

ORIGINAL ARTICLE

Medicine Science 2025;14(3):811-20

Investigation of the disease course of individuals with severe mental illness followed in community mental health center after the earthquake disaster and evaluation of caregiver burden

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Received 16 June 2025; Accepted 28 July 2025

Available online 28 August 2025 with doi: 10.5455/medscience.2025.06.161

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Abstract

Disasters such as earthquakes can lead to adverse psychological outcomes in vulnerable individuals with severe mental illness (SMI). This study aims to investigate how the course of disease and post-traumatic stress disorder (PTSD) symptoms in individuals with SMI are associated with caregiver-related outcomes, including caregiver burden, depression, anxiety, and stress levels. The study included 60 patients who were being followed at the Community Mental Health Center (CMHC) before the earthquake and agreed to participate in the study, along with their caregivers. Patients with SMI were assessed using the Brief Psychiatric Rating Scale (BPRS), the Post-Traumatic Stress Disorder Checklist (PCL-5), the General Health Questionnaire (GHQ-12), and the Clinical Global Impression Scale (CGI). Caregivers were evaluated using the Zarit Burden Interview (ZBI) and the Depression Anxiety Stress Scale – Short Form (DASS-21). Of the cases, 42 (70%) were male, 34 (56.7%) were single, and 30 (50%) were unable to access antipsychotic medication after the earthquake. The BPRS score of individuals who were hospitalized following an episode (62.3 ± 10.9) was significantly higher than those who were not hospitalized (36.8 ± 15.2) ($t=4.268$, $p=.001$). The PCL-5 score was found to have a positive and moderately significant correlation with both the ZBI ($r=.41$, $p=.001$) and the DASS-21 ($r=.38$, $p=.003$). The BPRS score showed a significant positive correlation with both ZBI ($r=.37$, $p=.004$) and DASS-21 scores ($r=.42$, $p=.001$). In conclusion, the worsening clinical course and increased PTSD symptoms in individuals with SMI following the earthquake were significantly associated with increased psychological burden, depression, and anxiety in caregivers. These findings underscore the multidimensional support needs of both patients and their caregivers.

Keywords: Severe mental illness, schizophrenia, earthquake, posttraumatic stress disorder, caregiver

Introduction

Earthquakes are largely uncontrollable and unpredictable disasters that can cause massive destruction across wide areas [1]. On 6 February 2023, two devastating earthquakes, measuring 7.7 and 7.5 in magnitude, struck Türkiye, with the epicentres located in Kahramanmaraş. According to official reports, these earthquakes resulted in at least 53,537 deaths and more than 138,000 injuries [2]. Earthquake survivors may face severe life challenges such as the loss of loved ones, financial losses, economic hardship, and forced migration. In addition

to these difficulties, mental health problems such as acute stress reactions, sleep disturbances, anxiety, depression, and post-traumatic stress disorder (PTSD) are commonly observed among earthquake survivors [3,4].

The effects of traumatic experiences on individuals with severe mental illness (SMI) are complex and not yet fully understood. According to the stress-diathesis model, stressful life events may increase the likelihood of symptom exacerbation in SMIs [5]. It has been suggested that symptom intensification in disorders such as schizophrenia results from a complex

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Sehlikoglu S, Micoogullari O, Pekdemir SA, et al. Investigation of the disease course of individuals with severe mental illness followed in community mental health center after the earthquake disaster and evaluation of caregiver burden. Med Science. 2025;14(3):811-20.



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interaction between persistent psychobiological vulnerability, lack of protective factors (e.g., coping abilities, social support), and exposure to psychosocial stressors. Individuals with SMI may lack adequate coping mechanisms and social resources to manage the stress induced by traumatic events [6]. Additionally, the inability to meet their healthcare needs during a disaster may lead to worsening of the illness and increased rates of hospitalization [7].

Caregivers of individuals with SMI, such as schizophrenia, already face a considerable psychosocial burden. However, this tends to intensify following large-scale disasters, such as earthquakes, leading to increased psychological distress. A study conducted in Japan following an earthquake found that the process of forced relocation significantly increased emotional stress levels among caregivers and led to impairments in social functioning [8]. Moreover, experiencing the loss of loved ones and financial losses further complicated the caregiving process for individuals with SMI and substantially increased the psychological burden on caregivers [9,10].

Community Mental Health Centers (CMHCs), which provide community-based mental health services requiring specialized expertise, have been integrated into the service infrastructure for individuals with mental illness. CMHCs can support people with mental disorders in achieving their recovery goals within and around their communities and can provide appropriate, specialized care to prevent unnecessary psychiatric hospitalizations during crises [7]. Following disasters, difficulties in accessing mental health services—exacerbated by damage to CMHC buildings—can result in inadequate care for these patients [10,11]. In low-income communities with structurally vulnerable post-disaster systems, individuals with SMI often face limited access to hospitals, disruptions in obtaining psychotropic medications, or complete loss of access [12]. Therefore, examining the post-disaster clinical course of individuals with SMI and evaluating caregivers burden is considered crucial for strengthening social capital. The aim of this study is to examine the following aspects in individuals with SMI who were being followed at a CMHC prior to the earthquake, as well as in their caregivers:

1. The course of illness in individuals with SMI in relation to earthquake-related factors,
2. Treatment needs and barriers to accessing care services among individuals with SMI,
3. The burden on caregivers, as well as levels of depression, anxiety, and stress among caregivers,
4. The relationship between the course of illness in individuals with SMI and caregiver burden, and caregivers' levels of depression, anxiety, and stress,
5. The relationship between the severity of PTSD symptoms in individuals with SMI and caregiver burden, and caregivers' levels of depression, anxiety, and stress.

Material and Methods

Participants and Procedure

This study included individuals with SMI who were being followed at the CMHC prior to the February 6 Kahramanmaraş centered earthquakes, as well as their first-degree caregiver relatives. Patients diagnosed with schizophrenia and bipolar disorder were included under the scope of SMI. According to the hospital information system of Adiyaman Training and Research Hospital, there were 153 patients registered at the CMHC as of February 6, 2023. This cross-sectional descriptive study was conducted in accordance with the revised 2013 Declaration of Helsinki. It was approved by the local non-interventional ethics committee of Adiyaman University on November 14, 2023, with the decision number 2023/3-17.

After obtaining ethical approval and institutional permission, the information of these individuals was retrieved from the hospital information system, and contact was attempted via telephone. Data collection for the study began approximately 10 months after the earthquakes. It was learned that 7 individuals had died under the rubble during the earthquake. Additionally, 33 individuals were excluded from the study due to their unwillingness to participate. A total of 11 cases were excluded from the study due to the presence of cognitive impairment associated with the illness, which prevented them from providing adequate responses to the study questions. In 42 cases, no response was received to phone calls. Consequently, 60 individuals with SMI and their 60 caregivers, all of whom agreed to participate in the study after being contacted by telephone, were included. To avoid creating an economic burden for patients and their relatives, assessments were conducted during routine follow-up visits. Neither patients nor their caregivers were asked to come to the hospital separately. Informed consent was obtained from all patients who participated in the study. Verbal consent was also obtained from the patients' legal representatives.

The inclusion criteria for the study were: being over 18 years of age, having a diagnosis of a SMI, and being under follow-up at the CMHC prior to the February 6, 2023 earthquakes. Exclusion criteria included: being under 18 years of age, the presence of a cognitive impairment severe enough to prevent comprehension of the study questions—despite having a SMI and being followed at the CMHC—and refusal to participate in the study.

Measures

Assessment Tools Administered to Patients

Sociodemographic and clinical data form: Patients were evaluated on variables such as age, gender, marital status, education level, occupation, economic status, type of residence, housing conditions, psychiatric diagnosis, age at illness onset, number of episodes before the earthquake, number of hospitalizations, and treatments received prior to the earthquake. Earthquake-related data were collected based on variables including injury status, loss of loved ones, level of housing damage, access to

medication after the earthquake, history of psychiatric episodes, and hospitalization status following the disaster.

Post-Traumatic Stress Disorder Checklist (PCL-5): The PCL-5 is a 20-item self-report measure developed by Blevins et al. to assess PTSD symptoms according to DSM-5 criteria [13]. Each item is rated on a 5-point Likert scale ranging from 0 (“not at all”) to 4 (“extremely”), yielding a total score between 0 and 80. The Turkish adaptation and psychometric evaluation of the scale were conducted by Boysan et al., and the internal consistency coefficient was reported as 0.94 [14]. For the Turkish population, a cut-off score of 47 has been established.

Brief Psychiatric Rating Scale (BPRS): The BPRS was developed by Overall et al. and is used to assess the severity and change of psychotic and some depressive symptoms in individuals with schizophrenia and other psychotic disorders [15]. It is a semi-structured instrument consisting of 18 items. Each item is rated on a scale from 0 to 6, with the total score calculated by summing all item scores. A total score between 15 and 30 indicates a minor syndrome, while a score of 30 or above indicates a major syndrome. The Turkish validity and reliability study was conducted by Soykan [16].

General Health Questionnaire (GHQ-12): The GHQ is used to assess general levels of psychopathology and to identify potential psychiatric cases in community screenings. The original version consisting of 60 items was developed by David Goldberg in 1972. Shorter versions containing 12, 28, 30, and 60 items have also been created. All adaptations have shown high correlations with each other [17]. The validity and reliability studies of the GHQ-12 and GHQ-28 in Türkiye were conducted by Cengiz Kılıç [18].

Clinical Global Impression Scale (CGI): The assessment also included the Clinical Global Impression Scale (CGI), which was developed by Guy in 1976. The CGI rates the severity of illness on a scale from 1 to 7, with higher scores indicating more severe symptoms and a worsening course of illness [19].

Assessment Tools Administered to Caregivers

Zarit Burden Interview (ZBI): The ZBI was developed by Zarit, Reever, and Bach-Peterson [20], and its Turkish validity and reliability were established by İnci and Erdem [21]. The scale, which can be completed either by the caregiver or administered by the researcher, consists of 22 items that assess the impact of caregiving on the caregiver’s life.

Depression Anxiety Stress Scale – Short Form (DASS-21): The Depression Anxiety Stress Scale was originally developed by Lovibond and Lovibond as a 42-item long-form instrument [22]. The short form, known as DASS-21, consists of 21 items. The Turkish adaptation of the DASS-21 was conducted by Yılmaz et al. [23].

Statistical Analysis

The data obtained in this study were analyzed using the SPSS 26.0 software package. The data analysis process was conducted

in three stages: (1) descriptive statistics, (2) between-group comparisons, and (3) examination of relationships among variables. In the first stage, descriptive statistics regarding participants’ sociodemographic characteristics and variables related to illness and the earthquake were summarized using frequency (n) and percentage (%) distributions. For continuous variables, mean, standard deviation, minimum, and maximum values were calculated. The assumption of normality was assessed using the Kolmogorov-Smirnov test, as well as skewness and kurtosis coefficients. Skewness and kurtosis values within the ± 1.5 range were considered indicative of a normal distribution [24]. In the second stage, parametric tests were applied to determine whether scale scores differed according to earthquake-related independent variables (e.g., injury during the earthquake, loss of a loved one, housing damage status, access to medication, experience of psychiatric episodes). For pairwise comparisons, the independent samples t-test was used, while one-way analysis of variance (ANOVA) was applied for comparisons involving three or more groups. When ANOVA revealed a significant difference, the Tukey HSD test was conducted to determine within-group differences. A significance level of $p < 0.05$ was accepted for all analyses. In the third stage, Pearson correlation analysis was conducted to examine the relationships among the scale variables. The resulting correlation coefficients (r) were interpreted to evaluate the direction and strength of the relationships. Correlation values between 0.10–0.29 were considered weak, 0.30–0.49 moderate, and above 0.50 strong [25]. The use of parametric tests throughout the study was supported by the fulfillment of their underlying assumptions. Findings were presented with both statistical values and interpretive explanations.

Results

Examining the sociodemographic data of the 60 individuals with SMI who participated in the study (Table 1) revealed that the largest proportion was in the 31–40 age group (45%, $n=27$), followed by the 41–50 age group (23.3%, $n=14$) and those aged 51 and over (20%, $n=12$). The lowest participation rate was observed in the 20–30 age group, accounting for 11.7% ($n=7$) of the sample. In terms of marital status, the majority of participants were single (56.7%, $n=34$), followed by married individuals (35%, $n=21$), and widowed individuals (8.3%, $n=5$). Regarding gender distribution, 70% of the participants were male ($n=42$), and 30% were female ($n=18$), indicating that male individuals were more prominently represented in the sample. Regarding the age of illness onset, 46.7% of participants ($n=28$) reported onset between the ages of 21–30, 45% ($n=27$) between 10–20 years, and 8.3% ($n=5$) at age 31 or older. In terms of the number of episodes experienced prior to the earthquake, half of the participants ($n=30$) had 1–5 episodes, while 25% ($n=15$) had 6–10, and another 25% ($n=15$) reported more than 11 episodes. Regarding the number of psychiatric hospitalizations, 61.7% ($n=37$) had been hospitalized 0–2 times, 25% ($n=15$) 3–5 times, and 13.3% ($n=8$) six or more times.

Table 1. Descriptive data regarding the sociodemographic and illness-related characteristics of individuals with severe mental illness

Variables	Categories	n	%
Age	20-30	7	11.7
	31-40	27	45
	41-50	14	23.3
	51+	12	20
Marital status	Single	34	56.7
	Married	21	35
	Divorced	5	8.3
Gender	Female	18	30
	Male	42	70
Education status	Illiterate	4	6.7
	Primary education	21	35
	High school	23	38.3
	University	12	20
Place of residence	Village	7	11.7
	City	53	88.3
Housing status	House	37	61.7
	Container	23	38.3
Economic status	Low	27	45
	Middle	33	55
Occupation	Housewife	10	16.7
	Civil servant	10	16.7
	Worker	3	5
	Private occupation	2	3.3
	Unemployed	35	58.3
Chronic disease status	Yes	21	35
	No	39	65
Smoking	Yes	39	65
	No	21	35
Alcohol use	Yes	4	6.7
	No	56	93.3
Age of illness onset	10-20	27	45
	21-30	28	46.7
	31+	5	8.3
Number of episode experienced prior to the earthquake	1-5	30	50
	6-10	15	25
	More than 11	15	25
Number of psychiatric hospitalization	0-2	37	61.7
	3-5	15	25
	6+	8	13.3
Depot injection treatment	Yes	22	36.7
	No	38	63.3
Oral antipsychotic medication use	Single	26	43.3
	Multiple	30	50
	No	4	6.7
Mood stabilizer use	Yes	13	21.7
	No	47	78.3
Active medication use	Yes	59	98.3
	No	1	1.7
Diagnosis	Schizophrenia	51	85
	Bipolar disorder	9	15

As shown in Table 2, when the injury status of participants during the earthquake was examined, 16.7% (n=10) reported being injured, while 83.3% (n=50) did not experience any physical injury. Regarding the loss of loved ones, 68.3% (n=41) reported losing other relatives, 8.3% (n=5) lost first-degree relatives, and 23.3% (n=14) did not report any loss. In terms of housing damage, 60% (n=36) reported minor damage to their homes, 13.3% (n=8) reported moderate damage,

and 26.7% (n=16) reported severe structural damage. When post-earthquake access to medication was evaluated, 55% of participants (n=33) reported being able to access their medications, while 45% (n=27) experienced difficulties. In terms of the duration without medication, half of the participants (50%, n=30) reported being without medication for less than one month, whereas the other half (50%, n=30) remained without medication for one month or longer.

Table 2. Descriptive statistics of earthquake-related variables in individuals with severe mental illness

Variables	Categories	n	%
Earthquake injury	Yes	10	16.7
	No	50	83.33
Losing relatives in an earthquake	No	14	23.3
	First-degree relatives	5	8.3
	Other relatives	41	68.3
Housing damage	Minor	36	60
	Moderate	8	13.3
	Severe	16	26.7
Post-earthquake access to medications	Yes	33	55
	No	27	45
Duration without medication after the earthquake	Less than 1 month	30	50
	1 month or more	30	50
Increase in cigarette use after the earthquake	Yes	25	41.7
	No	35	58.3
Having a manic/psychotic episode	Yes	26	43.3
	No	34	56.7
Hospitalization following an episode	Yes	7	11.7
	No	53	88.3

The mean score on the BPRS was 39.8±16.9 (min=6.00; max=85.00). The mean score on the CGI Scale was 9.7±2 (min=5.00; max=14.00). The mean score on the GHQ-12 was calculated as 17.9±5.8 (min=4.00; max=31.00). The mean score

on the PCL-5 was 39.3±11.2 (min=15.00; max=68.00). The mean score on the ZBI was 44.5±18.5 (min=5.00; max=77.00). The mean score on the DASS-21 was 23.60±9.53 (min=15.00; max=46.00) (Table 3).

Table 3. Descriptive statistics of scales scores

Variables	Mean	Min.	Max.	SD	Skewness	Kurtosis	KS Test
Brief Psychiatric Rating Scale	39.8	6.00	85.00	16.9	0.352	0.031	0.200
Clinical Global Impression Scale	9.7	5.00	14.00	2	0.053	-0.351	0.057
General Health Questionnaire	17.9	4.00	31.00	5.8	0.037	0.203	0.082
Post-Traumatic Stress Disorder Checklist	39.3	15.00	68.00	11.2	0.191	0.339	0.200
Zarit Burden Interview	44.5	5.00	77.00	18.5	-0.300	0.669	0.076
Depression Anxiety Stress Scale – Short Form	23.6	15.00	46.00	9.5	0.985	-0.044	0.051

The comparison of all clinical measurements between clinical and demographic subgroups were shown at Table 4. The mean BPRS score of individuals who were injured during the earthquake was 30.1±12.6, whereas the mean score for those who were not injured was 41.7±17.1. This difference was found to be statistically significant based on the independent samples t-test (t=−2.036, p=0.046). The mean BPRS score of individuals who were hospitalized following a psychotic or manic episode was 62.3±10.9, whereas it was 36.8±15.2 for those who were not hospitalized. According to the t-test, this difference was statistically significant (t=4.268, p=0.001). The

mean CGI score for those hospitalized after a psychotic or manic episode was 11.9±1.1, compared to 9.4±1.9 for those who were not hospitalized. This difference was statistically significant (t=3.403, p=0.001). Individuals who were hospitalized following a psychotic or manic episode had a significantly higher GHQ score (23.4±3.7) than those who were not hospitalized (17.1±5.7). This difference was statistically significant (t=2.847, p=0.006) (Table 4). Individuals who were hospitalized following an episode had a significantly higher PCL-5 score (47.7±9.7) than those who were not hospitalized (38.2±11), and this difference was statistically significant (t=2.167, p=0.034) (Table 4).

Table 4. Comparison of scales levels in terms of earthquake-related variables

Variables	Category	BPRS level		CGI level		GHQ level		PCL-5 Level		ZBI level		DASS-21 Level	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Earthquake injury	Yes	30.1	12.6	9.4	1.4	17.4	6.8	37.7	11.8	34.1	25.4	24.2	10.1
	No	41.7	17.1	9.7	2.1	18	5.7	39.7	11.2	46.6	16.3	23.5	9.5
Statistics	t	-2.036		-0.499		-0.276		-0.501		-1.492		0.216	
	p	0.046*		0.619		0.784		0.618		0.165		0.831	
Losing relatives in an earthquake	No (1)	40.1	16.8	9.6	2.2	18.9	6.6	38.8	12.4	42.4	19.9	21.4	6.6
	First-degree relatives (2)	28.8	14.8	8.4	0.6	15.2	6.8	35	12.5	41.2	25.7	24.6	9
	Other relatives (3)	41	17	9.9	1.9	17.8	5.5	40.1	10.8	45.6	17.5	24.2	10.5
	F	1.171		0.125		0.752		0.464		0.235		0.469	
Statistics	p	0.318		0.294		0.476		0.631		0.791		0.628	
	Difference	-		-		-		-		-		-	
Housing damage	Minor(1)	40.3	16.8	9.5	2	17.8	5.2	38.7	10.3	45.3	16.1	22.6	9.7
	Moderate (2)	40.5	19.4	10.1	2	16.9	7.6	39.1	12.1	57	12.6	28	7.5
	Severe (3)	38.2	16.9	9.9	1.9	18.4	6.5	40.8	13.2	36.6	22.7	23.6	10
	F	0.093		0.542		0.188		0.188		3.633		1.048	
Statistics	p	0.911		0.585		0.829		0.829		0.033*		0.570	
	Difference	-		-		-		-		2>3		-	
Post-earthquake access to medications	Yes	41.3	14	9.8	1.7	18.5	4.8	41.2	9.9	46.4	13.8	23.2	8.3
	No	37.9	19.9	9.6	2.2	17.2	6.9	37	12.4	42.2	23	24.1	11
	t	0.792		0.455		0.863		1.447		0.848		-0.337	
	p	0.431		0.651		0.392		0.153		0.401		0.738	
Duration without medication after the earthquake	Less than 1 month	39.6	13.3	9.7	1.7	18.2	4.8	40.8	10.3	46.6	14.1	22.6	8
	1 month or more	39.9	20.1	9.7	2.2	17.6	6.7	37.9	12.1	42.4	22.1	24.6	10.9
	t	-0.061		-0.066		0.396		0.989		0.864		-0.783	
	p	0.952		0.948		0.693		0.327		0.391		0.437	
Increase in cigarette use after the earthquake	Yes	43.8	19.1	10.1	2	18.6	6.3	41.6	13.4	51.8	14.3	25.7	9.8
	No	36.9	14.8	9.4	1.9	17.4	5.5	37.7	9.3	39.3	19.5	22.1	9.2
	t	1.568		1.479		0.777		1.277		2.723		1.471	
	p	0.122		0.145		0.440		0.209		0.009*		0.147	
Having a manic/psychotic episode	Yes	41.5	20.5	10	2.1	18.7	6.2	39.5	12.1	43.3	22.6	25.4	11.2
	No	38.5	13.7	9.5	1.8	17.2	5.5	39.2	10.7	45.4	14.9	22.2	7.9
	t	0.642		0.964		0.960		0.100		-0.411		1.218	
	p	0.524		0.339		0.341		0.921		0.683		0.230	
Hospitalization following an episode	Yes	62.3	10.9	11.9	1.1	23.4	3.7	47.7	9.7	51.6	19.9	30.3	13.8
	No	36.8	15.2	9.4	1.9	17.1	5.7	38.2	11	43.6	18.3	22.7	8.6
	t	4.268		3.403		2.847		2.167		1.079		1.411	
	p	0.001*		0.001*		0.006*		0.034*		0.285		0.047*	

*p<0.05; t=Independent Samples t test, F=ANOVA Test, Difference=Tukey Test, BPRS: Brief Psychiatric Rating Scale, CGI: Clinical Global Impression Scale, GHQ: General Health Questionnaire, PCL-5: Post-Traumatic Stress Disorder Checklist, ZBI: Zarit Burden Interview, DASS-21: Depression Anxiety Stress Scale – Short Form; The ZBI and DASS-21 scales were administered to the caregivers

Regarding housing damage, individuals with minor damage had a mean ZBI score of 45.3 ± 16.1 , those with moderate damage 57 ± 12.6 , and those with severe damage 36.6 ± 22.7 . The ANOVA test indicated a statistically significant difference ($F=3.633$, $p=0.033$), and Tukey's post hoc test revealed that caregiver burden was significantly higher for caregivers of individuals with moderate damage compared to those with severe damage (group 2>3). The mean ZBI score for individuals who experienced an increase in smoking after the earthquake was 51.8 ± 14.3 , while for those who did not report an increase, the mean score was 39.3 ± 19.5 . The difference was statistically significant ($t=2.723$, $p=0.009$) (Table 4).

The mean DASS-21 score of caregivers of individuals who were hospitalized after experiencing an episode was 30.3 ± 13.8 , while the mean score of caregivers of individuals who were not hospitalized was 22.7 ± 8.6 . According to the t-test results, this difference was statistically significant ($t=1.411$, $p=0.047$). This finding indicates that the levels of depression, anxiety, and stress were significantly higher among caregivers of individuals who were hospitalized (Table 4).

As shown in Table 5, there is a positive and moderately significant correlation between the BPRS scores and the ZBI scores ($r=.37$, $p=0.004$). There is also a positive and moderately significant correlation between BPRS scores and DASS-21 scores ($r=.42$, $p=0.001$). Accordingly, caregivers of individuals with higher psychiatric symptom severity experience higher levels of depression, anxiety, and stress. A positive and moderately significant correlation was observed between the CGI scores and ZBI scores ($r=.36$, $p=0.004$). Similarly, a positive and moderately significant correlation was found between CGI scores and DASS-21 scores ($r=.40$, $p=0.001$). A positive and moderately significant correlation was found between GHQ scores and ZBI scores ($r=.36$, $p=0.004$). There is also a positive and moderately significant correlation between GHQ scores and DASS-21 scores ($r=.40$, $p=0.002$). A positive and moderately significant correlation was observed between PCL-5 scores and ZBI scores ($r=.41$, $p=0.001$). Similarly, a positive and moderately significant correlation was found between PCL-5 scores and DASS-21 scores ($r=.38$, $p=0.003$).

Table 5. The relationship between the scale scores of individuals with severe mental illness and the scale scores of their caregivers

		Zarit Burden Interview level	Depression Anxiety Stress Scale – Short Form level
Brief Psychiatric Rating Scale level	r	.37**	.42**
	p	0.004	0.001
Clinical Global Impression Scale level	r	.36**	.40**
	p	0.004	0.001
General Health Questionnaire level	r	.36**	.40**
	p	0.004	0.002
Post-Traumatic Stress Disorder Checklist level	r	.41**	.38**
	p	0.001	0.003

**p<0.01; *p<0.05; Pearson correlation test

Discussion

This study has examined the post-earthquake clinical trajectories of individuals who had been followed at CMHC prior to the February 6 earthquakes, within the context of earthquake-related variables, and has also evaluated caregiver burden. One of the most significant findings has been that approximately half of the patients have been unable to access their medications for more than a month and have experienced difficulties in accessing healthcare services despite having had relapses. Furthermore, among the patients who have received inpatient treatment after the earthquake, illness severity, PTSD symptom levels, caregiver burden, and caregivers' levels of depression and anxiety have been found to be significantly higher compared to those who have not been hospitalized and their caregivers.

It has been observed that the majority of the cases included in the study have experienced loss of loved ones and financial losses due to the earthquake. However, no significant relationship has been identified between bereavement and the scale scores. In a systematic review investigating the relationship between grief and psychotic episodes, 10 out of 15 studies have shown

an association between bereavement and the development of psychosis [26]. Additionally, the present study has found that among individuals with SMI, those who have experienced moderate earthquake-related housing damage have had higher caregiver burden compared to those who have experienced either mild or severe housing damage. According to the 2010 Australian National Survey of High Impact Psychosis, housing instability among individuals with psychotic disorders has been reported to negatively affect the clinical course of the illness [27]. However, in the current study, housing damage has not been observed to have a significant impact on the clinical course of illness, though it has been suggested that it may be associated with a partial increase in caregiver burden. In light of these findings, there has been a need for further research involving larger samples of individuals with SMI following earthquakes.

It has been identified that the majority of participants in this study have experienced difficulties in accessing psychotropic medications after the earthquake, have been unable to take their medication for over a month, and have not been hospitalized despite having had psychotic or manic episodes. The redirection of medical resources in the earthquake-affected region

primarily toward treating physical injuries has restricted access to adequate psychiatric support for individuals with mental illnesses—particularly those with schizophrenia. This situation, compounded by forced displacement and the disruption of treatment continuity, has led to a significant deterioration in the course of illness. A study conducted after the Chi-Chi earthquake has reported that income loss, the closure of medical facilities, and the loss of caregivers (such as family members or close friends) have contributed to an increase in hospitalization rates for individuals with schizophrenia [28]. Similarly, following the February 6 earthquakes, the damage sustained by healthcare facilities in the affected areas—especially CMHCs [29]—has disrupted access to treatment and follow-up processes. This has created conditions conducive to the emergence of new episodes in individuals with SMIs such as schizophrenia and bipolar disorder. In this context, the findings have highlighted that post-disaster intervention plans must not be limited to physical health alone, and that the development of special policies and continuous support mechanisms for psychologically vulnerable groups is of vital importance. Therefore, it has been essential for local authorities and health institutions to develop holistic, sustainable, and accessible service models for the care and follow-up of individuals with SMIs in the aftermath of disasters.

It has been observed that individuals with SMI who have sustained physical injuries during the earthquake have exhibited significantly higher illness symptom severity compared to those who have not been physically injured. A study conducted after the February 6 earthquakes has found that individuals who had been trapped under rubble and experienced limb loss have shown significantly more severe PTSD symptoms compared to those who have not undergone such physical trauma [30]. Similarly, Zhou et al. [31] have reported that earthquake-related physical injuries and limb loss have been associated with higher levels of depressive symptoms and traumatic stress reactions. These findings have suggested that in individuals with SMI, not only the psychosocial trauma caused by the earthquake but also the experience of physical injury may have served as an additional source of stress, creating a “dual trauma” effect. Experiencing a traumatic event both physically and psychologically may result in a more complex clinical presentation, potentially leading to increased illness symptom severity and reduced responsiveness to treatment.

Among the individuals who have been hospitalized in psychiatric clinics due to psychotic or manic episodes following the earthquake, the course of illness and the severity of PTSD symptoms have been found to be significantly worse compared to those who have not required hospitalization. It has frequently been emphasized in the literature that individuals with schizophrenia have shown increased sensitivity to psychosocial stressors [6,32]. This vulnerability has been known to lead to a deterioration in clinical outcomes and an increased risk of relapse, particularly after traumatic life events. However, in contrast to this view, a systematic review has presented limited findings suggesting that

exposure to traumatic events does not always lead to worsening of symptoms in individuals with psychotic disorders; on the contrary, it may enhance psychological resilience in some cases [33]. A study conducted after the Northridge Earthquake in Southern California has revealed that individuals diagnosed with schizophrenia have developed more maladaptive coping strategies in response to stress, and have reported reduced social support and low self-esteem. These psychosocial factors have been shown to be closely associated with heightened sensitivity to stress. Furthermore, individuals diagnosed with schizophrenia or bipolar disorder have been found to exhibit earlier onset of PTSD symptoms—such as emotional numbing and avoidance—compared to control groups who have also experienced the earthquake [6]. The findings have underscored the necessity of developing follow-up and screening protocols aimed at the early detection of PTSD symptoms in individuals with SMI, in order to prevent the occurrence of psychotic or manic episodes during post-disaster periods.

In this study, increased illness severity and PTSD symptom severity in individuals with SMI have been found to be associated with higher caregiver burden and significantly elevated levels of depression and anxiety among caregivers. Moreover, caregivers of patients who have been hospitalized in psychiatric clinics after the earthquake have reported significantly higher levels of depression and anxiety compared to caregivers of those who have not required hospitalization. A study conducted after the Japan earthquake has shown that caregivers have experienced more emotional distress compared to the general population [8]. Similarly, a systematic review involving 35 studies has highlighted the substantial psychological burden experienced by caregivers of individuals with mental illness [34]. In line with our findings, a study conducted in Switzerland has also reported a significant and positive relationship between the burden experienced by caregivers and the acute episodes of patients with schizophrenia [35]. These findings have suggested that caregiver burden is not merely a subjective experience, but a psychosocial indicator that progresses in parallel with illness severity. Additionally, it has been considered that caregivers’ own exposure to earthquake-related trauma and their experiences of various losses (e.g., loss of loved ones or financial resources) may have further exacerbated their burden. Therefore, while developing post-disaster mental health policies, it has been of strategic importance to integrate programs that aim to enhance the psychological resilience of caregivers—both for the well-being of patients and the caregivers themselves.

This study had several limitations. First, the cross-sectional design has prevented the establishment of clear causal relationships between the course of illness in individuals with SMI and earthquake-related variables or caregiver burden. Second, the sample size has been limited, as many individuals with SMI have migrated to other cities following the February 6 earthquakes. Third, the use of self-report measures in the study may have introduced subjective bias. Finally, since data have been collected

approximately ten months after the earthquakes, recall bias may have affected responses to earthquake-related questions. Future studies that longitudinally monitor the post-earthquake symptom trajectory and caregiver burden in individuals with SMI may enable a more accurate understanding of causal relationships. Moreover, conducting research with larger and multicenter samples may reduce the representational limitations caused by post-disaster migration.

Conclusion

In conclusion, individuals with SMI have encountered significant difficulties in accessing healthcare services following the February 6 earthquakes. In cases where hospitalization due to psychotic or manic episodes has been necessary, this process has appeared to have adverse effects on PTSD symptom severity and the overall illness trajectory. Moreover, increased illness severity and PTSD symptom intensity in these individuals have been found to be significantly associated with perceived caregiver burden as well as elevated levels of depression and anxiety among caregivers. The findings have indicated that post-disaster mental health policies for individuals with SMI need to be restructured. Developing multi-stakeholder psychosocial intervention programs that also include caregivers may positively influence the long-term prognosis of these individuals.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

It was approved by the local non-interventional ethics committee of Adıyaman University on November 14, 2023, with the decision number 2023/3-17.

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