

# The Relationship Between Depression, Anxiety and Stress Levels on Suicidal Behavior in Patients with Schizophrenia

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## ABSTRACT

**Background:** Suicide is a major public health problem, and most people, who attempt suicide, have a psychiatric disorder. The preventable nature of suicide has further warranted the conduct of studies on suicide.

**Methods:** This cross-sectional and descriptive study aimed to investigate the effects of depression, anxiety, and stress levels on suicidal behavior in patients with schizophrenia. The study included 222 patients with schizophrenia. Data were collected by using the Descriptive Information Form, the Suicide Behaviors Questionnaire, and the Depression Anxiety Stress Scales–Short Form.

**Results:** It was found that 47.7% of the participants had suicidal ideation and 33.8% of them had attempted suicide by taking pills, self-cutting, jumping from a height, and hanging. While the participants had moderate levels of depression and anxiety, their stress levels were normal. The study has shown that the variables of stress, a good income level, and employment affect suicidal behavior, with a 1-unit increase in stress scores leading to an increase by 0.942, a 1-unit decrease in the good income level leading to an increase by 1.132, and a 1-unit increase in employment leading to an increase by 1.316 in suicidal behavior. Stress, income status, and employment accounted for 42.3% of the change in suicidal behavior.

**Conclusion:** This study has shown that suicidal ideation and suicide attempts are common in patients with schizophrenia compared to the normal population, and increased stress levels, poor income, and working in a job increased the risk of suicide among these patients. It can be suggested that efforts for improving stress management in patients during the post-pandemic period may be effective in reducing the risk of suicide.

## ARTICLE HISTORY

**Received:** December 28, 2022

**Accepted:** March 19, 2023

**Publication Date:** May 24, 2023

## INTRODUCTION

Schizophrenia is a public mental health problem affecting approximately 1% of the population, starting at a young age, and following a chronic course. It has been reported that 20%-50% of patients with schizophrenia have previous suicide attempts,<sup>1,2</sup> they use more lethal methods to commit suicide compared to other psychiatric patients, 5-15% die of suicide,<sup>2</sup> and globally, 1.3% of deaths were from suicide in 2019.<sup>3</sup> While the first year following the diagnosis, especially the first 3 months, is critical for patients with psychiatric disorders to engage in a suicidal act, this does not hold true for patients with schizophrenia. Because the suicide risk may be high at any time in a patient with schizophrenia, careful consideration of such risks in patients with schizophrenia is always of critical importance.<sup>4</sup> It has been reported that several factors are associated with an increased risk of suicide in patients with schizophrenia. Such factors include the awareness of disease symptoms—particularly, delusions, anhedonia,

asociality, and blunt affect—non-adherence to treatment, depressive symptoms, high insight levels, lack of social support, previous suicide attempts, and increased stress burden.<sup>2</sup>

Stress is an important factor affecting not only the emergence and course of the disorder but also suicidal behavior in patients with schizophrenia. Stressful life events and interpersonal problems have been reported as disease triggers.<sup>5</sup> It is known that individuals suffering from a psychotic episode become vulnerable to adverse life events or experience the emotional reactivity of their relatives as potentially chronic stressors and that the hypothalamic-pituitary-adrenal axis of such patients shows increased sensitivity and trigger recurrences.<sup>6,7</sup> Evaluation of stress intensity and psychiatric symptoms, especially depression, is important to address the suicide risk in schizophrenia. Acting on many aspects of life and leading to many losses, schizophrenia is commonly

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**Cite this article as:** Taktak Ş, Seki Öz H. The relationship between depression, anxiety and stress levels on suicidal behavior in patients with schizophrenia. *Psychiatry Clin Psychopharmacol.* 2023;33(2):108-116.



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comorbid with depression and anxiety. Depression is often overlooked due to the characteristic symptoms of schizophrenia and the side effects of anti-psychotics,<sup>8</sup> while anxiety can be included in the clinical picture through various comorbid anxiety disorders such as obsessive-compulsive disorder.<sup>9</sup>

Affecting the world globally, the COVID-19 pandemic led to serious lifestyle changes and alterations in the delivery of mental healthcare services, affected several vulnerable populations, particularly those with mental disorders, and acted on the engagement of individuals in suicidal behavior, and some studies have reported an increased risk of suicide even in stable patients.<sup>10,11</sup> The COVID-19 pandemic especially affected individuals with mental illness more negatively than other individuals in terms of access to services. In hospitals with limited beds and staff, psychiatry clinics were closed, and these clinics and the health personnel working there were used to combat COVID-19 infection. In addition, units providing psychiatric rehabilitation services had to stop their services due to isolation measures. This may have caused schizophrenia patients to be adversely affected by the pandemic, increased disease symptoms and comorbidities, limited help-seeking behavior, and an increased risk of suicide.<sup>12</sup> For this reason, new studies were needed to guide the planning of mental health services of the healthcare team providing care to schizophrenia patients in the post-pandemic period. Accordingly, this study aimed to examine the effects of depression, anxiety, and stress levels on suicidal ideation in schizophrenia patients. Depression and anxiety are treatable disorders and stress is a manageable phenomenon in schizophrenia; however, completed suicide is irreversible. This research aimed to identify risky groups in schizophrenia, to examine the effects of psychiatric symptoms on suicide, and to obtain information that could shed light on preventive mental health services in order to prevent suicide.

## MATERIALS AND METHODS

### Purpose and Type of Study

The effects of depression, anxiety, and stress levels on suicidal ideation were aimed to be investigated through

#### MAIN POINTS

- Of the individuals with schizophrenia in this study, 47.7% had suicidal ideation and 33.8% had previous suicide attempts.
- The participants in the study had moderate levels of depression and anxiety, but their stress levels were normal.
- There was a weak positive correlation between suicidal behavior and depression and anxiety, and a moderate positive correlation between suicidal behavior and stress.
- We found that the variables of stress, a good income level, and working at a job affected suicidal behavior.
- Mental healthcare teams should carefully consider the risk of suicide in patients with schizophrenia.

this cross-sectional and descriptive study in patients with schizophrenia. Accordingly, the research questions are as follows.

1. Is there a difference in suicidal behavior, depression, anxiety, and stress levels of patients diagnosed with schizophrenia according to their diagnostic characteristics?
2. Is there a relationship between suicidal behavior, depression, anxiety, and stress levels of patients diagnosed with schizophrenia?
3. Do the descriptive characteristics and depression, anxiety, and stress levels of patients diagnosed with schizophrenia have an effect on suicidal behavior?

### Study Population and Sample

The study was carried out with patients registered with the Community Mental Health Center (CMHC) in Kırşehir in Turkey. There are 500 schizophrenia patients registered with the CMHC in Kırşehir. Using the sample size calculation method for a known population to identify eligible patients for the study, 218 subjects were planned to constitute the study sample with a 5% margin of error and a 95% confidence interval. The study was completed with 222 subjects. Inclusion criteria for the study required subjects to have the diagnosis of schizophrenia as per Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) criteria, be at the age of 18 or over, be in remission (no exacerbations requiring hospitalizations or modifications of treatment in the last 6 months), have agreed to participate in the study and signed the informed consent form voluntarily and be legible. Exclusion criteria were having psychiatric comorbidities diagnosed as per DSM-5 criteria, a diagnosis of a physical or neurological disease that might affect the general condition of the patient or interfere with the interview with the patient, a history of alcohol or substance use disorder in the last 6 months, comorbid chronic diseases not stable despite treatment, and limited mental capacity disabling the patient to understand scale items to be administered during the psychiatric interview.

### Study Conduct

During the period from June 2022 to September 2022, the study was carried out with schizophrenia patients registered with the CMHC in Kırşehir. Established in 2011, Kırşehir CMHC is located in the city center. The CMHC building has 3 floors and includes painting, music, handicrafts, physical education, and chess workshops. The institution is staffed by a physician in charge, 4 nurses, 2 psychologists, a social worker, a medical technologist, a secretary, a cleaning staff, and a security guard. The institution is open on weekdays during working hours and offers group and individual psychotherapies, psychoeducation, music, coloring, exercise, and other activities. During the COVID-19 pandemic, only outpatient clinic services were provided and home visits were made

when necessary. After obtaining the permissions necessary for the study conduct, eligible patients presenting to the CMHC for outpatient services were informed about the study. Before the patients were included in the study, the schizophrenia diagnosis was confirmed by the researcher, who was a psychiatrist, and they were re-evaluated in terms of inclusion and exclusion criteria. During the 4-month period of the study, 367 schizophrenia patients applied to the CMHC outpatient clinic. In accordance with the inclusion and exclusion criteria, 222 patients were included in the study and 145 patients were excluded. The research was completed with 222 people who met the inclusion criteria. The interviews were conducted in halls and rooms available for use for recreational activities with patients in the CMHC. The questionnaires were filled out during face-to-face interviews with the patients included. The administration of questionnaires took approximately 10-15 min.

#### Data Collection Tools

Study data were collected by using the Descriptive Information Form, the Suicide Behaviors Questionnaire, and the Depression Anxiety Stress Scales–Short Form.

**Descriptive Information Form:** In this form developed by the researchers, there were 15 questions asking for information about the disease and the sociodemographic characteristics of participants.

**Suicide Behaviors Questionnaire:** Developed by Linehan and Nielsen in 1981, the scale was adapted into Turkish by Bayam et al (1995).<sup>13</sup> In the scale consisting of 4 items, the first item is about “suicide plans and attempts,” the second item is about “suicidal ideation,” the third item is about the “threat of suicide attempts,” and the fourth item is about the “likelihood of repeat suicide attempts.” The total scale score may range from 0 to 14. A score of “0” indicates that no suicidal behavior exists, while the highest score indicates the most severe type of suicidal behavior. Cronbach’s alpha coefficient for internal consistency in the Turkish version of Suicide Behaviors Questionnaire (SBQ) was found to be .73.

**Depression Anxiety Stress Scales–Short Form:** Following the first version of the 42-item scale developed by Lovibond and Lovibond (1995), Henry and Crawford (2005) converted the scale into a 21-item short form. The short form, the 21-item form of the scale, was adapted into Turkish by Sarıçam (2018) on normal and clinical sample populations, and the study reported that individuals diagnosed with depression, anxiety, and stress had distinctive features from those not diagnosed with such disorders.<sup>14</sup> The 5-point Likert-type scale consists of 7 questions for each of the depression, anxiety, and stress domains. A total scale score is not calculated. In the study for the adaptation of the scale to the Turkish language, Cronbach’s alpha coefficient for internal consistency was found to be 0.68 for depression, 0.66 for anxiety, and 0.61 for stress.

#### Data Analysis

The statistical analyses of this study were performed by using the Statistical Package for the Social Sciences 25.0 (IBM SPSS Corp., Armonk, NY, USA) for Windows. The data obtained as a result of the research were presented with descriptive statistics such as number, percentage, mean, standard deviation, median, minimum, and maximum. The Kolmogorow-Smirnov test was used to assess whether the data including all participants ( $n=222$ ) were normally distributed and it was found that the data were not normally distributed. Therefore, intergroup comparisons of dependent variables according to descriptive characteristics were made with Mann-Whitney *U* test, Kruskal-Wallis test, and adjusted Bonferroni test. The Spearman correlation coefficient was used for the relationship between dependent variables. After excluding the participants without suicidal ideation ( $n=106$ ) as per SBQ, the examination of the conformity to a normal distribution again revealed that the resulting data were normally distributed based on the skewness and kurtosis values. A multiple linear regression analysis was used to analyze the model, where SBQ was used as the dependent variable to examine the effect of the independent variables. In statistical decisions, a *P*-value of  $<.050$  was considered to indicate a significant difference.<sup>4</sup>

#### Ethics Committee Approval

Ethical committee approval was received from the Ethics Committee of Kırşehir Ahi Evran University (Approval Number: 2022-08/77, Date: 26.04.2022). After receiving the approval of the ethics committee, permission was obtained from the institution, where the research would be conducted. All participants of the study were informed about the study, and both written and verbal consent was obtained.

#### RESULTS

The majority of the participants were 50 years old and over, men, single, primary school graduates, unemployed, and smokers. Furthermore, the majority of the participants lived in the city center, had expenses as much as their incomes, used prescribed medications regularly, did not use alcohol, did not engage in regular workouts, and considered themselves adherent to a healthy diet. When the suicidal ideation of the participants was examined, it was found that 47.7% ( $n=106$ ) had suicidal ideation and 33.8% had previous suicide attempts. The mean number of suicide attempts was  $2.84 \pm 5.74$  (1-50). The methods, by which participants attempted suicide in decreasing order of frequency, were deliberate overdose (50%), self-cutting (18.4%), jumping from a height (15.8%), hanging (14.5%), shooting oneself with a firearm (2.6%), gas inhalation (1.3%), drowning (1.3%), and starting a fire (1.3%). Five percent of the participants stated that a first-degree

**Table 1.** Comparison of SBQ and DASS-21 Sub-dimensions by the Descriptive Characteristics of the Participants (n=222)

	SBQ			Depression		Anxiety		Stress	
	n (%)	Median (Min-Max.)	Test P	Median (Min-Max.)	Test P	Median (Min-Max.)	Test P	Median (Min-Max.)	Test P
<b>Age (years)</b>									
18-29	29(13.06)	1 (0-9)	9.744 .021*	8 (0-15)	5.552 .134	6 (0-11)	9.508 .023*	9 (0-16)	7.794 .050
30-39	37(16.66)	0 (0-9) <sup>1</sup>		6 (0-19)		6 (0-11)		5 (1-15)	
40-49	67(30.19)	2 (0-13) <sup>1,2</sup>		8 (0-20)		7 (0-19) <sup>1</sup>		7 (0-20)	
50 and over	89(40.09)	0 (0-10) <sup>2</sup>		6 (0-18)		4 (0-17) <sup>1</sup>		4 (0-17)	
<b>Gender</b>									
Men	156(70.27)	0 (0-13)	.266	7 (0-20)	.267	5 (0-19)	.002	5 (0-20)	.622
Women	66(29.73)	1 (0-9)	.790	8 (0-19)	.789	6 (0-14)	.998	6 (0-15)	.534
<b>Marital status</b>									
Married	60(27.02)	1 (0-13) <sup>1</sup>	6.738 .035*	9 (0-20) <sup>1</sup>	15.392 <.001*	7 (0-18) <sup>1</sup>	15.638 <.001*	7 (0-20) <sup>1</sup>	7.460 .024*
Single	115(51.80)	0 (0-10) <sup>1</sup>		5 (0-19) <sup>1,2</sup>		4 (0-19) <sup>1</sup>		5 (0-19) <sup>1</sup>	
Divorced	47(21.18)	1 (0-9)		8 (0-19)		6 (0-17)		5 (0-20)	
<b>Educational status</b>									
Elementary school	98(44.14)	1 (0-13)	8.331 .040*	8 (0-19) <sup>1</sup>	15.176 .002*	7 (0-19)	3.753 .289	6.5(0-19)	5.845 .119
Secondary school	56(25.23)	0 (0-9)		6 (0-19)		5 (0-14)		5 (0-17)	
High school	41(18.46)	1 (0-10) <sup>1</sup>		8 (0-20) <sup>2</sup>		6 (0-17)		7 (0-20)	
University	27(12.17)	0 (0-8) <sup>1</sup>		3 (0-14) <sup>1,2</sup>		4 (0-18)		4 (0-16)	
<b>Working status</b>									
Employed	20(9.01)	1 (0-6)	.769	7.5 (0-18)	.051	7.5 (0-18)	.897	10 (0-13)	.561
Unemployed	202(90.99)	1 (0-13)	.442	7 (0-20)	.959	5.5 (0-19)	.370	5 (0-20)	.582
<b>Place of residence</b>									
City center	177(79.72)	1 (0-13)	1.603	7 (0-20)	1.658	6 (0-19)	.811	6 (0-20)	1.298
District, village	45(20.28)	0 (0-8)	.109	6 (0-18)	.097	5 (0-18)	.418	5 (0-13)	.194
<b>Income status</b>									
Income <Expenses	76(34.23)	2 (0-10) <sup>1,2</sup>	10.661 .005*	9 (0-18) <sup>1</sup>	6.710 .035	7 (0-17)	5.026 .081	8 (0-20) <sup>1</sup>	7.156 .028*
Income=Expenses	123(55.40)	0 (0-13) <sup>1</sup>		6 (0-20)		5 (0-17)		5 (0-19)	
Income>Expenses	23(10.37)	0 (0-9) <sup>2</sup>		6 (0-19) <sup>1</sup>		2 (0-19)		4 (0-17) <sup>1</sup>	
<b>Regular medication use</b>									
Yes	199(89.63)	0 (0-10)	2.177	6 (0-20)	.919	5 (0-19)	2.469	5 (0-20)	2.795
No	23(10.37)	2 (0-13)	.034*	9 (0-16)	.358	7 (0-15)	.014*	10 (1-16)	.005*
<b>Clozapine use</b>									
Yes	43(19.37)	0 (0-9)	-.014	8 (0-19)	-1.098	7 (0-19)	-.993	9 (1-17)	-1.146
No	179(80.63)	1 (0-13)	.989	7 (0-20)	.272	6 (0-18)	.321	7 (0-20)	.252
<b>Smoking status</b>									
Yes	122(55)	1 (0-13)	1.777	7 (0-20)	.093	5 (0-19)	1.591	7 (0-20)	.136
No	100(45)	0 (0-9)	.076	7 (0-19)	.926	6.5 (0-18)	.112	5 (0-17)	.892
<b>Alcohol use</b>									
Yes	24(10.81)	2 (0-12)	1.653	7 (0-20)	.658	6 (0-18)	1.211	6 (0-19)	1.298
No	198(89.19)	1 (0-9)	.119	7 (0-18)	.597	5 (0-18)	.218	5 (0-18)	.194
<b>Regular workouts</b>									
Yes	79(35.58)	0 (0-9)	2.816	5 (0-18)	4.423	4 (0-14)	3.623	4 (0-19)	4.153
No	143(64.42)	1 (0-13)	<.001*	9 (0-20)	<.001*	7 (0-19)	<.001*	7 (0-20)	<.001*
<b>Healthy eating status</b>									
Yes	137(61.71)	0 (0-10)	-3.864	5 (0-20)	-4.581	4 (0-19)	-4.462	4 (0-19)	-4.935
No	85(38.29)	2 (0-13)	<.001*	9 (0-18)		8 (0-17)	<.001*	9 (0-20)	<.001*
<b>Previous suicide attempts</b>									
Yes	75(33.78)	4 (0-10)	10.172	9 (0-20)	4.267	7 (0-19)	4.056	9 (0-20)	5.545
No	147(66.22)	0 (0-13)	<.001*	6 (0-19)	<.001*	5 (0-18)	<.001*	4 (0-19)	<.001*
<b>Total</b>	222 (100)								

Mann-Whitney U test, Kruskal-Wallis H test, adjusted Bonferroni test.

<sup>1,2</sup>Subgroups contributing to a difference, \*P < .050.

DASS-21, Depression Anxiety Stress Scales–Short Form; SBQ, Suicide behaviors questionnaire.

relative in the family also had a suicide attempt. The age of the participants was  $45.92 \pm 12.31$  (18-80), the age at which they were diagnosed with schizophrenia was  $26.20 \pm 10.92$  (11-61), and the disease duration was  $19.77 \pm 11.15$  (2-50) years. The number of hospitalizations in the last 5 years was determined as  $2.60 \pm 3.16$  (0-14) (Table 1).

The examination of the mean SBQ scores of the subjects showed significantly increased scores in subjects, who were in the 40-49-year-old range, were married or divorced, were high school graduates, had income less than expenses, used prescribed medications regularly, were not engaged in regular workouts, were not eating healthy, and had previous suicide attempts ( $P < .050$ ). Depression scores were increased in subjects, who were married or divorced, were graduates of primary or high schools, had income less than expenses, were not engaged in workouts, were not eating healthy, and had previous suicide attempts. Significantly increased anxiety scores were found in subjects, who were in the age range of 40-49 years, were married, had medication nonadherence, were not engaged in regular workouts, were not eating healthy, and had previous suicide attempts ( $P < .050$ ). When the stress levels were examined, the scores were found to be increased in subjects, who were married, had income less than expenses, took medications regularly, were not engaged in regular workouts, were not eating healthy, and had previous suicide attempts ( $P < .050$ ).

The participants in the study had moderate levels of depression and anxiety, but their stress levels were normal. The examination of the Cronbach  $\alpha$  coefficients of the scales revealed that all scales used in the study had internal consistency (Table 2).

Suicide behaviors questionnaire and the sub-dimensions of Depression Anxiety Stress Scales–Short Form (DASS-21) revealed weak but positive correlations between depression and SBQ ( $r=0.447, P < .001$ ) and between anxiety and SBQ ( $r=.484, P < .001$ ), and a moderately positive correlation between stress and SBQ ( $r=.559, P < .001$ ) (Table 3).

**Table 2.** Internal Consistency Coefficients and Mean Scores of the Scales Used in the Study

	$\bar{X} \pm SD$	Min-Max	Cronbach's $\alpha$ coefficient
SBQ (n=222)*	$1.95 \pm 2.69$	0-13	0.793
SBQ (n=106)**	$3.67 \pm 2.27$	1-13	0.758
DASS-21-Depression	$7.80 \pm 5.25$	0-20	0.828
DASS-21-Anxiety	$6.03 \pm 4.42$	0-19	0.820
DASS-21- Stress	$6.54 \pm 4.87$	0-20	0.856

\*The analysis included the scale scores of all participants in the study.  
 \*\*Participants with "0" scores on the scale, indicating the subjects with no suicidal ideation, were excluded from the analysis. Subjects scored 1-13 on the scale were included in the analysis.  
 DASS-21, Depression Anxiety Stress Scales–Short Form; SBQ, Suicide behaviors questionnaire.

**Table 3.** Correlation Analysis Between SBQ and the Sub-dimensions of DASS-21 (n=222)

		Depression	Anxiety	Stress
SBQ	<i>r</i>	0.447	0.484	0.559
	<i>P</i>	<.001*	<.001*	<.001*
Depression	<i>r</i>	1	0.743	0.732
	<i>P</i>		<.001*	<.001*
Anxiety	<i>r</i>		1	0.763
	<i>P</i>			<.001*

\* $p < .050$ , DASS-21, Depression Anxiety Stress Scales–Short Form; SBQ, Suicide behaviors questionnaire.

Multiple linear regression analysis was performed to examine the effects of DASS-21 sub-dimensions and demographic characteristics on suicidal behavior. Subjects with a total SBQ score of 0 (n=116) were excluded from the analysis because they did not show any suicidal behavior. The multiple linear regression analysis was performed after observing that the data of SBQ scores of 1-13 points (n=106) showed a normal distribution based on the kurtosis and skewness values. The SBQ total score was included in the model as the dependent variable. Independent variables included in the model were depression, anxiety, and stress levels, as well as, age, disease duration in years, gender, marital status, educational status, employment status, income status, place of residence, medication use, workouts, healthy diet, and previous suicide attempts. The stepwise analysis showed that the model, which included stress, income status, and working status as variables, was statistically significant based on the significance level corresponding to the F value ( $F=24.899; P < .001$ ) (Table 4). When the beta coefficient, *t*-value, and significance level were examined concerning the independent variables, it was observed that the stress variable had a statistically significant effect on suicidal behavior ( $t=6.969 P < .001$ ). A 1-unit increase in the stress variable led to an increase by 0.942 in suicidal behavior ( $\beta=0.942$ ). Income status had a statistically significant effect on suicidal behavior ( $t=-3,196, P = .002$ ), and a 1-unit favorable increase in income status was found to cause a decrease by 1.132 in suicidal behavior ( $\beta=-1.132$ ). Employment had a statistically significant effect on suicidal behavior ( $t=2.203 P = 0.030$ ), with a 1-unit increase in working status causing an increase by 1.316 in suicidal behavior ( $\beta=1.316$ ). It was observed that stress, income status, and working status accounted for 42.3% of the change in suicidal behavior ( $R^2=0.423$ ). The Durbin-Watson value was in the range of 1.5 and 2.5, showing that an autocorrelation issue did not exist in the model (Durbin-Watson: 1.911).

## DISCUSSION

Suicide is a major public health problem, and the majority of individuals, who attempted suicide, were suffering from a psychiatric disorder. Suicide is a preventable

**Table 4.** Regression Analysis to Examine the Effects of DASS-21 Sub-dimensions and the History of Suicide Attempts on Suicidal Behavior (n = 106)

Model	Independent Variable	Dependent Variable, SBQ					
		$\beta$	<i>t</i>	<i>P</i>	<i>F</i>	Model ( <i>P</i> )	<i>R</i> <sup>2</sup>
1	Fixed	2.035	4.953	<.001*	24.899	<.001*	0.423
	Stress	0.942	6.969	<.001*			
	Income status	-1.132	-3.196	.002*			
	Working status	1.316	2.203	.030*			

\**P* < .050, multiple linear regression.

DASS-21, Depression Anxiety Stress Scales–Short Form; SBQ, Suicide behaviors questionnaire.

phenomenon, warranting the conduct of further studies about suicide. Of the individuals with schizophrenia in this study, 47.7% had suicidal ideation and 33.8% had previous suicide attempts. The mean number of suicide attempts was  $2.84 \pm 5.74$  (1-50) in the study. The methods, by which participants attempted suicide in decreasing order of frequency, were deliberate overdose, self-cutting, jumping from a height, hanging, shooting oneself with a firearm, gas inhalation, drowning, and starting a fire. Suicide risk is 12 times higher in patients with schizophrenia compared to the general population, and 20%-50% of patients experience thoughts about ending their lives.<sup>1,2</sup> In studies, the lifetime prevalence of suicide in schizophrenia patients is reported as 10%, and the risk of death by suicide is reported to be approximately 5%-15%.<sup>2,3</sup> In the study conducted by Yıldız et al<sup>15</sup> (2010) with 720 patients diagnosed with schizophrenia, it was found that 51.8% of the patients had suicidal ideation and 27.6% had previous suicide attempts. The rate of suicidal ideation (47.2%) was found to be similar to the literature in this study, and this rate is remarkable. This finding has been considered to be the result of the interplay of several factors due to the COVID-19 pandemic, including the restrictions imposed as precautions, increasing economic, psychological, and social problems, interrupted/modified mental healthcare services, and problems with access to necessary medications and care.

The examination of the mean SBQ scores of the subjects in this study showed significantly increased scores in subjects, who were in the 40-49-year-old range, were married or divorced, were high school graduates, had income less than expenses, used prescribed medications regularly, were not engaged in regular workouts, were not eating healthy, and had previous suicide attempts. When the literature is reviewed, it is found that risk factors for suicide in schizophrenia include young age, male gender, being unmarried, living alone, unemployment, a favorable level of intelligence, having insight, having a favorable educational status, a history of good premorbid functioning, having high personal expectations and hopes, recent life events, unfavorable work performance, and having access to deadly tools such as firearms.<sup>16,17</sup> It has been reported that low educational status, poor income, and a comorbid

chronic disease with schizophrenia lead to negative emotions in patients and increase the risk of suicide.<sup>18</sup> The negative connotations of the diagnosis of psychotic disorders and the burden that may be directly related to a feeling of being trapped can prepare the grounds for a suicidal crisis in these individuals. Furthermore, suffering from the disorder, self-stigmatization, social rejection, and related consequences can instill hopelessness and fuel suicidal thoughts. The quality and improvements of insight may worsen depressive experiences and the risk of suicide.<sup>19</sup> Suicide can occur at any time during the clinical course of schizophrenia, but it is emphasized that the highest risk of suicide pertains to the first 10 years of the disorder.<sup>20</sup> Although young age is considered a risk factor for suicide, similar to our study, a study conducted in China has reported that the patients with schizophrenia with previous suicide attempts were significantly older and had more severe disease symptoms compared to those with no suicide attempts and that positive symptoms were significantly associated with suicide attempts.<sup>19</sup> In another study, too, it was found that the rate of suicide attempts is high in middle-aged and older patients with schizophrenia and cognitive impairments were less associated but clinical symptoms were more associated with suicide attempts.<sup>21</sup> In our study, unlike the literature, it was found that married and middle-aged patients had increased suicidal ideation. It was considered that this situation was related to the increase in economic, social, and familial problems due to the pandemic, and the married and middle-aged populations encountered such problems more commonly compared to other demographic groups. Again, unlike the literature, we found that patients taking their medications regularly had high suicidal ideation scores. This might suggest that medication adherence is associated with insight and that a good insight level along with the consequences of the pandemic will increase awareness of all negative experiences and fuel suicidal ideation.

In this study, the participants had moderate depression and anxiety levels, but their stress levels were normal. It was found that depression, anxiety, and stress levels were increased in married or divorced subjects, in subjects at low educational and income levels, in subjects with poor medication adherence, in subjects, who were not

engaged in regular workouts, did not eat healthily, and had previous suicide attempts. In the longitudinal study of Conley et al<sup>22</sup> (2007) 39.4% of patients with schizophrenia were depressed, and depression was significantly more likely to have greater substance-related problems and report poorer life satisfaction, mental functioning, family relationships, and medication adherence. Another study showed that approximately 25% of patients with schizophrenia were prone to depression.<sup>8</sup> It was found that patients with the co-diagnosis of depression suffered from poor psychological and physical health and poor social and environmental quality of life, inadequate social support, and adverse environmental conditions, and these were associated with the high levels of awareness of and insight into the treatment effectiveness and the social consequences of the mental illness.<sup>23</sup> Depressive symptoms, high insight, lack of social support, and a previous suicide attempt are important factors acting on the suicide risk in schizophrenia.<sup>5</sup> In this respect, it can be said that literature findings support our research findings. Besides depressive symptoms, anxiety symptoms are very common in schizophrenia. In a study on anxiety disorders in schizophrenia patients, majority of the patients (62%) were diagnosed with at least one comorbid anxiety disorder.<sup>24</sup> In another study, comorbid anxiety disorders were present in 38.3% of patients with schizophrenia and the most common anxiety disorders were social phobia, post-trauma stress disorder, and obsessive-compulsive disorder.<sup>25</sup> In a study with schizophrenia patients, anxiety and negative childhood experiences and personal distress levels had a significant relationship, while the anxiety was determined by socio-cognitive dimensions.<sup>26</sup> Cognitive symptoms, which are very common to schizophrenia, may also impair the individual's ability to cope with stress, leading to ineffective coping strategies.<sup>27</sup> Psychiatric symptoms such as depression and anxiety are common comorbid symptoms in schizophrenia, and, together with stress, they may aggravate the clinical picture.<sup>28</sup> It can be said that depression, anxiety, and stress which was accompanying schizophrenia were affected by some dynamics such as environmental condition, some personal characteristics, lifestyle habits, medication adherence, and previous suicide attempt.

Suicide is a major factor associated with reductions in life expectancy in patients with schizophrenia. In this study, we found that the variables of stress, a good income level, and working at a job affected suicidal behavior, with a one-unit increase in stress scores leading to an increase by 0.942, a 1-unit increase in the good income level leading to a reduction by 1.132, and a 1-unit increase in the working status leading to an increase by 1.316 in suicidal behavior. Stress, income status, and employment accounted for 42.3% of the change in suicidal behavior. Stress is a factor that negatively affects both the onset and course of schizophrenia. It was emphasized that patients with schizophrenia were affected by social stimuli, which

could be either sudden life events or the expressed emotions of the relatives as long-term stress factors.<sup>29</sup> It was observed that stressful life events acted on the relapse rates of schizophrenia, and this was associated with the reduced usage of effective coping mechanisms to deal with stressors.<sup>7,30</sup> In a study, it was shown that individuals suffering from a psychotic episode were overexposed to stressful life events, consequently leading to a higher sensitivity of the hypothalamic-pituitary-adrenal axis.<sup>6</sup> Therefore, it can be argued that the inevitable nature of stressful life events and increased stress associated with the pandemic might increase the risk of suicide in people, who cannot cope with stress effectively and cannot find the necessary support. A study reported that anxiety, impaired daily functioning, low self-esteem, high levels of distress, and relapses were associated with suicide rates in patients with schizophrenia.<sup>27</sup> It can be suggested that these variables are directly related to our study findings associated with employment and income status. Besides unemployment as a risk factor for suicide in people with schizophrenia, being intelligent, well-educated, well-adjusted, and having a favorable level of functioning, high personal expectations, hopes, insight into the fact that expectations and hopes may not be met, and poor job functioning were listed as risk factors, too.<sup>2</sup> In our study, we found that employment increased the risk of suicide. We considered that this finding was mostly related to increased work-related responsibilities and stress burden. Furthermore, it can be suggested that being able to work in a job may be associated with a favorable insight level, which may elevate personal expectations and awareness, aggravating hopelessness, and eventually leading to suicide.

The main strength of this study is to evaluate suicidal behavior in patients with schizophrenia more than 2 years after the onset of the pandemic in our country. Another strength is the inclusion of patients in remission and without additional psychiatric diagnoses. It also has some limitations. A limitation is that the study was conducted in a single center and only patients registered to this center were included in the sample. It is recommended that multicenter and community-based field studies be planned to include patients who cannot access services or are not registered with an institution. The research is a cross-sectional study, so a causal effect between suicidal behavior and various factors cannot be inferred. Longitudinal studies are therefore recommended. In addition, information on patients' medication-use patterns was obtained from the patients. Misconceptions in this factor may lead to different outcomes for suicidal behavior. Another limitation is that a self-report scale was used to evaluate the psychiatric symptoms of the patients participating in the study. Overall, the results of the study cannot be directly attributed to the COVID-19 pandemic, as we did not identify the status of suicide risk and psychiatric symptoms before the pandemic.

Patients with schizophrenia have a high risk of suicide throughout the disease course with relapses and remissions. Comorbidities between various diseases and mental disorders are often associated with an increased risk of suicide, warranting the assessment of depression, anxiety, and stress in this patient population. This study has shown that suicidal ideation and suicide attempts are common in patients with schizophrenia compared to the normal population, and increased stress levels, poor income, and working in a job increased the risk of suicide in these patients. It can be suggested that efforts for improving stress management in patients during the post-pandemic period may be effective in reducing the risk of suicide. Furthermore, it is considered that high levels of interest and effort by mental healthcare professionals are of great importance in order to prevent suicide in patients with schizophrenia.

**Ethics Committee Approval:** Ethical committee approval was received from the Ethics Committee of Kırşehir Ahi Evran University (Approval No: 2022-08/77).

**Informed Consent:** Informed consent was obtained from all participants who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept - Ş.T., H.S.Ö.; Design - Ş.T., H.S.Ö.; Supervision - Ş.T., H.S.Ö.; Funding - Ş.T., H.S.Ö.; Materials - Ş.T., H.S.Ö.; Data Collection and/or Processing - Ş.T., H.S.Ö.; Analysis and/or Interpretation - H.S.Ö., Ş.T.; Literature Review - Ş.T., H.S.Ö.; Writing - H.S.Ö., Ş.T.; Critical Review - Ş.T., H.S.Ö.

**Acknowledgments:** The authors are grateful to the patients with schizophrenia who participated in the research.

**Declaration of Interests:** The authors declare that they have no competing interest.

**Funding:** The authors declare that this study had received no financial support.

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