Relationship Suicide, Cognitive Functions, and Depression in Patients with Schizophrenia

Bülent Kenan KOCATÜRK¹, Altan EŞSİZÖĞLU², Gökay AKSARAY², Ferdane Özlem AKARSU², Ahmet MUSMUL³

¹Clinic of Psychiatry, Yunus Emre State Hospital, Eskişehir, Turkey

²Department of Psychiatry, Eskişehir Osmangazi University Faculty of Medicine, Eskişehir, Turkey

³Department of Biostatistics, Eskişehir Osmangazi University Faculty of Medicine, Eskişehir, Turkey

ABSTRACT

Introduction: The aim of this study was to compare schizophrenic patients with and without a suicide attempt history in terms of sociodemographic and clinical features and cognitive functions and to determine the predictive factors for suicide attempt history.

Methods: In this study, we assessed and compared 70 patients with schizophrenia, 27 patients with a suicide attempt history, and 43 patients without a suicide attempt history. The cognitive functions of patients were assessed by the Stroop test, Wisconsin Card Sorting Test (WCST), and Rey Auditory Verbal Learning Test. In order to evaluate clinical symptoms, the Positive and Negative Syndrome Scale (PANSS) and Calgary Depression Scale for Schizophrenia (CDSS) were used.

Results: In this study, the number of hospitalizations, PANSS general psychopathology subscale score, CDSS total score, suicide item score,

and WCST total number of responses (WCSTI) were significantly higher among the patients with a suicide attempt history. The WCSTI and CDSS total scores were predicted using the suicide attempt history.

Conclusion: Revealing the factors related to suicidal behavior in patients with schizophrenia contributes to the prevention of suicide. Studies with long-term follow-up and with a larger sample group are required for the investigation of relationship suicide, cognitive impairment, which is one of the core symptoms of schizophrenia, and depression.

Keywords: Schizophrenia, suicide, cognitive function, depression

INTRODUCTION

It is reported that 20%-50% of patients with schizophrenia attempt to commit suicide at a given time during their life and that 9%-13% of patients die as a result of suicide. Suicide is one of the important causes of early death in patients with schizophrenia under the age of 35 years (1,2,3).

Suicidal behavior in patients with schizophrenia is reported to be related to being male, being single, the presence of depression and hopelessness (1,2,3,4,5,6,7), a prior suicide attempt (5,8), severe course of the illness, early onset of the illness, frequent exacerbation of symptoms, greater number of hospitalizations, better insight, presence of positive symptoms, diagnosis of a paranoid subtype, drug abuse, impairment of social functioning, and lack of sufficient social support. Additionally, there are studies that report a relation between suicidal behavior and impairment of cognitive functioning (2,4,5,9,10,11,12).

Impairment of cognitive functions is one of the core symptoms of schizophrenia. The cognitive domains that are inversely affected in schizophrenia are executive functions, attention, perceptual/motor processing, sustained attention, verbal learning, verbal and spatial memory processing, and verbal fluency (13,14,15). Cognitive impairment in patients with schizophrenia has negative effects in both social and occupational skills as well as patients' quality of life (16).

There are a limited number of studies investigating the relation between suicidal behavior and cognitive functions (2,9,12,17,18). In these studies, there are contradictory findings about the relation between cognitive functions of patients and history of suicide attempt.

The purpose of this study is to compare the patients with and without a history of suicide attempt with respect to cognitive domains such as attention and memory and executive functions and thus to determine the predictive factors of suicide.

Correspondence Address: Dr. Altan Eşsizöğlü, Department of Psychiatry, Eskişehir Osmangazi University Faculty of Medicine, Eskişehir, Turkey Phone: +90 507 233 43 25 E-mail: altanessizoglu@gmail.com

Received: 10.11.2013 **Accepted:** 27.01.2014

©Copyright 2015 by Turkish Association of Neuropsychiatry - Available online at www.noropsikiyatriarsivi.com

METHODS

Sample

Seventy patients who applied consecutively to the Mental Health and Diseases Polyclinics of Faculty of Medicine, Eskişehir Osmangazi University between April 2010 and February 2011 and who had a diagnosis of schizophrenia according to the Diagnostic and Statistical Manual for Mental Disorders- Revised Edition (DSM-IV-TR) (19) were included in the study. The inclusion criteria were being between the ages of 18 and 65 years; not being at a period of disease exacerbation; not having undergone electroconvulsive therapy in the last six months, not having alcohol or drug abuse or dependence; not having a history of head trauma, organic brain syndrome, or mental retardation; not having conditions that interfere with the administration of neuropsychological tests such as severe visual impairment and color blindness, in particular; and being literate. Neuropsychological tests were performed on the same or following day. The history of suicide attempt in patients was determined based on the patients' and relatives' reports and their medical records. In this way, 27 (38.6%) patients were determined to have a history of suicide attempt, and 43 (61.4%) patients were found to not have a history of suicide attempt. This study was approved by the ethical committee of Eskişehir Osmangazi University Medical Faculty, and written informed consent was obtained from all the patients and their relatives.

MATERIALS

The following forms, scales, and tests were administered to the patients. The scales were administered by B.K.K and tests by F.Ö.A.

Demographic information form: The age, gender, educational status, duration of illness, life-time number of hospitalizations, current psychotropic medication, type of antipsychotic medication (typical or atypical), and presence of a suicide attempt were determined by the form that was created by our research team.

Positive and Negative Syndrome Scale (PANSS): This scale, developed by Kay et al. (20) in 1987, is a 30 item semi-structured interview including a seven points grading for severity. The Turkish validity and reliability of the study was performed by Kostakoğlu et al. (21) in 1999. In our study, the scores of positive and negative symptoms and subscales of psychopathology were evaluated.

Calgary Depression Scale for Schizophrenia (CDSS): This is a scale used to evaluate patients with schizophrenia for depression and to measure the level and severity of changes in depressive symptoms. It was developed by Addington et al. (22), and the Turkish validity and reliability studies were conducted by Oksay et al. (23) and Aydemir et al. (24).

Wisconsin Card Sorting Test (WCST): WCST is used for the evaluation of abstraction/problem solving and set-shifting in the face of changing reinforcement schedules in adults. The scale assesses frontal lobe functions such as strategy development and shifting as well as cognitive flexibility. It was originally developed by Berg in 1948, and the last version was developed by Heaton in 1981 (25). The Turkish validity and reliability of the scale was performed (26). In the current study, the total number of responses (WCST1), total number of perseverations (WCST2), and percentage of perseveration errors (WCST3) were taken into account as these scores are extensively used in these kinds of studies (27).

Stroop Test (STP): STP measures perceptual encoding, set-shifting based on altering instructions and paradigms under "conflicting effects," inhibition of habitual behavior patterns, competence in making unusual responses, and selective attention. It was developed by Stroop (28) and was standardized to Turkish by Karakaş et al. (29).

Rey Auditory Verbal Learning Test (RAVLT): RAVLT is a test that measures information processing related to verbal material in a multifaceted way. Among these processes are verbal learning, immediate spatial memory, backward masking effect, free recall, and recognition memory. In this study, the scores that are extensively used in literature such total recall score (A1-5), post-interference recall score, (A6), and delayed recall score (A7) were used (30,31). The original version of the test was developed by Rey in 1940 and was revised by Taylor in 1959. The Turkish standardization of the test was performed (32,33).

Statistical Analysis

All the data analysis was performed with the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) statistical 16.0 package. Continuous quantitative data were expressed as n, mean, and standard deviation and qualitative data as n and ratio (25%-75%). For the two-pair groups that comprise independent samples indicating normal distribution, the t-test was used, whereas the Mann-Whitney U test was used for those without a normal distribution. For the categorical data set, the chi-square test was applied. The probability value of $p < 0.05$ was accepted as significant. To determine the variables that are assumed to have an effect on past suicidal behavior, regression analysis (backward stepwise) was performed. The clinical and neuropsychological variables with $p < 0.05$ were put into the analysis.

RESULTS

The mean age of patients with schizophrenia was 38.82 ± 10.04 years, and 46 (65.7%) of them were males, whereas the remaining 24 (34.3%) were females. When the two gender groups with and without a past history of suicide attempt were compared, no difference was found in terms of sociodemographic characteristics ($p > 0.05$, Table 1).

In relation to illness characteristics, when the two groups with and without a past history of suicide were compared, the patients who committed suicide were determined to have a significantly higher number of hospitalizations ($z = -2.155$, $p < 0.05$). For the other variables related to illness characteristics, no significant difference was obtained ($p > 0.05$, Table 1).

When the two groups with and without a past history of suicide attempt were compared with respect to clinical evaluation measures and neuropsychological test performances of the PANSS sub-score of general psychopathology, total score of CDSS, CDSS suicide item score (Table 2), and additionally WCST1 (total number of responses), the group with a suicide history had a significantly higher score than the group without a suicide history ($z = -1.971$, $p < 0.05$; $z = -2.907$, $p < 0.01$; $z = -3.269$, $p < 0.01$; $z = -2.542$, $p < 0.05$ respectively; Table 3).

When variables affecting prior suicidal behavior were evaluated via logistic regression analysis (backward stepwise), the total scores of WCST1 and CDSS were determined to be related with suicide attempt at a critical predictive value (OR:1.07, $p < 0.05$; OR:1.22, $p < 0.01$; respectively) as indicated in Table 4.

DISCUSSION

This study is important because it is one of the limited numbers of studies investigating sociodemographic and clinical characteristics, cognitive functions, and a suicide attempt history.

When two groups with and without history of suicide attempt are compared, the patients in the group with a suicide attempt history were found to have a higher number of hospitalizations and significantly higher scores in the PANSS general psychopathology sub-scale than the patients in the

group without a suicide attempt history. In patients with schizophrenia, the suicidal risk was reported to increase as the number of hospitalizations increased (34). It is widely known that it is difficult to cope with symptoms that determine general psychopathology and that these may cause depression (35,36,37). The results of our study indicate that the schizophrenic patients with a suicide attempt history had a higher number of hospitalizations and more severe psychopathology and further underline the necessity of taking suicidal risk parameters into account in clinical evaluation.

Table 1. The comparison of schizophrenic patients with and without a history of suicide attempt in terms of sociodemographic and clinical characteristics

	Patients with a history of suicide attempt n=27 n (%)	Patients without a history of suicide attempt n=43 n (%)	χ^2	p
Gender				
Female	6 (22.2)	18 (41.9)	2.03	>0.05
Male	21 (77.8)	25 (58.1)		
Marital status				
Single	16 (59.3)	23 (53.5)	0.28	>0.05
Married	9 (33.3)	17 (39.5)		
Widow	2 (7.4)	3 (7.0)		
	Mean±SD	Mean±SD	t	p
Age, mean	38.11±8.39	39.28±11.03	-0.47	>0.05
	Median 25%–75%	Median 25%–75%	z	p
Education duration (year)	11.00 (8.00-12.00)	11.00 (5.00-15.00)	-0.31	>0.05
Illness duration (year)	13.00 (7.00-21.00)	8.00 (4.00-13.00)	-1.856	>0.05
Age at illness onset	22.00 (19.00-32.00)	26.00 (22.00-35.00)	-1.715	>0.05
Number of hospitalizations	3.00 (2.00-6.00)	2.00 (1.00-4.00)	-2.155	<0.05
SD: standard deviation				

The total CDSS score was found to be higher in the patient group with a suicide attempt history than the group without a suicide attempt history and additionally to predict past prior suicidal behavior. Depression and despair are known to constitute risk factors for suicidal behavior, and studies have demonstrated that depression leading to suicide attempt is more common in patients with schizophrenia (1,2,3,6,9,11,34,35,36,37,38,39,40,41,42,43).

Kim et al. (9) reported that in patients with schizophrenia, cognitive functions such as attention, psychomotor speed, verbal working memory, verbal fluency, and recall memory and executive functions are better but not be predictive of past suicidal behavior. Nangle et al. (12) reported that patients with schizophrenia who attempted suicide before had better executive functions and that they are more decisive in planning and initiating relevant behavior (as in the suicidal behavior). Likewise, in one of these studies conducted by Delaney et al. (18) on this topic, schizophrenic patients with suicidal ideation and a suicidal attempt had better cognitive functions than the group without suicidal ideation and attempt. Barrett et al. (17) demonstrated that patients with schizophrenia spectrum disorders with a past history of suicide attempt and those without a history suicide attempt are not significantly different in terms of cognitive domains such executive functions, attention, and memory. Although studies that investigated the cognitive functions of patients with a history suicide attempt are limited in number, it seems that these patients are not different from those without a history of suicide attempt in terms of cognitive functions. In general, our findings regarding cognitive functions support these findings. However, the finding that patients with schizophrenia who die as a result of committing suicide have higher global cognitive functions lead us to believe that predictors of suicide are different in attempters and committers (17,44).

In our study, the findings that the WCSTI score was higher in patients with a history of suicide and that it was predictive of committing suicide may be important. Despite the different opinions about which properties the WCST scores indicate, researchers have reached a consensus that the first eight items except WCST3 measure perseveration (27). Perseverative responses in WCST point to frontal lobe dysfunctions and particularly dorsolateral prefrontal cortex (DLPFC) functions (45). The presence of symptoms related with DLPFC may be a clinically significant parameter in terms of suicide commitment in patients with schizophrenia. Whether this finding of our study would be replicated in prospective studies is a critical

Table 2. The comparison of scores that schizophrenic patients with and without a history of suicide attempt obtained from clinical evaluation scales

Clinical evaluation scales	Patients with a history of suicide attempt (n=27)	Patients without a history of suicide attempt (n=43)	z	p
PANSS	Median 25%-75%	Median 25%-75%		
Positive symptoms sub-scale score	11.00 (8.00-20.00)	9.00 (7.00-15.00)	-1.578	>0.05
Negative symptoms sub-scale score	17.00 (8.00-22.00)	12.00 (8.00-19.00)	-1.036	>0.05
General psychopathology sub-scale score	30.00 (22.00-44.00)	24.00 (19.00-32.00)	-1.971	<0.05
Total score	65.00 (37.00-83.00)	47.00 (35.00-62.00)	-1.738	>0.05
Insight item score	3.00 (1.00-5.00)	1.00 (1.00-3.00)	-1.191	>0.05
CDSS				
Total score	5.00 (1.00-11.00)	1.00 (0.00-6.00)	-2.907	<0.01
Despair item score	0.00 (0.00-2.00)	0.00 (0.00-1.00)	-1.672	>0.05
Suicide item score	0.00 (0.00-1.00)	0.00 (0.00-0.00)	-3.269	<0.01

PANSS: Positive and Negative Syndromes Scale; CDSS: Calgary Depression Scale for Schizophrenia

Table 3. The comparison of schizophrenic patients with and without a history of suicide attempt in terms of neuropsychological test performances

STP	Patients with a history of suicide attempt (n=27)	Patients without a history of suicide attempt (n=43)	z	p
	Median 25%-75%	Median %25-%75		
STP1 duration	11.00 (9.00-14.00)	11.00 (9.00-14.00)	-0.297	>0.05
STP2 duration	11.00 (9.00-14.00)	11.00 (9.00-13.00)	-0.042	>0.05
STP3 duration	16.00 (13.00-26.00)	15.00 (12.00-19.00)	-1.270	>0.05
STP4 duration	25.00 (17.00-35.00)	24.00 (17.00-29.00)	-0.640	>0.05
STP5 duration	40.00 (31.00-51.00)	32.00 (23.00-42.00)	-1.889	>0.05
STP3 error	0.00 (0.00-1.00)	0.00 (0.00-1.00)	-1.431	>0.05
STP3 NOC	0.00 (0.00-1.00)	0.00 (0.00-1.00)	-1.643	>0.05
STP4 error	1.00 (0.00-1.00)	1.00 (0.00-2.00)	-0.096	>0.05
STP4 NOC	1.00 (0.00-1.00)	1.00 (0.00-2.00)	-0.006	>0.05
STP5 error	2.00 (2.00-7.00)	3.00 (1.00-7.00)	-0.535	>0.05
STP5 NOC	2.00 (1.00-3.00)	2.00 (1.00-3.00)	-0.813	>0.05
WCST				
WCST1	128.00 (128.00-128.00)	128.00 (112.00-128.00)	-2.542	<0.05
WCST4	2.00 (0.00-4.00)	3.00 (1.00-6.00)	-1.766	>0.05
WCST6	22.00 (17.00-35.00)	21.00 (8.00-51.00)	-0.187	>0.05
WCST8	17.18 (13.28-27.34)	17.75(6.97-39.84)	-0.235	>0.05
RAVLT				
A1-5	34.00 (30.00-42.00)	38.00 (33.00-44.00)	-1.613	>0.05
A6	6.00 (4.00-8.00)	7.00 (5.00-10.00)	-0.948	>0.05
A7	5.00 (4.00-7.00)	6.00 (4.00-8.00)	-1.094	>0.05

STP: Stroop Test; WCST: Wisconsin Card Sorting Test; RAVLT: Rey Auditory Verbal Learning Test; NOC: number of corrections

Table 4. Logistic regression analysis (backward stepwise) of the WCST1 and CDSS total score changes in schizophrenic patients with and without a history of suicide attempt

	β	Standard error	p	OR	CI
WCST1	0.074	0.33	0.026	1.077	1.009-1.150
CDSS total score	0.204	0.72	0.004	1.227	1.066-1.412
Constant	-10.496	4.284	0.014	0.000	

OR: odds ratio; CI: confidence interval; df: 1; WCST: Wisconsin Card Sorting Test; CDSS: Calgary Depression Scale for Schizophrenia

point. Regarding this topic, studies with larger groups of patients strengthened by functional brain imaging techniques should be performed.

Limitations of our study may be summarized as follows: the small sample size that affects the generalizability of our findings, the cross-sectional design of our study, the use of a limited number of neuropsychological tests that enabled to comment on only particular cognitive functions, and the evaluation of the presence of suicide commitment as the primary variable. The use of medications is an important shortcoming for studies on schizophrenia. A majority of patients are treated with antipsychotics, antidepressants, mood stabilizers, and anxiolytic drugs, and the effect of the co-medication of these on cognitive status is a matter of discussion (46).

Although it is known that cognitive impairment influences the clinical course in schizophrenia and social functionality more than other symptoms and that it is the best predictor factor in long term follow-up, its exact relation to suicidal behavior is not completely determined. The exploration of factors related to suicide in patients with schizophrenia may have significant contributions in the prevention of suicide. Long-term studies with larger patient samples investigating the relation between the impairment of cognitive functions, which is a core symptom of schizophrenia, depression, and suicidal behavior in patients are required.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Kirkpatrick B. Bölüm 12.8: Şizofreni: Klinik Özellikler ve Psikopatoloji Kavramı Kaplan & Sadock's Comprehensive Textbook of Psychiatry içinde. 8.Baskı, 2. Cilt, Aydın H, Bozkurt A,çev.editörleri. Güneş Kitabevi; 2007. s.1416-1436.
2. Potkin SG, Anand R, Alphs L, Fleming K. Neurocognitive performance does not correlate with suicidality in schizophrenic and schizoaffective patients at risk for suicide. Schizophr Res 2002; 59:59-66. [CrossRef]
3. Öztürk MO, Uluşahin A. Özkıym (intihar). Ruh Sağlığı ve Bozuklukları I içinde. Berber MS, editör: I I. Baskı. Ankara: Nobel Tıp Kitapevleri; 2008; s.428-447.

4. Fenton WS, McGlashan TH, Victor BJ, Blyler CR. Symptoms, subtype, and suicidality in patients with schizophrenia spectrum disorders. *Am J Psychiatry* 1997; 154:199-204. [\[CrossRef\]](#)
5. Caldwell CB, Gottesman II. Schizophrenia: a high-risk factor for suicide: clues to risk reduction. *Suicide Life Threat Behav* 1992; 22:479-493.
6. Buchanan RW, Carpenter WT. Şizofreni ve Diğer Psikotik Bozukluklar: Kaplan and Sadock's Comprehensive Textbook of Psychiatry içinde. 8.Baskı, 2. Cilt, çev. editörleri: Aydın H, Bozkurt A. Güneş Kitabevi; 2007. s.1329-1448.
7. Erol A. Şizofrenide Klinik Özellikler ve Tanı Ölçütleri, Kullanılan Ölçekler: Soygür H, Alptekin K, Atbaşoğlu EC, Herken H, editörler: Şizofreni ve Diğer Psikotik Bozukluklar içinde. Ankara: Türkiye Psikiyatri Derneği Yayınları, Bilimsel Çalışma Birimleri Dizisi - No:6; 2007. s. 165-195.
8. Mann JJ, Waternaux C, Haas GL, Malone KM. Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry* 1999; 256:181-189.
9. Kim, CH, Jayathilake, K, Meltzer, HY. Hopelessness, neurocognitive function, and insight in schizophrenia: relationship to suicidal behaviour. *Schizophrenia Res* 2003; 60:71-80. [\[CrossRef\]](#)
10. Rossau CD, Mortensen PB. Risk factors for suicide in patients with schizophrenia: nested case control study. *Br J Psychiatry* 1997; 171:355-359. [\[CrossRef\]](#)
11. Pompili M, Amador XF, Girardi P, Harkavy-Friedman J, Harrow M, Kaplan K, Krausz M, Lester D, Meltzer HY, Modestin J, Montross LP, Mortensen PB, Munk-Jørgensen P, Nielsen J, Nordentoft M, Saarinen PI, Zisook S, Wilson ST, Tatarelli R. Review: Suicide risk in schizophrenia: learning from the past to change the future. *Ann Gen Psychiatry* 2007; 6:1-22. [\[CrossRef\]](#)
12. Nangle JM, Clarke S, Morris DW, Schwaiger S, McGhee KA, Kenny N, Murphy K, Gill M, Corvin A, Donohoe G. Neurocognition and suicidal behaviour in an Irish population with major psychotic disorders. *Schizophr Res* 2006; 85:196-200. [\[CrossRef\]](#)
13. Saykin AJ, Gur RC, Gur RE, Mozley PD, Mozley LH, Resnick SM, Kester DB, Stafiniak P. Neuropsychological function in schizophrenia. Selective impairment in memory and learning. *Arch Gen Psychiatry* 1991; 48:618-624. [\[CrossRef\]](#)
14. Bilder RM, Goldman RS, Robinson D, Reiter G, Bell L, Bates JA, Pappadopulos E, Willson DF, Alvir JM, Woerner MG, Geisler S, Kane JM, Lieberman JA. Neuropsychology of first-episode schizophrenia: initial characterization and clinical correlates. *Am J Psychiatry* 2000; 157:549-559. [\[CrossRef\]](#)
15. Andreasen NC, Nopoulos P, O'Leary DS, Miller DD, Wassink T, Flaum M. Defining the phenotype of schizophrenia: cognitive dysmetria and its neural mechanisms. *Biol Psychiatry* 1999; 46:908-920. [\[CrossRef\]](#)
16. Alptekin K, Akvardar Y, Kivircik Akdede BB, Dumlu K, Işık D, Piriñçi F, Yahsin S, Kitiş A. Is quality of life associated with cognitive impairment in schizophrenia? *Prog Neuropsychopharmacol Biol Psychiatry* 2005; 29:239-244. [\[CrossRef\]](#)
17. Barrett EA, Sundet K, Simonsen C, Agartz I, Lorentzen S, Mehlum L, Mork E, Andreassen OA, Melle I. Neurocognitive functioning and suicidality in schizophrenia spectrum disorders. *Compr Psychiatry* 2011; 52:156-163. [\[CrossRef\]](#)
18. Delaney C, McGrane J, Cummings E, Morris DW, Tropea D, Gill M, Corvin A, Donohoe G. Preserved cognitive function is associated with suicidal ideation and single suicide attempts in schizophrenia. *Schizophr Res* 2012; 140:232-236. [\[CrossRef\]](#)
19. Amerikan Psikiyatri Birliği. Ruhsal Bozuklukların Tanısal ve Sayımsal El Kitabı. Yeniden Gözden Geçirilmiş 4. Baskı, Köroğlu E, çev.editörü. Ankara: Hekimler Yayın Birliği; 2007.
20. Kay SR, Fiszbein A, Opler LA. The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophr Bull* 1987; 13:261-276. [\[CrossRef\]](#)
21. Kostakoğlu E, Batur S, Tiryaki A, Göğüş A. Pozitif ve negatif sendrom ölçeğinin (PANSS) Türkçe uyarlamasının geçerlilik ve güvenilirliği. *Türk Psikoloji Derg* 1999; 14:23-32.
22. Addington D, Addington J, Maticka-Tyndale E. Specificity of the Calgary Depression Scale for schizophrenics. *Schizophr Res* 1994; 11:239-244. [\[CrossRef\]](#)
23. Oksay SO, Aksaray G, Kaptanoğlu C. Calgary Depresyon Ölçeği'nin şizofreni hastalarında geçerlik ve güvenilirlik çalışması. *Türk Psikiyatri Dergisi* 2000; 11:278-284.
24. Aydemir Ö, Danacı Esen A, Deveci A. Calgary Şizofrenide Depresyon Ölçeği'nin Türkçe versiyonunun güvenilirliği ve geçerliliği. *Nöropsikiyatri Arşivi* 2000; 37:82-86.
25. Heaton RK. Wisconsin Card Sorting Test Manual. Odesa (FL), Psychological Assessment Test Resources, Inc; 1981.
26. Karakaş S, Irak M, Ersezgin ÖU. Wisconsin Kart Eşleme Testi (WCST) ve Stroop Testi TBAG formu puanlarının test içi ve testler-arası ilişkileri. X. Ulusal Psikoloji Kongresi özet kitabı, 1998, s: 44.
27. Karakaş S. BİLNOT Bataryası El Kitabı: Nöropsikolojik Testler için Araştırma ve Geliştirme Çalışmaları. Dizayn Ofset Ankara, 2004.
28. Stroop JR. Studies of interference in serial verbal reaction. *J Exp Psychology* 1935; 18:643-662. [\[CrossRef\]](#)
29. Karakaş S, Erdoğan E, Sak L, Soysal AŞ, Ulusoy T, Ulusoy İY, Alkan S. Stroop testi TBAG formu: Türk kültürüne standardizasyon çalışmaları, güvenilirlik ve geçerlilik. *Klinik Psikiyatri* 1999; 2:75-88.
30. Midin M, Razali R, Zamzam R, Fernandez A, Hum LC, Shah SA, Radzi RS, Zakaria H, Sinniah A. Clinical and cognitive correlates of employment among patients with schizophrenia: a cross-sectional study in Malaysia. *Int Ment Health Syst* 2011; 5:1-7. [\[CrossRef\]](#)
31. Zanella A, Perrig L, Huguelet P. Cognitive functions related to interpersonal problem-solving skills in schizophrenic patients compared with healthy subjects. *Psychiatry Res* 2006; 142:67-78. [\[CrossRef\]](#)
32. Genç-Açıkgöz D, Karakaş S. AVLT'nin Türk diline uyarlanmasına ilişkin bir çalışma. IX. Ulusal Psikoloji Kongresi. İstanbul: 1996a.
33. Genç-Açıkgöz D, Karakaş S. Bellek ve dikkat fonksiyonlarını ölçen nöropsikolojik testlerin faktör yapısı. IX. Ulusal Psikoloji Kongresi İstanbul: 1996b.
34. Çetin Ö, Eker SS. Şizofreni ve özkıym. Psikiyatride güncel yaklaşımlar. *Current Approaches in Psychiatry* 2011; 3:611-627.
35. Tekin Z. Bir psikiyatri hastanesinde tedavi gören şizofrenili hastalarda intihar düşüncesi: Pozitif, negatif belirtiler ve depresyon ile ilişkisi. Sağlık Psikolojisi Anabilim Dalı yüksek lisans tezi. Karadeniz Teknik Üniversitesi Sağlık Bilimleri Enstitüsü, Trabzon; 2007.
36. Sevinçok L. Şizofrenide depresyon. Şizofreni Dizisi 1998; 2:46-53.
37. Eskin M. İntihar: açıklama, değerlendirme, tedavi ve önleme. Ankara: Çizgi Tıp Yayınevi; 2003.
38. Öztürk MO, Uluşahin A. Şizofreni. Ruh Sağlığı ve bozuklukları I içinde. 11. Baskı. Ankara: Nobel Tıp Kitapevleri; 2008. s.243-323.
39. Aydemir Ö, Danacı AE, Pırıldar Ş. Şizofrenide depresyonu olan ile olmayan hastaların belirti yönünden ayrımı. *Türk Psikiyatri Dergisi* 2002; 13:173-178.
40. Bolton C, Gooding P, Kapur N, Barrowclough C, Tarrier N. Developing psychological perspectives of suicidal behaviour and risk in people with a diagnosis of schizophrenia: We know they kill themselves but do we understand why? *Clin Psychol Rev* 2007; 27:511-536. [\[CrossRef\]](#)
41. Kırpınar İ, Aydın N. Şizofrenide intihar. *Anadolu Psikiyatri Dergisi* 2001; 2:47-52.
42. Hawton K, Sutton L, Haw C, Sinclair J, Deeks JJ. Schizophrenia and suicide: systematic review of risk factors. *Br J Psychiatry* 2005; 187:9-20. [\[CrossRef\]](#)
43. Ceylan ME, Çetin M. Şizofreni ve İntihar: Araştırma ve Klinik Uygulamada Biyolojik Psikiyatri. Şizofreni I. cilt içinde. Uzun Ö, editör: 4. Baskı. İstanbul: İncekara Kağıt Mat. San. ve Dış Tic. Ltd. Şti; 2009. s.1231-1240.
44. De Hert M, Mckenzie K, Peuskens J. Risk factors for suicide in young patients suffering from schizophrenia. *Schizophr Res* 2001; 47:127-134. [\[CrossRef\]](#)
45. Sullivan EV, Mathalon DV, Zipursky RB ve ark. Factors of the Wisconsin Card Sorting Test as Measures of Frontal-Lobe Function in Schizophrenia and in Chronic Alcoholism. *Psychiatry Res* 1993; 46:175-199. [\[CrossRef\]](#)
46. Kayahan B, Veznedaroğlu B, Öztürk Ö, Ersoy MA. Atipik antipsikotik ilaçların şizofreni hastalarında kısa kognitif muayene üzerine etkisi: Tipik antipsikotiklerle karşılaştırmalı doğal izlem çalışması. *Anadolu Psikiyatri Derg* 2004; 5:206-212.