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ORIGINAL ARTICLE

Post-Traumatic Stress Disorder and Fear of Childbirth in Pregnant Women After the 2023 Earthquake in Türkiye: A Descriptive Cross-Sectional Study

2023 Türkiye Depremi Sonrası Gebelerde Travma Sonrası Stres Bozukluğu ve Doğum Korkusu: Tanımlayıcı Kesitsel Bir Çalışma

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Abstract

Introduction: The aim of this research is to investigate the post-traumatic stress levels and the fear of childbirth of pregnant women who experienced 2023 Türkiye earthquakes.

Methods: The research was conducted between March-May 2023 with 311 pregnant women. Online survey was sent to pregnant women living in 11 provinces affected by the earthquake. "Personal Information and Earthquake Experience Form", "DSM-5 Posttraumatic Stress Disorder Checklist (PCL-5)" and "Childbirth Fear Scale (CFS)" were used for data collection. Student's t test, One-Way ANOVA, Pearson Correlation were used for statistical tests.

Results: The mean PCL-5 total score of pregnants was 58.99±13.93 and the mean CFS total score was 72.94±12.03. The prevalence rate of post-traumatic stress disorder was 80%. A low level but not statistically significant correlation was found between PCL-5 total and CFS total. A significant correlation was found between some variables related to earthquake experiences and socio-demographic characteristics of pregnant women and PCL-5 and CFS.

Discussion and Conclusion: It was concluded that the prevalence of post-traumatic stress disorder symptoms and fear of childbirth was high among pregnant women who experienced earthquake. The results of the study provide a source of information about post-traumatic stress and fear of childbirth for nurses caring for pregnants in the field after the earthquake.

Keywords: Pregnant women; Post-traumatic stress disorder; Childbirth; Fear; Disasters; Nursing

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Türkiye was hit by two disruptive earthquakes with epicenters in Pazarcık (Magnitude 7.7) and Elbistan (Magnitude 7.6) in Kahramanmaraş on February 6th, 2023. Then on February 20th, 2023, another 6.4 magnitude earthquake occurred with epicenter of Hatay. These devastating earthquakes caused considerable damage in a total of 11 provinces. These series earthquakes result with more than 50.000 fatalities, too much buildings damaged. These earthquakes, which resulted in financial losses as well as spiritual losses, have affected many people directly or indirectly.[1] The World Health Organization (WHO) has been indicated that these large earthquakes have created physiological and psychological stressors for people who were affected from the disaster.[2]

Earthquakes are considered as one of the major destructive disasters that can cause short and long term undesirable psychological results. The traumatic consequences of earthquakes can lead to various psychological impacts on individuals and communities. These may include post-traumatic stress disorder, anxiety, chronic depression, insomnia and other psychological health disorders.[3] Especially PTSD is one of the more common trouble aftermath of earthquakes. Studies indicate that the prevalence of PTSD after earthquakes can vary between 20–82%.[3,4]

On the other hand, vulnerable groups such as women and children are prone to PTSD than others. It is state that lifetime prevalence of PTSD more common among women compared to men. Particularly, gender differences of PTSD seem higher in women following natural or humanitarian disasters.[4–6] Studies conducted with mothers who have been exposed to traumatic events such as earthquakes indicate that the prevalence of PTSD is higher in this group.[4,7,8] Pregnant women are more critical in this vulnerable group. Even without a trauma or disaster, the prevalence of psychological problems in pregnancy is over 7%.[8] In this context, pregnant women may be more likely to experience PTSD and fear of childbirth after earthquake.[7,9–12] Because some studies have been shown that pregnant women worry for their babies during seismic event, and accommodation afterwards earthquake. They stated that temporary housing is uncomfortable in the post-term of earthquake, and accommodation which close to the maternity facility or health institution is more preferable.[10,11] It is thought that situations such as the death of family members cause fear of losing the baby and housing problems cause fear of safe childbirth.[8,10,13]

The concept of trauma is the experience of a series of events or situations that physically or emotionally harm the individual or threaten life, exceeding the person's coping capacity.[14] Trauma during pregnancy is associated with adverse maternal and fetal outcomes such as low birth weight.[15] The concept of fear of childbirth is a general definition for all kinds of anxiety and fear that women experience about pregnancy and childbirth, but it is a psychological symptom that negatively affects the health of pregnant women.[16,17] Thus, it is thought that understanding the psychological impact of earthquakes on pregnant women is important. By shedding light on the effects of the earthquake on women's health, this study is thought to contribute to the protection of public health and to provide a scientific basis for nurses to plan education and counselling services for women more effectively. The objective of this study is to identify the impact of the earthquake on PTSD and fear of childbirth of pregnant women in Türkiye.

Materials and Methods

Study Design and Participants

This study is a descriptive and cross-sectional type and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist (Appendix 1).

This study was conducted in 11 provinces in 2023, after great Türkiye earthquakes. Data was collected between March-May 2023. Pregnant women above 18 years of age, who resided in 11 provinces and experienced the earthquakes in February, 2023 were included the study. Women who had a psychiatric diagnosis or had a high risk pregnancy were excluded from the study. Also, women who learned the pregnancy after the earthquake or who resided in these cities but were not present in there during the seismic events were excluded from the study.

Power analysis was used for sample size calculation. The primary endpoint in our study was the mean PCL-5 score of the pregnant women, and this value was based on the mean score of the "DSM-5 Posttraumatic Stress Disorder Checklist (PCL-5)" in a similar descriptive study conducted previously. The mean PCL-5 reported in the related study was "57.27±17.90".[18] Calculations were made with the ClinCalc program (https://clincalc.com/stats/samplesize.aspx) assuming a 95% confidence level (Z=1.96), 80% power (1-β=0.80), 5% type I error (α=0.05) and expected percentage difference compared to the known population (5% increase). As a result of the calculation, the minimum sample size was found to be 307. However, the study was completed with 311 pregnant women to prevent possible data loss. At the end of the study, posthoc power analysis for 311 pregnant women showed that the power of the study was 0.99 with an effect value of 0.3 and α=0.05.

Data Collection Tools

In the questionnaire "Personal Information and Earthquake Experience Form", "DSM-5 Post-traumatic Stress Disorder Checklist (PCL-5)" and "Childbirth Fear Scale (CFS)" were taken part.

Personal Information and Earthquake Experience Form

This form was developed by the researchers based on the literature, included 22 questions about the socio-demographic characteristics of the participants, pregnancy & childbirth information and their experience of earthquake.[9,11,18]

DSM-5 Post-Traumatic Stress Disorder Checklist (PCL-5)

PCL-5 Checklist was used to assess the PTSD symptoms. It has four sub-scales and 20 items rated on a 5-point Likert type. Participants are asked to rate the items about evaluating their experiences after a stressful/traumatic event from (0) to (4). It was stated that the score range of the scale is between 0–80 and the cut-off score of 48 will be reliable in terms of distinguish the PTSD. The development of scale was performed by Weathers et al.[19] in 2013. The Turkish validity and reliability of the scale were performed by Boysan et al.[20] in 2017. The Cronbach's alpha value was measured as 0.88 for this study.

Childbirth Fear Scale (CFS)

CFS was used to assess pregnant women's fear of childbirth. This scale has three sub-dimensions, and 20 items is a 5-point Likert-type that was evaluated between 1 strongly agree and 5 strongly disagree. The total score obtained from the scale is a minimum of 34 and maximum 170. As the score decreases, it is interpreted that the fear of childbirth increases. The scale was developed by Nuraliyev and Kaya[21] in 2022. The Cronbach's alpha value was measured as 0.81 for this study.

Data Collection

The effects of the earthquake were taken into account, and an online survey was designed using Google Forms to provide easy access to pregnant women. The survey link created by the researchers was shared online through the researchers' professional and personal connections via snowball sampling method. The purpose, content and participation criteria of the study were stated in the online survey and informed consent has been approved by pregnant women. Since two researchers in this study team lived in the earthquake zone, the data collection process was initiated by directly reaching the pregnant women who had experienced the earthquake. The researchers first sent the link to the online questionnaire to the pregnant women in their neighbourhood and then asked them to share the link with other pregnant women who had experienced the earthquake in a similar way. Thus, the questionnaire was administered in the earthquake region and to pregnant women who experienced the earthquake.

Statistical Analysis

Data were analyzed by using SPSS 25 (The Statistical Package for Social Science IBM Corp., Armonk, NY, USA) program. Frequency, percentage, arithmetic mean, standard deviation, minimum and maximum values were used in descriptive statistics. Kolmogorov-Smirnov test was used to determine that the data were suitable for normal distribution. It was determined that the data were suitable for normal distribution and parametric statistical test was selected. Student's t test and One-Way ANOVA were used for significance tests. In cases where 3 or more groups were compared with advanced statistics, the group from which the difference originated was determined with Tukey test. The relationship between the scales and between the total and sub-dimensions of the scales was determined by Pearson Correlation Analysis. Statistical significance value was accepted as $p<0.05$ in all tests.

Ethical Considerations

This study received ethical approval from the Ethics Committee of Ankara Medipol University (Decision Number: 38, Decision Date: 28.03.2023). The consent of the pregnant women was obtained with the information that participation in the study was voluntary and the box "I agree to participate in the study". For the scales used in the study, the necessary permission was obtained via an e-mail from the creators. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Results

Online surveys were distributed to 357 pregnant women. 320 pregnant women agreed to participate in the study. The study was completed with 311 pregnant women who fulfilled all data collection forms completely (Fig. 1).

Almost all pregnant women (95.5%) reported that they did not experience any injury in this earthquake and 98.7% reported that they were not trapped under the debris. Most pregnant women (73.0%) had experienced an earthquake

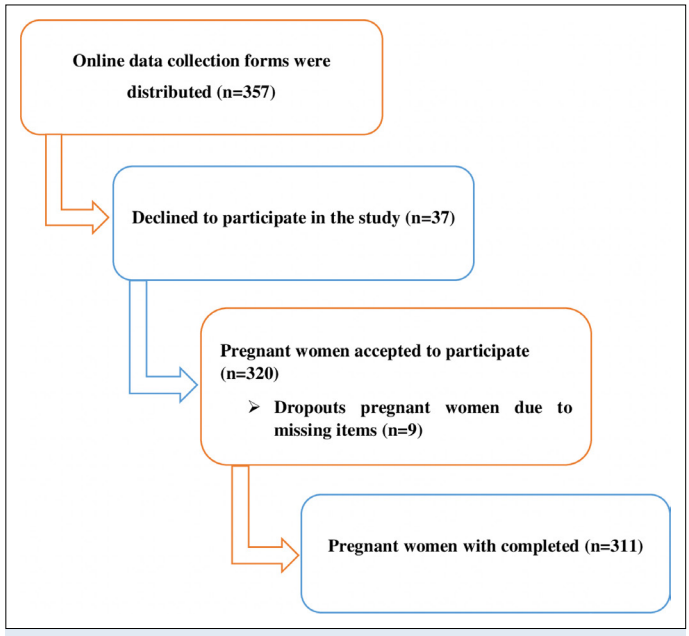

Figure 1. Flow diagram of study sample.

before. In addition, 73.3% of the pregnant women did not see anyone trapped under the debris and 74.9% did not see anyone who died under the debris. 50.2%, 51.1%, and 51.8% of the pregnant women did not have any relatives who were trapped under the debris, injured in the earthquake, and died during the earthquake, respectively. 74.9% of the pregnant women stated that they were extremely afraid during the earthquake. 52.1% of the pregnant women thought that the earthquake would affect the pregnancy period moderately. In addition, 22.8% of the participants considered giving birth in another province because of the earthquake (Table 1).

The mean scores of the total, re-experiencing, avoidance, negative alterations and hyper arousal subscales of the PCL-5 scale were 58.99±13.93, 15.22±3.73, 6.0±61.67, 19.66±5.26, 18.03±4.58, respectively. The mean score of CFS was 72.94±12.03. The mean subscale scores of fear of pregnancy, childbirth and maternal role, fear of inability to meet physical and social needs, and fear of pregnancy and childbirth problems were 35.93±7.44, 22.37±5.20, and 14.62±4.46, respectively (Table 2). The posttraumatic stress disorder (PTSD) cut-off point of 48 points on the PCL-5 scale was used to estimate the proportion of clinically significant PTSD symptoms.[20] According to this reference, the overall prevalence of PTSD symptoms in the investigated region was 80%.

The mean age of the pregnant women was 27.51±4.30 years and 55.3% were between 27–34 years. It was determined that 98.7% of the pregnant women did not use alcohol, 89.1% did not smoke, 43.8% were university graduates and 71.1% were not employed. More than half of the pregnant women (52.7%) were at or above 28 weeks of gestation, 45.7% were primigravid, 46.9% had never given birth before and most of them (87.1%) had planned pregnancies (Table 3).

There was a statistically significant difference between the total score of the PCL-5 scale and educational status, smoking, gravida, and between the total score of CFS and educational status, smoking and planned pregnancy (Table 3).

Further analysis revealed that primary school graduates had a lower PCL-5 total score than high school and university graduates ($F=4.095$, $p=0.007$), and those with 1 pregnancy had a higher PCL-5 total score than those with 4 or more pregnancies ($F=8.055$, $p<0.001$). A significant difference was observed between smoking status and PCL-5 ($t=3.479$, $p<0.001$). For CFS total score, it was found that primary school graduates had lower CFS total score than university graduates ($F=4.204$, $p=0.006$), non-smokers had higher CFS total score than smokers ($t=-2.560$, $p=0.011$), and planned pregnancies had higher CFS total score than unplanned pregnancies ($t=2.306$, $p=0.022$) (Table 3).

PCL-5 total score was increased in pregnant women who had relatives trapped under debris ($t=5.601$, $p<0.001$), injured ($t=3.573$, $p<0.001$) and died ($t=5.012$, $p<0.001$) during the earthquake (Table 4). In addition, the PCL-5 total score was also increased in pregnant women who saw someone trapped under the debris ($t=3.751$, $p<0.001$), injured ($t=4.154$, $p<0.001$) and died ($t=3.962$, $p<0.001$) during the earthquake (Table 4). It was determined that those who thought that the pregnancy period would not be affected by the earthquake had a lower total score of PCL-5 ($F=42.833$, $p<0.001$) than those who thought that the pregnancy period would be moderately or significantly affected. Those who thought that they would give birth in another province due to the earthquake had a higher total PCL-5 score ($F=19.279$, $p=<0.001$) than those who did not (Table 4).

A significant difference was found between CFS and the variables such as sleep status of pregnant women after the earthquake and the thought that the pregnancy period would be affected by the earthquake. Pregnant women who stated that their sleep status was moderately affected after the earthquake ($F=3.370$, $p=0.036$) and who thought that the pregnancy period would not be affected at all by the earthquake ($F=5.416$, $p=0.005$) had higher scores from childbirth fear scale (Table 4). A low but not statistically significant correlation was found between PCL-5 total and CFS total ($r=0.024$, $p=0.676$) (Table 5).

Table 1. Distribution of data about the earthquake experiences of pregnant women (n=311)

Earthquake experiences	n	%
Have you experienced an earthquake before?		
Yes	84	27.0
No	227	73.0
Have you been injured in an earthquake?		
Yes	14	4.5
No	297	95.5
Have you been trapped under debris in an earthquake?		
Yes	4	1.3
No	307	98.7
Did any of your relatives get trapped under the debris?		
Yes	155	49.8
No	156	50.2
Did any of your relatives get injured?		
Yes	152	48.9
No	159	51.1
Did any of your relatives lose their lives?		
Yes	150	48.2
No	161	51.8
Have you seen people trapped under the debris?		
Yes	83	26.7
No	228	73.3
Have you seen people injured during the earthquake?		
Yes	163	52.4
No	148	47.6
Have you seen anyone who lost their life in the debris field?		
Yes	78	25.1
No	233	74.9
How scared were you during the earthquake?		
Extremely	233	74.9
Moderate	69	22.2
Very little	5	1.6
I was never scared	4	1.3
How would you rate your sleep status since the earthquake?		
Poor	142	45.7
Moderate	150	48.2
Good	19	6.1
How did your income being affected after the earthquake?		
We have lost our entire source of income	10	3.2
We have lost most of our source of income	47	15.1
Our source of income was little affected	167	53.7
Our income was not affected	87	28.0
How do you think the earthquake will affect your pregnancy?		
Does not affect	14	4.5
Moderately affects	162	52.1
Affects too much	135	43.4
Do you plan to give birth in a different province due to the earthquake?		
Yes	71	22.8
No	175	56.3
Undecided	65	20.9

Table 2. The mean scores of DSM-5 Post-Traumatic Stress Disorder Checklist (PCL-5) and CFS and subscales of the pregnant women (n=311)

	Min–Max	Mean±SD
PCL-5 total and subscales		
Re-experiencing subscale	4–20	15.22±3.73
Avoidance subscale	2–8	6.06±1.67
Negative alterations subscale	4–28	19.66±5.26
Hyper arousal subscale	5–24	18.03±4.58
Total	18–80	58.99±13.93
CFS total and subscales		
Fear of pregnancy, childbirth, and maternal role	9–45	35.93±7.44
Fear of inability to meet physical and social needs	6–30	22.37±5.20
Fear of pregnancy and childbirth problems	5–25	14.62±4.46
Total	40–99	72.94±12.03

CFS: Childbirth Fear Scale, DSM-5: Diagnostic and Statistical Manual of Mental Disorders, PCL-5: Post-Traumatic Stress Disorder Checklist; Min: Minimum; Max: Maximum; SD: Standard deviation.

Discussion

The study determined the short-term effects of the massive earthquake in Türkiye in February 2023 on the mental health of pregnant women. The results of the study show significant relationships between earthquake experiences of pregnant women and their PTSD and fear of childbirth. Women's mental health problems not only affect women during pregnancy but also cause negative effects on infant health after birth.[7,22] Therefore, after a stressful event such as an earthquake, early psychological evaluation is of great importance, taking into account the earthquake experiences of women. Thus, possible psychiatric conditions that may develop during pregnancy and childbirth can be detected early and it will be possible to take preventive health measures.

First, the prevalence of PTSD in pregnant women who experienced an earthquake was found to be very high. This finding is higher than the prevalence rates of PTSD recorded in women after the earthquake in previous studies.[4,7,23] The first explanation for this result is that it includes data on the short-term effects of the earthquake on pregnant women compared to other studies. Secondly, it is thought that the prevalence of PTSD is high due to the high number and severity of earthquakes, as well as the fact that they affected a wide geography and the destruction was high. Moreover, this finding may be connected with healthcare perception or socio-cultural condition of this region. Because most of the time healthcare system focus on physical health before mental health after earthquakes. So, nurses may be educated to deal with challenge and fear of childbirth and mental well-being.

In this study, it was found that pregnant women who experienced an earthquake had high level of fear of childbirth. Studies on fear of childbirth were frequently conducted with women without earthquake experience and high levels of fear of childbirth were found in Turkish women.[24–26] When the results of this study are evaluated within the scope of the literature, it is considered as a possible result that Turkish women who have high fear of childbirth under normal conditions may have increased this fear due to the earthquake effect. Therefore, the findings of this study support that health professionals should pay more attention to pregnant women who have experienced a traumatic event such as an earthquake in terms of fear of childbirth.

The results of the study reveal the significance between earthquake experiences and outcomes related to both PTSD and fear of childbirth. It was concluded that the many negative earthquake experiences of pregnant women increased the likelihood of having PTSD symptoms. These findings are consistent with previous studies examining the psychological state of women who have experienced earthquakes.[23,27,28] It is an expected result that witnessing traumatic events such as injury, debris, and loss of life of one's own relatives or other people increases the level of PTSD in pregnant women. A significant difference was found between CFS and the variables such as sleep status of pregnant women after the earthquake and the thought that the pregnancy period would be affected by the earthquake. However, in the study it is seen that fear of childbirth scores do not show a significant difference with other earthquake experience. This situation is thought to be due to the fact that fear of childbirth is a multidimensional concept and cannot be explained only by the earthquake experience, and that a number of other factors that increase fear of childbirth are affected.

In a study examining PTSD and depression in mothers after earthquake, women with insomnia were found to have a higher risk of depression.[29] In our study, the thought that the pregnancy period would be affected by earthquake and sleep status were variables that had a significant relationship with both PTSD and fear

Table 3. The relationship between socio-demographic and obstetric characteristics of pregnant women and mean total scores of PCL-5 and CFS (n=311)

Socio-demographic and obstetric characteristics	n (%)	PCL-5 total		CFS total	
		Mean±SD	Test and p-value	Mean±SD	Test and p-value
Age (years) (Mean±SD: 27.51±4.30, Min–Max: 19–44)					
19–26	123 (39.6)	57.95±14.43	F=0.572 p=0.565	71.89±12.42	F=1.658 p=0.192
27–34	172 (55.3)	59.72±13.53		73.98±11.82	
35+	16 (5.1)	59.12±14.74		69.81±10.45	
Educational status					
Primary school graduatea	58 (18.6)	53.48±15.06	**F=4.095 p=0.007* (a–b, c)****	70.17±1259	**F=4.204 p=0.006* (a–c)****
High school graduateb	101 (32.5)	60.38±13.70		71.02±11.68	
University- bachelor degreec	136 (43.8)	59.83±13.32		74.94±11.85	
University-post-graduate degreed	16 (5.1)	63.06±12.11		78.00±9.77	
Employment status					
Employed	83 (26.6)	61.09±12.45	F=1.538 p=0.216	74.07±13.25	F=1.114 p=0.330
Unemployed	221 (71.1)	58.11±14.37		72.68±11.44	
Unemployed because of earthquake	7 (2.3)	61.85±15.72		67.57±14.97	
Smoking use status					
Yes	34 (10.9)	66.70±10.56	**t=3.479 p=0.001***	68.00±12.60	**t=-2.560 p=0.011***
No	277 (89.1)	58.04±14.02		73.54±11.84	
Alcohol use status					
Yes	4 (1.3)	56.75±24.75	t=-0.324 p=0.747	68.75±5.79	t=-0.701 p=0.484
No	307 (98.7)	59.02±13.81		72.99±12.08	
Planning pregnancy					
Yes	271 (87.1)	58.55±14.25	t=-1.452 p=0.148	73.54±12.23	**t=2.306 p=0.022***
No	40 (12.9)	61.97±11.24		68.87±9.77	
Gestational week					
13–27 week	147 (47.3)	57.53±13.23	t=-1.750 p=0.081	73.96±11.44	t=1.423 p=0.156
≥28th week	164 (52.7)	60.29±14.45		72.02±12.49	
Gravida					
1a	142 (45.7)	58.16±13.81	**F=8.055 p<0.001* (a–d)****	74.03±12.47	F=1.584 p=0.193
2b	90 (28.8)	62.01±12.38		73.29±11.46	
3c	50 (16.1)	62.08±13.49		71.20±11.49	
4+d	29 (9.4)	48.79±15.11		69.44±12.26	
Previously birth type					
Cesarean birth	76 (24.5)	60.31±14.81	F=0.538 p=0.584	72.26±11.60	F=2.118 p=0.122
Vaginal birth	89 (28.6)	58.95±13.91		71.20±11.25	
I did not give birth	146 (46.9)	58.28±13.49		74.39±12.62	

t: Student's t-Test; F: One-way ANOVA test; *: Statistical significance at p<0.05; **: The differences between groups expressed by the letters are statistically significant at p<0.05 after Tukey test; CFS: Childbirth Fear Scale; PCL-5: Post-traumatic stress disorder checklist; SD: Standard deviation; Min: Minimum; Max: Maximum.

of childbirth. It is thought that the data obtained will contribute to development of strategies that will be beneficial in reducing fear of childbirth and PTSD among pregnant women who have experienced an earthquake.

Among all the factors investigated in this study, educational status, smoking and gravida were the variables associated with PTSD. Those with 1 gravida had higher PTSD scores than those with 4 or more gravida. The fact that primigravid

Table 4. The relationship between earthquake experiences of pregnant women and total mean scores of PCL-5 and CFS

	PCL-5 total		CFS total	
	Mean±SD	Test and p-value	Mean±SD	Test and p-value
Have you experienced an earthquake before?				
Yes	58.28±14.54	t=-0.544 p=0.587	71.64±12.10	t=-1.159 p=0.247
No	59.25±13.72		73.42±11.99	
Have you been injured in an earthquake?				
Yes	60.42±16.80	t=0.394 p=0.694	73.50±10.85	t=0.177 p=0.859
No	58.92±13.81		72.91±12.10	
Have you been trapped under debris in an earthquake?				
Yes	61.75±28.00	t=0.398 p=0.691	73.50±8.42	t=0.093 p=0.926
No	58.95±13.74		72.93±12.08	
Did any of your relatives get trapped under the debris?				
Yes	63.23±12.85	**t=5.601 p<0.001***	72.89±11.30	t=-0.066 p=0.947
No	54.78±13.73		72.98±12.74	
Did any of your relatives get injured?				
Yes	61.82±13.50	**t=3.573 p<0.001***	72.80±11.61	t=-0.200 p=0.842
No	56.28±13.84		73.07±12.45	
Did any of your relatives lose their lives?				
Yes	62.94±12.87	**t=5.012 p<0.001***	72.72±11.47	t=-0.314 p=0.754
No	55.31±13.91		73.14±12.56	
Have you seen people trapped under the debris?				
Yes	63.80±13.68	**t=3.751 p<0.001***	70.89±10.74	t=-1.820 p=0.070
No	57.24±13.64		73.8±12.40	
Have you seen people injured during the earthquake?				
Yes	62.04±13.00	**t=4.154 p<0.001***	71.74±11.22	t=-1.843 p=0.066
No	55.63±14.20		74.25±12.77	
Have you seen anyone who lost their life in the debris field?				
Yes	64.28±12.46	**t=3.962 p<0.001***	70.89±11.96	t=-1.740 p=0.083
No	57.22±13.98		73.62±12.00	
How scared were you during the earthquake?				
Extremely[a]	60.28±14.07	**F=3.111 p=0.027* (a–d)**	73.65±11.92	F=1.092 p=0.353
Moderate[b]	55.42±12.35		70.89±12.09	
Very little[c]	49.00±16.07		70.60±17.16	
I was never scared[d]	57.75±19.12		69.75±10.27	
How would you rate your sleep status since the earthquake?				
Poor[a]	64.32±12.87	**F=26.382 p<0.001* (a–b, c)****	71.09±11.61	**F=3.370 p=0.036* (a-b)****
Moderate[b]	55.53±12.73		74.72±11.74	
Good[c]	46.47±14.64		72.73±15.50	
How did your income being affected after the earthquake?				
We have lost our entire source of income[a]	68.60±18.40	**F=6.954 p<0.001* (a–d)****	68.70±7.74	F=2.459 p=0.063
We have lost most of our source of income[b]	65.51±12.01		69.63±8.89	
Our source of income was little affected[c]	58.16±12.95		73.07±12.01	
Our income was not affected[d]	55.96±14.79		74.96±13.49	

Table 4 (cont). The relationship between earthquake experiences of pregnant women and total mean scores of PCL-5 and CFS

	PCL-5 total		CFS total	
	Mean±SD	Test and p-value	Mean±SD	Test and p-value
How do you think the earthquake will affect your pregnancy?				
Does not affect[a]	43.21±9.21	**F=42.833 p<0.001* (a–b, c)****	81.64±13.89	**F=5.416 p=0.005* (a–b,c)****
Moderately affects[b]	54.58±13.51		73.61±12.43	
Affects too much[c]	65.91±11.13		71.23±10.91	
Do you plan to give birth in a different province due to the earthquake?				
Yesa	65.94±11.11	**F=19.279 p<0.001* (a–b)****	70.47±11.49	F=2.576 p=0.078
Nob	55.06±14.84		73.14±13.05	
Undecidedc	61.96±10.12		75.09±9.04	

t: Student's t-Test; F: One-way ANOVA Test; *: Statistical significance at p<0.05; **: The differences between groups expressed by the letters are statistically significant at p<0.05 after Tukey test; CFS: Childbirth Fear Scale; PCL-5: Post-traumatic stress disorder checklist; SD: Standard deviation; Min: Minimum; Max: Maximum.

Table 5. Correlation between PCL-5 and CFS total and subscale mean scores of pregnant women

Scales	PCL-5 total	CFS total
PCL-5 total		
r	1	0.024
p		0.676
CFS total		
r	0.024	1
p	0.676	

r: Correlation coefficient, Pearson Correlation Test; CFS: Childbirth Fear Scale; PCL-5: Post-traumatic stress disorder checklist.

woman felt to be more vulnerable to the trauma and stress caused by the earthquake due to their lack of experience in pregnancy and childbirth may have contributed to this result. In the study, it was determined that women with higher level of education had higher PTSD scores. However, studies in the literature contradict this result.[4,23,28,29] In our study, women who were smokers had significantly higher PTSD scores compared to non-smokers. The data reported in previous studies on the relationship between smoking and PTSD show discrepancies with our study.[27,29] In the light of all this information, it is thought that further research is needed to clarify how each socio-demographic factor affects post-earthquake PTSD.

The study also examined the role of socio-demographic variables on fear of childbirth. In the literature, there are different studies showing that low level of education and unplanned pregnancies are significantly associated with fear of childbirth.[5,25,26] Bilge and colleagues[30] reported an increase in fear of childbirth in women who smoke. In addition, it is stated that pregnant women's concerns about medical care, inadequate support during the birth process, and conditions that may affect mental health before birth can lead to fear of childbirth, regardless of traumatic events.[25] Among all the factors investigated in this study, low educational level, unplanned pregnancies and smoking were the factors associated with fear of childbirth, consistent with the literature. Therefore, it is thought that it is important to evaluate pregnant women with risk factors for fear of childbirth in terms of a traumatic situation such as an earthquake and to conduct more detailed studies on the subject.

In the study, a low level relationship was found between the total of PCL-5 and the total of CFS, but this relationship was not statistically significant. The fact that these two scales have different psychological structures and focal points, as well as the fact that PCL-5 focuses on general traumatic events such as earthquake and fear of childbirth focuses on birth-specific concerns may have caused the lack of a significant correlation.

Strengths and Limitations

The strength of the study is that it includes data from the early post-earthquake period. Researchers organized quickly after the earthquake. Thus, data on early mental health problems of pregnant women after the earthquake could be evaluated. The results of the study constitute a source of data for psychological support programs and health care strategies for post-traumatic stress and birth fears in pregnant women after the earthquake. In addition, since two of the researchers had experienced the earthquake and were familiar with the conditions of the region, the target group was effectively reached and

the direction in which the research should be directed was effectively planned. This is considered to be one of the strengths of the study.

The first limitation of the study is that it included data on the mental health status of pregnant women at a certain point in time. Another limitation is that there was no comparison group in the study. Therefore, the mental health data of pregnant women after the earthquake could not be compared with a similar group that did not experience the earthquake. Other limitations are that the research data were collected online, and the data were collected with self-report-based measurement tools.

Conclusion

It was concluded that the prevalence of PTSD and fear of childbirth were high in pregnant women who had experienced the earthquake. There was a significant correlation between some earthquake experiences and socio-demographic characteristics of pregnant women and the results related to both PTSD and fear of childbirth. The results of the study suggest that post-earthquake mental well-being support programs should include interventions to improve the psychological health of pregnant women to improve the health of mother and baby. It is recommended to investigate the long-term effects of this earthquake on mother and baby. In addition, it is recommended that earthquake emergency response team should include and women's health nurses who have educated about post-traumatic stress and management of process until childbirth.

Ethics Committee Approval: The Ankara Medipol University Non-Interventional Clinical Research Ethics Committee granted approval for this study (date: 28.03.2023, number: 38).

Informed Consent: Online informed consent was obtained from participants.

Conflict of Interest: None declared.

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Authorship Contributions: Concept: ZÇ, SG, GA; Design: ZÇ, SG, GA; Supervision: ZÇ, SG, GA; Resource: ZÇ, SG, GA; Materials: ZÇ, SG; Data Collection or Processing: ZÇ, SG; Analysis or Interpretation: ZÇ, SG; Literature Search: ZÇ, GA; Writing: ZÇ, SG, GA; Critical Reviews: ZÇ, SG, GA.

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References

1. T.C. Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı. 2023 Kahramanmaraş and Hatay Earthquakes Report. Available at: http://bit.ly/44lWXty Accessed July 1, 2025.
2. World Health Organization. 2023. Dealing with the psychological aftershocks of the Türkiye earthquakes: Why mental health and psychosocial support are so desperately needed. Available at: http://bit.ly/461flcj Accessed July 1, 2025.
3. Valladares-Garrido MJ, Zapata-Castro LE, Peralta CI, García-Vicente A, Astudillo-Rueda D, León-Figueroa DA, et al. Post-traumatic stress disorder after the 6.1 magnitude earthquake in Piura, Peru: A cross-sectional study. Int J Environ Res Public Health 2022;19(17):11035. [CrossRef]
4. Kvestad I, Ranjitkar S, Ulak M, Chandyo RK, Shrestha M, Shrestha L, et al. Earthquake exposure and post-traumatic stress among nepalese mothers after the 2015 earthquakes. Front Psychol 2019;10:734. [CrossRef]
5. Tang B, Deng Q, Glik D, Dong J, Zhang L. A meta-analysis of risk factors for post-traumatic stress disorder (PTSD) in adults and children after earthquakes. Int J Environ Res Public Health 2017;14(12):1537. [CrossRef]
6. Hocaoglu M, Ayaz R, Gunay T, Akin E, Turgut A, Karateke A. Anxiety and post-traumatic stress disorder symptoms in pregnant women during the COVID-19 pandemic's delay phase. Psychiatr Danub 2020;32(3-4):521-6. [CrossRef]
7. Cai D, Zhu Z, Sun H, Qi Y, Xing L, Zhao X, et al. Maternal PTSD following exposure to the Wenchuan earthquake is associated with impaired mental development of children. PLoS One 2017;12(4):e0168747. [CrossRef]
8. Ren JH, Chiang CL, Jiang XL, Luo BR, Liu XH, Pang MC. Mental disorders of pregnant and postpartum women after earthquakes: A systematic review. Disaster Med Public Health Prep 2014;8(4):315-25. [CrossRef]
9. Ren J, Jiang X, Yao J, Li X, Liu X, Pang M, et al. Depression, social support, and coping styles among pregnant women after the Lushan earthquake in Ya'an, China. PLoS One 2015;10(8):e0135809. [CrossRef]
10. Ozturk N, Aydin N, Unal I, Oztemel O. Long-term mental health effects of exposure to earthquake-related prenatal maternal stress. Psychiatry Clin Psychopharmacol 2020;30(3):72-85. [CrossRef]
11. Giusti A, Marchetti F, Zambri F, Pro E, Brillo E, Colaceci S. Breastfeeding and humanitarian emergencies: The experiences of pregnant and lactating women during the earthquake in Abruzzo, Italy. Int Breastfeed J 2022;17(1):45. [CrossRef]
12. Murakami K, Ishikuro M, Obara T, Ueno F, Noda A, Onuma T, et al. Traumatic experiences of the Great East Japan Earthquake and postpartum depressive symptoms: The Tohoku medical megabank project birth and three-generation cohort study. J Affect Disord 2023;320:461-7. [CrossRef]
13. Ren J, Jiang X, Gu L, He D, Xiang J, Zhang J, et al. Evolving meaning from being pregnant and becoming a new mother

over the period of a major earthquake: A grounded theory study. Int J Disaster Risk Reduct 2021;63:102476. [CrossRef]
14. Winders SJ, Murphy O, Looney K, O'Reilly G. Self-compassion, trauma, and posttraumatic stress disorder: A systematic review. Clin Psychol Psychother 2020;27(3):300-29. [CrossRef]
15. Baas MAM, van Pampus MG, Braam L, Stramrood CAI, de Jongh A. The effects of PTSD treatment during pregnancy: Systematic review and case study. Eur J Psychotraumatol 2020;11(1):1762310. [CrossRef]
16. Chen C, Hussein SZB, Nasri NWM, Yao J, Qin Y, Zhao Z, et al. Fear of childbirth among pregnant women: A concept analysis. J Adv Nurs 2024;80(11):4476-87. [CrossRef]
17. Nilsson C, Hessman E, Sjöblom H, Dencker A, Jangsten E, Mollberg M, et al. Definitions, measurements and prevalence of fear of childbirth: A systematic review. BMC Pregnancy Childbirth 2018;18(1):28. [CrossRef]
18. Kara P, Nazik E, Nazik H, Özer D. Post-traumatic stress disorder and affecting factors in pregnant women in the COVID-19 pandemic. Psychiatr Danub 2021;33(2):231-9. [CrossRef]
19. National Center for PTSD. PTSD Checklist for DSM-5 (PCL-5). Available at: https://www.ptsd.va.gov/professional/assessment/documents/PCL5_Standard_form.pdf. Accessed July 1, 2025.
20. Boysan M, Guzel Ozdemir P, Ozdemir O, Selvi Y, Yilmaz E, Kaya N. Psychometric properties of the Turkish version of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders, (PCL-5). Psychiatry Clin Psychopharmacol 2017;27(3):300-10. [CrossRef]
21. Nuraliyeva Z, Kaya N. Development of the childbirth fear scale. Arch Health Sci Res 2022;9(3):161-9.
22. Khatri GK, Tran TD, Baral S, Fisher J. Experiences of an earthquake during pregnancy, antenatal mental health and infants' birthweight in Bhaktapur District, Nepal, 2015: A population-based cohort study. BMC Pregnancy Childbirth 2020;20(1):414. [CrossRef]
23. Qu Z, Tian D, Zhang Q, Wang X, He H, Zhang X, et al. The impact of the catastrophic earthquake in China's Sichuan province on the mental health of pregnant women. J Affect Disord 2012;136(1-2):117-23. [CrossRef]
24. Serçekuş P, Vardar O, Özkan S. Fear of childbirth among pregnant women and their partners in Turkey. Sex Reprod Healthc 2020;24:100501. [CrossRef]
25. Gökçe İsbir G, Serçekuş P, Yenal K, Okumuş H, Durgun Ozan Y, Karabulut Ö, et al. The prevalence and associated factors of fear of childbirth among Turkish pregnant women. J Reprod Infant Psychol 2024;42(1):62-77. [CrossRef]
26. Çıtak Bilgin N, Coşkun H, Coşkuner Potur D, İbar Aydın E, Uca E. Psychosocial predictors of the fear of childbirth in Turkish pregnant women. J Psychosom Obstet Gynaecol 2021;42(2):123-31. [CrossRef]
27. Watanabe Z, Iwama N, Nishigori H, Nishigori T, Mizuno S, Sakurai K, et al. Psychological distress during pregnancy in Miyagi after the Great East Japan Earthquake: The Japan environment and children's study. J Affect Disord 2016;190:341-8. [CrossRef]
28. Zhou Y, Liang Y, Tong H, Liu Z. Patterns of posttraumatic stress disorder and posttraumatic growth among women after an earthquake: A latent profile analysis. Asian J Psychiatr 2020;51:101834. [CrossRef]
29. Qu Z, Wang X, Tian D, Zhao Y, Zhang Q, He H, et al. Posttraumatic stress disorder and depression among new mothers at 8 months later of the 2008 Sichuan earthquake in China. Arch Womens Ment Health 2012;15(1):49-55. [CrossRef]
30. Bilge Ç, Dönmez S, Olgaç Z, Pirinççi F. Fear of birth in pregnancy and affecting factors. Value Health Sci 2022;12(2):330-5. [CrossRef]

Appendix 1. STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies

	Item no	Recommendation	Page no
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2–3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3–4
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4
Bias	9	Describe any efforts to address potential sources of bias	–
Study size	10	Explain how the study size was arrived at	3
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	4–5
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	4–5
		(b) Describe any methods used to examine subgroups and interactions	4–5
		(c) Explain how missing data were addressed	–
		(d) If applicable, describe analytical methods taking account of sampling strategy	–
		(e) Describe any sensitivity analyses	4–5
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	5
		(c) Consider use of a flow diagram	5
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5
		(b) Indicate number of participants with missing data for each variable of interest	5
Outcome data	15*	Report numbers of outcome events or summary measures	5–6–7
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	6–7
		(b) Report category boundaries when continuous variables were categorized	6–7
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period-	–
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	6–7

Appendix 1 (cont). STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies

	Item no	Recommendation	Page no
Discussion			
Key results	18	Summarise key results with reference to study objectives	8–9–10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	10
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	8–9–10
Generalisability	21	Discuss the generalisability (external validity) of the study results	10
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	11

*: Give information separately for exposed and unexposed groups. An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.