276. [Crossref]
20. Kostakoğlu AE, Batur S, Tiryaki A. Reliability and validity of the Turkish version of the Positive and Negative Syndrom Scale (PANSS). Türk Psikoloji Derg. 1999;14:23–32.
21. Andreasen NC. Negative symptoms in schizophrenia. Definition and reliability. Arch Gen Psychiatry. 1982;39(7):784–788. [Crossref]
22. Erkoç Ş, Arkonaç O, Ataklı C, Özmen E. Negatif semptomları değerlendirme ölçeğinin güvenilirliği ve geçerliliği. Düşünen Adam. 1991;4:16–19.
23. Andreasen NC. Methods for assessing positive and negative symptoms. Mod Probl Pharmacopsychiatry. 1990;24:73–88. [Crossref]
24. Erkoç Ş, Arkonaç O, Ataklı C, Özmen E. Pozitif Semptomları Değerlendirme Ölçeğinin güvenilirliği ve geçerliliği. Düşünen Adam. 1991;4:20–24.
25. Addington D, Addington J, Maticka-Tyndale E, Joyce J. Reliability and validity of a depression rating scale for schizophrenics. Schizophr Res. 1992;6:201–208. [Crossref]
26. Aydemir Ö, Esen Danacı A, Deveci A, İçelli İ. Calgary Şizofrenide Depresyon Ölçeğinin Türkçe versiyonunun güvenilirliği ve geçerliliği. Noro Psikiyatr Ars. 2000;37:82–86.
27. Guy W. ECDEU Assessment Manual for Psychopharmacology, Revised US Dept Health, Education and Welfare publication (ADM). Rockville: National Institude of Mental Health; 1976. p. 76–338. [Crossref]
28. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, fourth ed. Washington, DC: American Psychiatric Association; 1994. p. 25–35.
29. Simpson GM, Angus JWS. A rating scale for extrapyramidal side effects. Acta Psychiatr Scand (Suppl 44). 1970;212:11–19. [Crossref]
30. Erkorkmaz Ü, Etikan İ, Demir O, Özdamar K, Sanisoğlu SY. Confirmatory factor analysis and fit indices: review. Turkiye Klinikleri J Med Sci. 2013;33(1):210–23. [Crossref]
31. Leucht S, Rothe P, Davis JM, Engel RR. Equipercentile linking of the BPRS and the PANSS. Eur Neuropsychopharmacol. 2013;23:956–959. [Crossref]
32. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis, 7th ed. New Jersey, United States: Pearson Prentice Hall; 2009. p. 116.