

Follow-up findings from a disaster psychiatry clinic: Depression, anxiety, stress, and resilience six months after a major earthquake

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SUMMARY

Objective: Earthquakes and their consequences are associated with social, economical, and psychological difficulties. This study aimed to evaluate the psychological stress and psychological resilience levels of people who applied to Eskişehir Osmangazi University Disaster Psychiatry Outpatient Clinic (DPOC) 6 months after the February 6, 2023 earthquakes and to review the predictors.

Method: In the first phase of the study, the sociodemographic and clinical data form records applied to the individuals who applied to DPOC were retrospectively evaluated. In the second phase of the study, the participants were applied the Depression Anxiety Stress-21 Scale (DASS-21) and the Brief Psychological Resilience Scale (BRS) 6 months after the earthquake.

Results: In the first phase of the research, 68 people were included and 42 of them participated in the second phase. In the 6th month of the disaster, 59.5% of the participants scored moderate or higher on the depression subscale, 42.9% on the anxiety scale, and 31% on the stress scale. Clinical Global Impression Scale (CGI) scores during the first evaluation correlated with the anxiety subscale score, total DASS-21 score. CGI score at the first application was negatively related to resilience score in follow-up. BRS score was negatively correlated with total DASS-21 score.

Discussion: Providing psychosocial support in the post-disaster period is important to prevent mental disorders and increase psychological resilience. Also, identifying risky groups and monitoring the follow-up and treatment processes of these individuals is an important factor to reduce the associated morbidity.

Key Words: Disasters, earthquakes, mental health services, psychological distress, resilience

INTRODUCTION

On February 6, 2023, earthquakes of magnitudes 7.7 and 7.6 struck the Pazarcık and Elbistan districts of Kahramanmaraş Province. The earthquake disaster affected millions of people, resulting in over 50,000 casualties and over 100,000 physical injuries, according to official figures (1). Due to the lack of affordable accommodation following the earthquake, many people were forced to stay in tents and containers. Some people who had relatives in provinces unaffected by the earthquake migrated to live with them or stayed in various places, such as dormitories and hotels, for the short

or long term through state and social aid organizations. Natural disasters such as earthquakes and their consequences are associated with social, economic, and psychological difficulties (2, 3).

Although posttraumatic stress disorder is a well-known diagnosis after disasters, the psychological difficulties after traumatic events are not limited to this diagnosis (4). Following traumatic events such as natural disasters, people may experience many reactions, such as anxiety, depression, dissociation, shock, and agitation (5). After the 7.0 magnitude earthquake in Haiti in 2010, it was stated that more than one-fourth of the earthquake survivors had

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severe posttraumatic stress disorder (PTSD) symptoms, one-third had severe depression symptoms, and one-fifth had severe anxiety symptoms (6). Researchers also focused on those who do not suffer from mentally ill health after the disasters. Psychological resilience is defined as the ability to remain well despite negative experiences and maintain functionality despite stress and difficulties and is associated with positive mental health outcomes (7).

Psychological first aid may be considered a specific crisis-focused disaster mental health intervention during and after disasters (8). It is effective in reducing anxiety, and there is supporting evidence of its efficiency in reducing depression and post-traumatic stress disorder and improving resilience (9). Designed to stabilize and alleviate acute distress related to disaster experiences, psychological first aid requires an empathetic relationship and a sense of trust (8).

After the February 6, 2023, earthquakes, as the earthquake region lacked safe shelters and basic needs, survivors traveled to other cities, near or far. They applied to mental health services in the cities where they arrived. At that time, the mental health professionals who served in the hospitals faced an important obstacle regarding the healthcare system: Psychiatry outpatient clinic examinations were being scheduled approximately every 15 minutes. The routine mental healthcare services contradicted psychological first aid principles that focus on empathetic and compassionate care. That gap was filled with disaster psychiatry outpatient clinics in many institutions, either face-to-face or online. After the acute period, those disaster psychiatry outpatient clinics were closed and integrated into routine mental health services. That did not allow a longitudinal follow-up of the disaster survivors.

On the other hand, literature states that adverse mental health outcomes are not limited to the acute phase: After the 2015 earthquake in Nepal, it is stated that the frequency of anxiety symptoms, depressive symptoms, and posttraumatic stress disorder symptoms is high even one year later in people exposed to the earthquake (10). The effects of natural disasters, such as earthquakes, on people's

mental health can last for many years (11). Therefore, it is important to provide early diagnosis, follow-up, and psychosocial support after natural disasters (12).

The aims of this study are stated below:

- 1- To retrospectively examine the sociodemographic and clinical characteristics of the cases who applied to the Eskisehir Osmangazi University Faculty of Medicine Disaster Psychiatry Outpatient Clinic after the Kahramanmaraş 2023 earthquakes.
2. Monitor the applicants' psychological distress and resilience levels six months after the disaster to determine their levels.
- 3- Examining the relationship between psychological stress and psychological resilience in the post-disaster period and baseline clinical evaluation.

METHODS

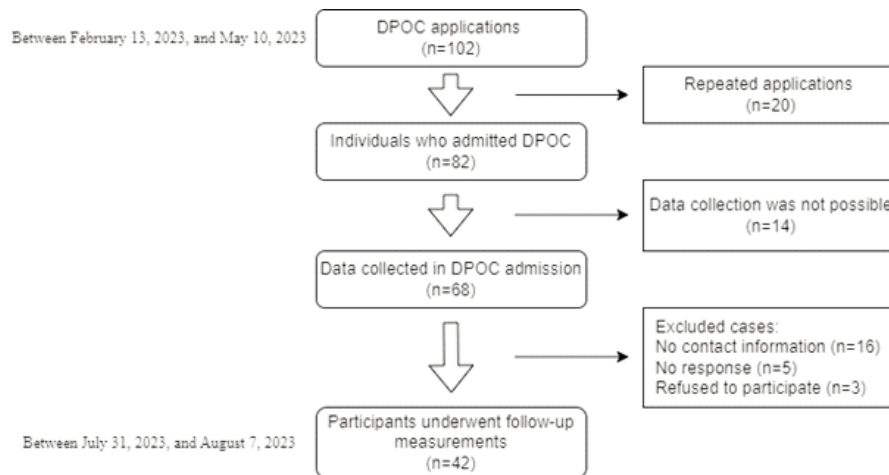
Ethical approval

This study was approved by the Eskisehir Osmangazi University Non-invasive Clinical Research Ethics Committee on 25.07.2023 with decision number 09. The research was conducted in accordance with the principles of the Declaration of Helsinki.

Study design

The present study consisted of two phases. The first phase was retrospective, and the second phase was cross-sectional. All participants were applicants of the Disaster Psychiatry Outpatient Clinic (DPOC) of Eskisehir Osmangazi University Faculty of Medicine. DPOC was established on February 13, 2023. Its purpose was to provide psychological first aid to people affected by the February 6, 2023 earthquakes. DPOC worked without an appointment; no fixed interval was determined for meeting times, and psychological support was provided according to the person's needs. Psychiatry residents and psychologists worked at the DPOC

Figure 1: The flowchart diagram of the research process



under the supervision of faculty members, applying standardized forms to the applicants. As the number of applications decreased and it was understood that these needs had been significantly reduced, the DPOC was closed on May 10, 2023, and integrated into the General Adult Psychiatry Outpatient Clinic.

It is crucial to note that Eskisehir City is nearly 820 kilometers far away from the earthquake center Pazarcık, Kahramanmaraş. Considering the destructive nature of the disaster, many individuals left the region in search of safe shelters.

Inclusion and exclusion criteria

All individuals aged 18 years or older who applied to the Disaster Psychiatry Outpatient Clinic (DPOC) between February 13 and May 10, 2023, were considered for inclusion in the first phase of the present study. Exclusion criteria were based on clinical judgment during the first phase: individuals with cognitive impairments (e.g. dementia or intellectual disability) or acute psychiatric presentations that would interfere with survey participation, such as psychotic or manic episodes, were excluded.

For the second phase (the follow-up), participants who could be reached by phone were included. In both phases, participants were required to provide informed consent.

Recruitment process

In the first and retrospective phase of the study, the sociodemographic and clinical characteristics of the cases that applied to DPOC between February 13, 2023, and May 10, 2023, were evaluated. In the cross-sectional phase of the study, the contact numbers of the cases who applied to DPOC were obtained from the hospital automation system. The subjects were contacted through their phone numbers between July 31, 2023, and August 7, 2023. The purpose of the research was explained on the phone call. An online Informed Consent Form was sent to the subjects who agreed. People who approved the submitted online consent form were directed to the research survey by the relevant link. During data collection, the earthquake survivors were asked about their actual needs regarding their mental health. General Adult Psychiatry Outpatient Clinic appointments were scheduled for those suffering from ongoing psychiatric symptoms.

The research design is summarized in Figure 1.

Psychometric evaluation

Sociodemographic and Clinical Data Form: The form was created using the Disaster and Mass Violence Evaluation Form (13). It includes the characteristics that define the person, the nature of the earthquake experience, and the diagnosis and treatment made through clinical interviews. It was routinely applied at DPOC, as recommended by the Psychological Trauma and Disaster Psychiatry Working Unit of the Turkish Psychiatric

Table 1. Sociodemographic characteristics of the participants (n=42)

		Mean	Standard deviation
Age		38.76	16.21
		Frequency	Percent
Sex	Female	32	76.2
	Male	10	23.8
Civil status	Single	22	52.4
	Married	20	47.6
Number of children	None	17	40.5
	1	4	9.5
	2	12	28.6
	3	7	16.7
	4	2	4.8
Educational level	Illiterate	2	4.8
	Primary school	1	2.4
	Secondary school	3	7.1
	High school	21	50
	Collage	11	26.2
Employment	Postgraduate	4	9.5
	Full-time	23	54.8
	Retired	17	40.5
	Unemployed	2	4.8

Association (13). The Clinical Global Impressions Scale (CGI) was included in the form. The CGI assesses disease severity on a scale from 1 to 7 (14). Higher scores indicate increased disease severity.

The following measurements were applied in the second phase of the present study.

Depression Anxiety Stress-21 Scale (DASS-21): The 42-item depression, anxiety, and stress scale developed by Lovibond and Lovibond was reduced to 21 items (2005), and a shortened version was developed (15, 16). The measurement tool, evaluated on a 4-point scale, consists of 7 items each for depression, anxiety, and stress. The internal consistency coefficients of the scale were calculated as 0.91 for depression, 0.84 for anxiety, and 0.90 for the stress dimension. A Turkish adaptation study of the scale was conducted by Sarıçam (17). The internal consistency coefficients of the Turkish form were calculated as 0.92 for depression, 0.86 for anxiety, and 0.88 for the stress dimension. Cut-off points were set as 9/10 for depression, 7/8 for anxiety, and 14/15 for stress following previous research (18).

Brief Psychological Resilience Scale: The scale was developed by Smith and colleagues to measure the psychological resilience of individuals (19). The Brief Psychological Resilience Scale is a 5-point Likert-type, 6-item, self-report measurement tool. High scores indicate high psychological resilience.

The validity and reliability study of the scale was conducted by Doğan (20).

Statistical analysis

IBM SPSS version 26 was utilized to perform statistical analysis. Categorical data were presented as frequency and percentage. Continuous data were presented as mean and standard deviation. Data were normally distributed. Pearson correlation analysis was performed to reveal the relationships between scale scores. A statistically significant p-value was set at 0.05.

RESULTS

Between February 13, 2023, and May 10, 2023, the Eskisehir Osmangazi University Medical Faculty's DPOC provided support to earthquake survivors. Eighty-two adults applied in that period. Forty-two of them (51.2%) responded and accepted to participate in the present study.

Table 1 presents the sociodemographic characteristics of the participants. The mean age was 38.76 ± 16.21 . Most participants were female (76.2%), and 59.5% had children. The disaster survivors recruited for the present study had high educational levels, with 85.7% having graduated from high school or higher educational institutions.

Table 2 summarizes the experiences of earthquake survivors. Many participants felt the earthquake

Table 2. Earthquake experiences of the survivors (n=42).

		Frequency	Percent
Felt the earthquake tremor	Yes	39	92.9
	No	3	7.1
Thought they would die	Yes	35	83.3
	No	7	16.7
Wounding of significant others	Yes, immediate family	6	14.3
	Yes, other	22	52.4
	No	14	33.3
Death of significant others	Yes, immediate family	1	2.4
	Yes, other	29	69
	No	12	28.6
The house became unusable	Yes	24	57.1
	No	18	42.9
Trapped under rubble	Yes	0	0
	No	42	100
Participated in search and rescue operations	Yes	9	21.4
	No	33	78.6
Witnessed to the wounding of others	Yes	27	64.3
	No	15	35.7
Witnessed to the death of others	Yes	11	26.2
	No	31	73.8
Being wounded due to the earthquake	Yes	3	7.1
	No	39	92.9
Basic needs such as shelter, clothing, and food were met following the earthquake	Yes	18	42.9
	Partly	8	19.0
	No	16	38.1

Table 3. Psychometric characteristics of the participants 6 months after the earthquakes (n = 42).

	Mean	Standard deviation
DASS-21 Total score	19.23	10.04
Depression subscale	7.26	4.06
Anxiety subscale	5.07	3.54
Stress subscale	6.90	4.16
BRS	18.28	3.83

DASS-21: Depression Anxiety Stress-21 Scale, BRS: Brief Psychological Resilience Scale

tremor (92.9%) and thought they would die (83.3%). Twenty-eight participants (66.7%) had their significant others wounded, while 30 (71.4%) lost relatives or acquaintances. Over half of the study sample had their house unusable after the disaster (57.1%). None of them were trapped under rubble. Several earthquake survivors participated in search and rescue operations (21.4%). Participants witnessed other disaster victims' wounding (64.3%) and death (26.2%). Three participants were wounded due to the earthquake (7.1%). 38.1% of them were unable to meet basic needs such as shelter, clothing, and food following the earthquake.

Before the disaster, 19 participants had a psychiatric disease history: depression (n=9), anxiety disorders (n=8), posttraumatic stress disorder (n=1), attention deficit and hyperactivity disorder (n=1). Twelve participants had physical diseases such as hypertension (n=5), diabetes (n=2), congestive heart failure (n=1), coeliac disease (n=1), asthma (n=1), benign breast tumor (n=1), and trigger finger (n=1).

Fourteen participants (33.3%) reported having experienced one or more traumatic events in the

past. Those were the death of loved ones (n=5), domestic violence (n=3), another earthquake (n=3), divorce (n=3), the danger of death (n=1), and severe COVID-19 (n=1). Based on DSM-5 Criterion A for trauma, 7 of these participants (50%) reported experiences that qualify as traumatic, such as domestic violence, life-threatening situations, or exposure to another earthquake. The remaining experiences—including bereavement, divorce, and fear related to COVID-19—do not meet the DSM-5 trauma criteria, although they represent significant stressors. This distinction is crucial for understanding how various types of adverse experiences may be linked to subsequent psychological outcomes.

At the first examination of the DPOC applicants, 28 individuals were diagnosed with a psychiatric disorder. Those diagnoses were acute stress disorder (n=16), anxiety disorders (n=4), posttraumatic stress disorder (n=4), depression (n=3), and adjustment disorders (n=1). CGI score's mean value was 2.40 ± 1.14 (minimum 1, maximum 4). Clinicians found the intervention adequate for 12 cases (28.6%). Thirteen subjects (31%) were informed about possible psychiatric needs and the places to apply in such cases. Three patients (7.1%) were considered risky to develop more severe psychopathology, and psychiatric follow-up was recommended. Seven cases (16.7%) were identified as requiring regular follow-up.

The DPOC applicants were evaluated regarding resilience, depression, anxiety, and stress in the sixth month of the earthquake (See Table 3). The mean value of the resilience score was 18.28 ± 3.83 . The total score of the DASS-21 had a mean value of 19.23 ± 10.04 , while the mean subscores for depression, anxiety, and stress were 7.26 ± 4.06 , 5.07 ± 3.54 , and 6.90 ± 4.16 , respectively.

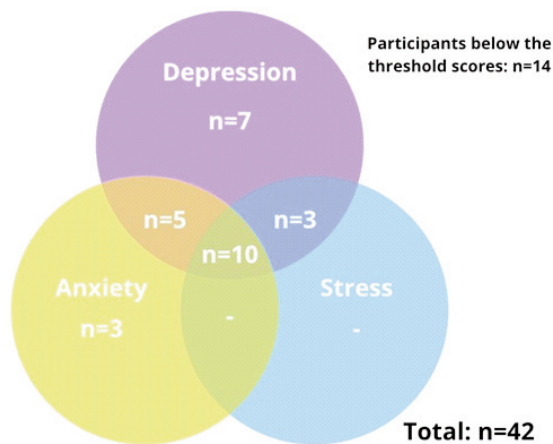


Figure 2: Overlap of depression, anxiety, and stress symptoms at moderate or higher severity (DASS-21)

Figure 2 illustrates the comorbidity patterns of depression, anxiety, and stress symptoms at moderate or higher severity (DASS-21).

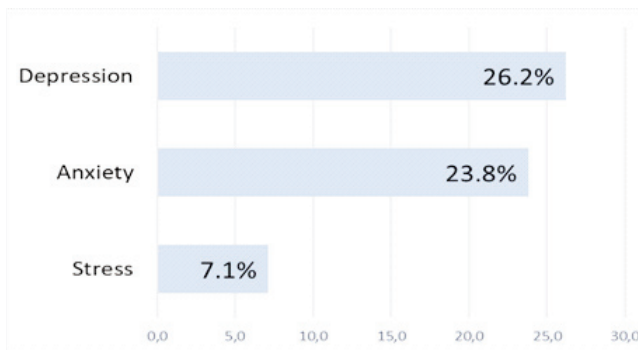


Figure 3. Depression, anxiety, and stress prevalences of the participants in the 6-month follow-up.

rate or higher levels based on DASS-21. Fourteen participants scored below the threshold in all subscales. Among the rest, 10 experienced all three symptoms concurrently. Partial overlaps were also noted: 5 participants had both depression and anxiety, 3 had depression and stress, while 3 experienced only anxiety and 7 only depression.

Using the cut-off values of DASS-21, prevalences of depression, anxiety, and stress were calculated. Among the participants, 26.2% had depression, 23.8% had anxiety, and 7.1% had stress psychometrically (See Figure 3).

Table 4 demonstrates the correlation analysis of primary and follow-up measurements. The participant's age was negatively associated with DASS-21 scores ($r = -0.432$, $p = 0.004$), as well as with scores on the depression subscale ($r = -0.398$, $p = 0.008$) and the stress subscale ($r = -0.417$, $p = 0.006$). The CGI score at the first application was positively related to the anxiety score ($r = 0.442$, $p = 0.003$) and negatively related to the resilience score ($r = -0.331$, $p = 0.032$) in the follow-up. Higher resilience scores were associated with lower levels of DASS-21 ($r = -0.578$, $p < 0.001$), depression ($r = -0.553$, $p < 0.001$), and stress ($r = -0.595$, $p < 0.001$). Anxiety scores were also negatively related to resilience with a marginal significance ($r = -0.303$, $p = 0.051$).

Table 4. Correlation analysis of age and psychological measurements (n=42).

	I	II	III	IV	V	VI
Age (I)	-					
CGI (II)	0.077	-				
BRS (III)	0.259	-0.331*	-			
DASS-21 (IV)	-0.431**	0.277	-0.578**	-		
Depression (V)	-0.398**	0.076	-0.553**	0.848**	-	
Anxiety (VI)	-0.275	0.442**	-0.303 _a	0.766**	0.398*	-
Stress (VII)	-0.417**	0.217	-0.595**	0.932**	0.740**	0.617**

DASS-21: Depression Anxiety Stress-21 Scale, BRS: Brief Psychological Resilience Scale

** : Correlation is significant at the 0.01 level (2-tailed).

* : Correlation is significant at the 0.05 level (2-tailed).

a: $p=0.051$

DISCUSSION

The present study evaluated the psychological distress and resilience among individuals who presented to the disaster psychiatry outpatient clinic six months after the earthquake disaster. At the sixth-month mark following the disaster, among individuals attending the DPOC, depression was observed in 26.2%, anxiety in 23.8%, and stress in 7.1% of the cases. Baseline CGI scores were positively correlated with anxiety and negatively associated with resilience in the follow-up. Age appeared to be a significant factor in that younger participants had higher psychological distress. Psychological resilience was associated with lower distress.

The prevalence of psychiatric disorders in the post-earthquake period is reported at varying prevalence rates. Yokoyama and colleagues found that severe mental health problems were 42.6% prevalent among the survivors six to twelve months after the earthquake (21). Guo and colleagues reported that 22.9% of adults had depression scores above the cut-off six months after the Wenchuan earthquake (22). A study after the Pakistan earthquake showed that 63% of women survivors at reproductive age experienced anxiety symptoms, while 54% had symptoms of depression (23). Another study on the 1988 Armenia earthquake reported that 52% of adult survivors met the criteria for depression (24). Although psychiatric symptoms can be observed frequently after an earthquake, the application rates of people seeking professional help may be variable in association with cultural factors (25). At the same time, it is known that the severity of the disaster and the support provided after the disaster are important in terms of psychiatric symptoms (22). Variations in the prevalence of psychiatric disorders in the post-disaster period may be related to the severity of the disaster, cultural fac-

tors, the time after the disaster, and post-disaster support resources.

According to Hobfoll, individuals experience psychological stress when the resources they value are either lost or threatened. Sudden and devastating events such as earthquakes may lead to the loss of both physical (e.g., shelter, safety) and psychological (e.g., sense of security, social support) resources, thereby increasing stress levels. Based on the Conservation of Resources (COR) theory, individuals tend to rely on protective factors such as social support, self-esteem, and psychological resilience to prevent entering a resource-loss spiral (26). Particularly in post-disaster contexts, access to safe environments, opportunities for rapid relocation, and psychosocial first aid services such as DPOC may help individuals restore their depleted resources.

The population that DPOC served was relatively advantaged since they could immediately find a safe place out of the disaster zone; none of them were trapped under the rubble, only 7.1% of them were physically harmed, and 2.1% lost their family. Thus, that may be the reason the present study found lower prevalences. Additionally, considering that the study population received psychological first aid in the DPOC, this may help alleviate psychological distress following the disaster.

In previous studies, gender, socioeconomic status, education level, age, perceived psychosocial support, and peritraumatic distress were reported as risk factors for psychiatric symptoms after a disaster (27-29). In the review, Cénat et al. reported that depression and anxiety symptoms may decrease over time, but the time factor may not be a moderator in terms of PTSD symptoms (6). Identifying high-risk groups in the post-disaster period and providing follow-up care and treatment can make valuable contributions to reducing associated morbidity. In this context, follow-up and treatment processes of individuals who experience more severe psychiatric symptoms in the early period are important. The present study showed that baseline clinical evaluation was related to the sixth-month outcomes, showing that those who suffer from psychological distress soon after the earthquake are at risk. In addition, differentiating between traumatic

events (as defined by DSM-5) and stressful life events is essential when evaluating prior adversity. Half of the participants who reported previous difficult experiences met the diagnostic threshold for trauma, which may have implications for how such experiences influence post-disaster psychological responses.

Natural disasters such as earthquakes are risk factors for stress and psychiatric disorders. The psychological challenges experienced by people after disasters vary. Psychological resilience has been considered a predictor in the assessment process of such differences (7, 27). There is a negative relationship between increased psychological resilience and psychiatric symptoms (30).

It has been reported in many studies that age may be a predictor for psychiatric symptoms in the post-disaster period. However, it has been reported that this predictive effect may not be valid in different mental disorders (31); this difference emerged in young men (21), and being young or old may be a risk factor (32). Bonanno et al. reported that traumatic stress reactions are less familiar with increasing age and that age may be associated with psychological resilience (27). The present study population was young, with a mean age of 38.7, which may be the reason for the correlation between younger age and higher psychological distress.

Future research should include longitudinal assessments beginning in the acute phase of disaster response to better capture symptom trajectories over time. Additionally, studies with larger and more diverse samples across varying levels of trauma exposure would help clarify risk and resilience factors among disaster-affected populations.

Strengths and limitations

The present study demonstrated that baseline clinical characteristics were associated with psychological outcomes at six months, offering valuable insight into the long-term mental health trajectories of individuals affected by disaster.

However, several limitations should be acknowledged. First, the sample size was relatively small,

and no a priori power analysis was conducted due to the emergency nature of the setting and the exploratory design of the study. Although naturalistic recruitment enhanced ecological validity, the absence of systematic baseline psychometric data limited our ability to evaluate changes in symptom severity over time. Additionally, follow-up data were collected through self-administered online surveys, which may have introduced response bias or inaccuracies. It is also worth noting that the study did not involve formal psychiatric diagnoses. Instead, standardized self-report psychometric instruments were used to assess symptom severity levels. Therefore, findings should be interpreted as reflecting psychological distress rather than diagnostic prevalence. We did not collect systematic data on whether participants received pharmacological or psychotherapeutic interventions during the six-month follow-up period. That constitutes a limitation, as such treatments could have influenced psychological outcomes.

Another important consideration is the potential for selection bias. The study included only those who could be contacted by phone and who consented to participate, raising the possibility of non-response bias. Individuals who declined or could not be reached may have differed meaningfully from participants in terms of psychological distress.

Furthermore, most participants had relocated to relatively safe regions shortly after the earthquake and voluntarily sought mental health services. That suggests that the sample may represent a more advantaged subgroup in terms of post-disaster conditions, which limits the generalizability of the findings to populations with higher levels of exposure or fewer resources.

Despite these limitations, the study contributes to the limited literature on post-disaster outpatient psychiatric assessment and highlights the importance of early clinical evaluation in shaping longer-term outcomes.

The present study focused on a population of earthquake survivors who relocated to a safe area shortly after the disaster and subsequently applied for mental health services. Baseline clinical evaluation with CGI was associated with higher anxiety and lower resilience in follow-up. Resilience was

related to lower psychological distress regarding depression, anxiety, and stress. In the sixth month of the disaster, 26.2% had depression scores above the cut-off, and 23.8% had probable anxiety regarding cut-off values. Even relatively advantaged survivors of disasters experience adverse mental health outcomes. The study also shows that a psychiatric clinic may need to respond to an emergency due to a disaster outside its zone.

The study provides an examination of mental health outcomes following a disaster while defining mental health services in disaster situations. Psychiatry clinics should be flexible in serving the population's needs. The order of the day may not match routine working conditions as experienced by the authors. Even the clinic in the present study was not located in the disaster area; survivors of the earthquake arrived in the city seeking safe shelters, as well as those close to them or their relatives. Thus, the population that routinely served had changed. The authors' experience may help other mental health professionals in similar emergency conditions. Besides, the authors observed that the individuals who were assessed as having worse mental health ended up with higher psychological distress in the follow-up. That demonstrates that disaster psychiatry clinics should consider routine follow-ups and screenings. Since planning for those work in short periods is challenging, behavioral health clinics should consider emergency plans in the event of possible disasters.

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