

Original Research

Cite this article: Dincer M, Akyol M, Karatas YE and Kocakaya M (2024). The Assessment of Post-Earthquake Quality of Life of Earthquake Survivors. *Disaster Medicine and Public Health Preparedness*, **18**, e338, 1–6
<https://doi.org/10.1017/dmp.2024.309>

Received: 26 December 2023

Revised: 10 September 2024

Accepted: 23 October 2024

Keywords:

quality of life; earthquake survivors; natural disasters; Türkiye Earthquake 2023

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Abstract

Objectives: This study aims to assess the quality of life (QoL) of earthquake survivors who experienced 2 major earthquakes in Türkiye on February 6, 2023, with different measurement tools.

Methods: The study was conducted in 2 centers with a total of 467 participants. For QoL measurement, face-to-face Euroqol EQ-5D-5L, Euroqol Visual Analog Scale (EQ-VAS), and Nottingham Health Profile (NHP) measurement tools were used.

Results: On the EQ-5D-5L scale, most of the participants stated that they struggled the most with the anxiety/Depression dimension. In NHP, the highest mean score is in the Emotional Reaction section. Females and the 55+ age group were found to have worse QoL. A linear and moderate correlation was found between the EQ-5D-5L index value and the EQ-VAS score; an inverse, weak, or moderate correlation was found between the EQ-VAS score and the sections of the NHP scores; an inverse and strong correlation was found between the Nottingham Health Profile Distress (NHP-D) score and the EQ-5D-5L index value.

Conclusions: The findings obtained with the measurement tools used in this study reveal various dimensions affecting the QoL of different cohorts. In addition, the study provides important evidence for policies to be developed to increase post-earthquake QoL.

Quality of life (QoL), which measures life satisfaction, is considered as a conscious, cognitive judgment about a person's physical health, psychological state, social relations, and life.¹⁻⁴ Although QoL is not directly related to health, it is influenced by many economic, political, social, and environmental factors.³ Additionally, there is an increasing interest in the realization of QoL, which is also considered as a measure of well-being based on personal evaluation.⁵

Natural disasters are one of the environmental factors that are rarely encountered but significantly affect QoL.^{6,7} After a natural disaster, destructive experiences, such as bodily injuries, loss of relatives, and financial losses, as well as losses associated with routine daily life, such as housing, nutrition, hygiene, and the psychological state, cause a significant decrease in QoL.^{6,8} However, it is critical to address all dimensions of QoL to better understand the health dynamics of the population after the earthquake.⁹

There is no consensus in the measurement of QoL. A diverse range of measurement tools are used, with some studies focusing on objective indicators, some on subjective indicators, and some others on the mixed approach.⁵ EUROQOL 5 Dimensions 5 Levels (EQ-5D-5L) and Nottingham Health Profile (NHP) are among the most frequently used tools for HRQoL measurement.^{10,11} The aim of this study is to investigate the QoL of the earthquake survivors who were exposed to 2 major earthquakes in Kahramanmaraş Pazarcık and Elbistan on February 6, 2023, in Türkiye. It will also provide a significant reference for future research by comparing the results obtained from different measurement tools.

These 2 earthquakes affected 11 provinces including Kahramanmaraş, Hatay, Adıyaman, Gaziantep, Malatya, Kilis, Diyarbakır, Adana, Osmaniye, Şanlıurfa, and Elazığ.¹² The population of the 11 provinces listed is 14 013 196 people in total (16.4% of the country's population).¹³ In the press release published by the Disaster and Emergency Management Presidency on March 1, 2023, it was stated that 45 089 people lost their lives and 1 971 589 people left the region (evacuated and left through their own means).¹⁴

The aim of this study was to evaluate the quality of life (QoL) of earthquake survivors who experienced 2 major earthquakes in Türkiye with different measurement tools. By using different measurement tools, the similarities and differences of the tools will be investigated. In this way, suggestions will be made regarding the tools to be used in identifying the main problems and needs of earthquake survivors after earthquakes.

Methods

Study Design and Data Collection

The study was conducted in Malatya and Kahramanmaraş provinces between May 1, 2023 and July 1, 2023. EQ-5D-5L, Euroqol Visual Analog Scale (EQ-VAS) and NHP were utilized as measurement tools, and the face-to-face interview method was applied.

Settings and Sampling

In this study, no special sampling method was used; instead, a convenience sampling method was preferred, in which all participants who agreed to participate in the study and met the following conditions were included:

- Living in Kahramanmaraş or Malatya,
- Having lived through the earthquake,
- Not having left the earthquake zone,
- 18 years of age or older,
- Not being trapped under wreckage
- If trapped under wreckage, stayed less than 12 hours and not hospitalized,
- Volunteering to participate in the study

Only 1 volunteer from each family was included in the study. By this means, data were collected from different families.

Data Collection Tools

In this study, the EQ-5D-5L scale developed by EuroQol, Visual Analog Scale (VAS), and Nottingham Health Profile (NHP) were used as data collection tools.

The EQ-5D-5L

The EQ-5D-5L developed by the EuroQol group consists of 2 parts, the descriptive system and the EQ visual analog scale (EQ-VAS), and 5 dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.¹¹ Each dimension is evaluated at 5 different levels: no problems, mild problems, moderate problems, severe problems, and extreme problems.¹¹ EQ-VAS enables the patients to evaluate their health on a vertical visual analogue scale, where the endpoints are labeled as “The best health you can imagine” and “The worst health you can imagine.”¹¹ EQ-VAS scores of the participants were measured in the range of 0-100 (0: worst case, 100: best case). Permission was obtained for the use of measurement tools by registering on the Euroqol Customer Portal with the number 55762. EuroQol recommends using the US index value in countries that do not have an EQ-5D-5L index value. Because Türkiye does not have an EQ-5D-5L index value, the US index value is used in this study as recommended by EuroQol.^{15,16} The findings for the EQ-5D-5L are presented in accordance with the EuroQol User Guide.¹⁷

Visual Analog Scale (VAS)

Although it is not known exactly when the VAS was first used in its current form, a study conducted by Yeung and Wong revealed that the VAS originated from the Graphic Rating Scale developed by Hayes and Patterson in 1921.¹⁸ The VAS basically consists of an uninterrupted horizontal line 10 cm long and 2 descriptive statements at either end, prepared for participants to mark.¹⁸ The EQ-VAS is not a scale developed

by EuroQol specifically for EQ-5D-5L. It is an adapted version of the VAS used in various fields.

Nottingham Health Profile (NHP)

The Turkish adaptation of NHP and its validity and reliability tests were conducted by Küçükdeveci et al. in 2000.¹⁹ Permission was obtained from the authors for the use of the Turkish adaptation of this scale. NHP includes 38 items divided into 6 sections (EN: Energy level [3 items], P: Pain [8 items], EM: Emotional reactions [9 items], SL: Sleep [5 items], SO: Social isolation [5 items], and PM: Physical mobility [8 items]). Additionally, a score ranging from 0-24 (each yes answer is calculated as 1 point), calculated with 24 of these 38 items, is also calculated for the measure of Nottingham Health Profile Distress NHP-D. The yes answer given by each participant is divided by the number of items in that section and the result is multiplied by 100. Therefore, in the first part, the participant ranks the items in each category according to their relative importance and each category is scored between 0-100. A higher score indicates more distress.¹⁹

The EQ-5D-5L index value and the high score obtained with EQ-VAS indicate better QoL, while the high score obtained with NHP indicates worse QoL. Therefore, the fact that there is an inverse correlation between NHP-EQ-VAS and NHP-D-EQ-5D-5L due to the methodology used in the measurement tools indicates that the measurement tools give consistent results and measure QoL in a similar manner.

Statistical Analysis

All descriptive statistics for the scales are given as mean (SD: standard deviation). Categorical variables (province, gender, age groups, etc.) are indicated using numbers and percentages. Comparisons by gender were made with the independent sample *t* test. Comparisons by age groups were made with the One-Way Anova test, and post-hoc pairwise comparisons were made when necessary (Tukey test if the assumption of homogeneity of variances is provided, Games-Howell test if no assumption is provided). The correlations between EQ-VAS and sections of the NHP were examined with a Pearson correlation coefficient. For statistical analysis and calculations, MS-Excel 2016 and IBM SPSS Statistics 22.0 (IBM Corp. Version 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY, IBM Corp.) software was used and *P* < 0.05 was accepted as an indicator of significant difference in statistical decisions.

Results

The study was conducted in 2 centers with a total of 467 participants, 240 (51.4%) in Malatya and 227 (48.6%) in Kahramanmaraş provinces. 171 (36.6%) of the participants were male and 296 (63.4%) were female. The mean age was calculated as 35.8 ±13.1 years. The number of participants who were under the wreckage for 12 hours or less and who were not hospitalized was 17 (3.6%), and 9 (52.9%) of these people reported that they were rescued within the first hour. 86 (18.4%) of the participants stated that they had a chronic disease. The most common of these are diabetes melitus (*n* = 26), asthma (*n* = 16), and hypertension (*n* = 11). The demographic characteristics of the participants and the findings related to EQ-5D-5L US and sections of the NHP are shown in Table 1.

Table 1. Health profiles according to the demographic characteristics of the participants

	n (%)	EQ 5D- 5L		Nottingham Health Profile													
		US index		Energy level		Pain		Emotional reactions		Sleep		Social isolation		Physical mobility		Distress	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Number of participants	467 (100.0)	0.786	0.163	45.70	36.10	20.10	29.70	53.30	32.10	43.10	29.40	34.30	35.10	17.50	21.30	10.02	6.29
Province																	
Kahramanmaraş	227 (48.6)	0.805	0.169	45.50	36.70	19.20	29.60	53.50	31.60	43.40	30.40	32.30	34.10	18.00	23.50	9.95	6.34
Malatya	240 (51.4)	0.767	0.156	45.80	35.60	21.00	29.90	53.20	32.60	42.80	28.60	36.20	36.00	16.90	18.90	10.08	6.25
Gender																	
Female	296 (63.4)	0.765	0.162	51.90	34.20	23.90	32.20	57.30	30.70	46.10	29.20	37.90	35.70	19.20	22.20	11.04	6.11
Male	171 (36.6)	0.823	0.160	34.90	36.80	13.60	23.60	46.40	33.30	38.00	29.20	28.10	33.10	14.40	19.30	8.24	6.22
Job																	
Has a job	232 (49.7)	0.808	0.152	39.70	35.20	13.90	22.90	52.20	32.20	41.10	30.60	32.20	34.10	14.10	18.90	9.21	5.92
Does not have a job	235 (50.3)	0.764	0.171	51.60	36.10	26.20	34.20	54.40	32.00	45.10	28.10	36.30	35.90	20.70	22.90	10.81	6.55
Age groups																	
18 – 24	118 (25.3)	0.819	0.150	41.20	36.40	11.30	22.20	52.40	32.30	40.50	29.80	28.30	32.50	11.50	17.10	9.19	6.19
25 – 34	117 (25.1)	0.816	0.147	41.90	34.50	11.60	21.70	51.50	30.90	39.80	30.30	34.00	35.40	12.80	18.80	9.16	5.91
35 – 44	112 (24.0)	0.801	0.153	41.70	33.90	16.40	25.00	51.40	32.30	42.70	29.60	30.90	33.40	14.50	17.20	9.37	5.84
45 – 54	79 (16.9)	0.738	0.169	53.20	36.80	36.20	36.30	52.90	32.90	45.60	26.80	36.20	35.40	25.00	21.20	11.11	6.46
55+	41 (8.8)	0.656	0.182	65.90	36.90	48.50	37.00	67.20	30.60	56.60	27.50	58.00	36.80	41.20	28.50	14.51	6.58
Smoke																	
Smoke	164 (35.1)	0.813	0.162	40.90	36.40	14.30	23.50	54.50	32.40	44.40	30.00	32.90	34.10	13.30	18.40	9.76	6.20
Never smoke	275 (58.9)	0.775	0.162	47.50	35.80	22.50	32.40	51.60	32.10	42.00	29.10	35.20	36.30	18.80	22.70	10.01	6.40
Quit smoking	28 (6.0)	0.729	0.158	56.00	35.20	30.40	30.30	63.50	29.00	47.10	30.40	33.60	28.80	29.00	17.40	11.54	5.61
Alcohol																	
Drinker	43 (9.2)	0.787	0.153	35.70	40.80	11.30	20.90	51.20	31.80	43.30	30.80	34.90	32.10	12.50	20.00	9.19	6.32
Never drink	411 (88)	0.790	0.161	46.10	35.40	20.60	30.20	53.10	32.10	42.80	29.20	34.10	35.50	17.60	21.30	10.01	6.28
Quit drinking	13 (2.8)	0.646	0.200	66.70	33.30	34.60	35.00	65.80	30.60	53.80	32.00	40.00	33.70	29.80	20.10	12.92	6.02
Loss in Family																	
Experienced	60 (12.8)	0.756	0.146	55.60	35.60	22.70	29.50	63.70	32.30	53.00	30.30	44.70	37.60	19.80	23.30	12.03	6.60
Did not experience	407 (87.2)	0.790	0.165	44.20	36.00	19.70	29.80	51.80	31.80	41.70	29.10	32.80	34.50	17.10	21.00	9.72	6.20
Accommodation																	
House	253 (54.2)	0.809	0.154	45.10	36.50	19.00	28.70	51.70	32.20	40.80	30.50	30.80	33.70	17.80	22.30	9.60	6.49
Container/prefabricated	104 (22.3)	0.759	0.169	46.80	35.20	22.10	33.20	53.20	32.00	45.40	26.80	35.60	35.20	16.70	20.40	10.27	6.10
Tent	65 (13.9)	0.737	0.170	48.20	34.40	22.50	30.20	60.90	28.10	47.10	27.50	43.70	36.20	17.10	19.50	11.38	5.33
Other*	45 (9.6)	0.790	0.170	43.00	39.30	18.30	26.90	51.60	36.20	45.30	31.70	37.30	38.50	17.80	20.40	9.78	6.77
Chronical illness																	
Has	86 (18.4)	0.706	0.178	60.90	36.20	42.90	36.90	62.70	30.90	53.70	27.00	40.20	34.40	32.30	25.00	13.03	6.24
Does not have	381 (81.6)	0.804	0.154	42.30	35.20	15.00	25.20	51.20	32.00	40.70	29.50	33.00	35.10	14.10	18.80	9.34	6.11
Education																	
≤ Middle school	179 (38.3)	0.751	0.175	52.70	36.50	30.80	35.00	53.00	31.80	46.80	28.10	37.80	37.20	23.90	24.50	10.93	6.58
High school	166 (35.5)	0.829	0.149	40.40	35.50	12.50	23.60	53.70	32.10	43.10	30.70	29.30	33.10	13.00	18.90	9.42	6.14
College/university	122 (26.1)	0.779	0.150	42.60	34.90	14.80	23.70	53.30	32.60	37.70	29.10	36.10	33.90	14.00	16.40	9.49	5.94

(Continued)

Table 1. (Continued)

	n (%)	EQ 5D- 5L		Nottingham Health Profile													
		US index		Energy level		Pain		Emotional reactions		Sleep		Social isolation		Physical mobility		Distress	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Household income																	
< Min wage	136 (29.1)	0.753	0.170	53.70	34.90	27.50	33.50	58.10	31.00	43.70	27.90	40.90	35.00	22.40	24.50	11.34	6.34
~ Min wage	148 (31.7)	0.807	0.165	43.20	39.50	21.20	31.90	48.70	32.70	43.60	30.40	31.40	36.60	18.80	22.30	9.45	6.67
> Min wage	183 (39.2)	0.793	0.154	41.70	33.20	13.70	23.00	53.50	32.10	42.30	29.90	31.80	33.40	12.70	16.40	9.49	5.81

*Individuals living in vehicles/workplaces.

Table 2. EQ-5D-5L frequencies and proportions reported by dimension and level

Levels	Mobility n (%)	Self care n (%)	Usual activities n (%)	Pain / discomfort n (%)	Anxiety / depression n (%)
Level 1 (No problems)	337 (72.2)	405 (86.7)	307 (65.7)	272 (58.3)	109 (23.3)
Level 2 (Slight problems)	59 (12.6)	35 (7.5)	83 (17.8)	100 (21.4)	102 (21.8)
Level 3 (Moderate problems)	58 (12.4)	25 (5.4)	63 (13.5)	77 (16.5)	171 (36.7)
Level 4 (Severe problems)	11 (2.4)	2 (0.4)	13 (2.8)	17 (3.6)	40 (8.6)
Level 5 (Extreme problems / unable to do)	2 (0.4)	N/A	1 (0.2)	1 (0.2)	45 (9.6)
Total	467 (100.0)	467 (100.0)	467 (100.0)	467 (100.0)	467 (100.0)

It was observed that more than half of the participants did not experience problems in the EQ-5D-5L dimensions of mobility, self-care, usual activities, and pain/discomfort. In the anxiety/depression dimension, 171 (36.7%) of the participants were found to have moderate problems. None of the participants reported experiencing problems at extreme/unable to do levels in the self-care dimension (Table 2). Additionally, it was detected that in all dimensions, more females experienced problems than males. When compared to the sections of the NHP, it is seen that more problems were experienced in the EN and EM sections and that and more females report problems. In this respect, it can be said that the 2 measurement tools present parallel results.

It was observed that females had lower mean EQ-5D-5L index values than males, and that this difference is statistically significant ($t = 3.750$; $P < 0.001$). When the EQ-5D-5L index values were compared between the age groups, it was found that at least 1 age group was different from the others ($F = 11.648$; $P < 0.001$). As age increases, index value decreases, therefore, QoL decreases index values of the 55+ and 45-54 age groups differ significantly from all other age groups ($P < 0.05$). No significant difference between the averages of the 18-24, 25-34, and 35-44 age groups was observed ($P > 0.05$).

It was researched whether the mean EQ-5D-5L index differed between age groups for female and male participants. For both genders, it was observed that at least 1 of the age groups was different from the others ($F = 11.160$ for females; $P < 0.001$ and $F = 4.734$ for males; $P = 0.001$). It was observed that the mean EQ-5D-5L index decreased as the age increased among the male participants. It was observed that the mean EQ-5D-5L index of the 55+ age group showed a significant difference with the 18-24, 25-34, and 35-44 age groups, and the 45-54 age group showed a significant difference only with the 18-24 age group ($P < 0.05$). Among females, the mean EQ-5D-5L index decreased as age increased (only the 25-34 age group had a higher index value than the 18-24 group). A significant difference was observed between the

55+ and 45-54 age groups and the 18-24, 25-34, and 35-44 age groups in terms of the mean EQ-5D-5L index ($P < 0.05$).

The mean of the sections of the NHP females was significantly higher than that of males ($P < 0.05$). It was observed that the biggest difference was the EN section, and the energy level of females was significantly lower than males ($t = 5.034$; $P < 0.001$).

When the sections of the NHP were compared according to age groups, it was determined that at least 1 age group of all sections except EM was different from the others ($P < 0.05$). The mean SO, PM, and NHP-D sections of the 55+ age group were higher than all other groups ($P < 0.05$). For the EN and Pain sections, the mean of the 55+ age group was significantly higher than all other age groups except the 45-54 age group ($P < 0.05$). Subsequently, for the SL section, the average of the 55+ age group is different from the 18-24 and 25-34 age groups ($P < 0.05$). The means of the 3 age groups under the age of 45 are similar to all sections of NHP ($P > 0.05$).

The overall mean EQ-VAS score was calculated as 64.64 ($SD = 21.58$). It was observed that the EQ-VAS score of females was lower than that of males and the difference was significant ($t = 2.101$; $P = 0.036$). Regardless of gender, when the EQ-VAS means were compared in all age groups, it was seen that the EQ-VAS mean of at least 1 age group was different from the others ($F = 7.749$; $P < 0.001$). When the source of the difference was researched, it was determined that the mean EQ-VAS score of the participants in the 55+ age group was lower than the participants in all other age groups ($P < 0.01$). It was also seen that there was no significant difference between other age groups ($P > 0.05$) (Figure 1).

There is a statistically significant, inverse, weak-moderate correlation between the EQ-VAS score and the section of the NHP ($P < 0.001$) (Table 3). An inverse and strong correlation was found between the NHP-D section score and the EQ-5D-5L index value ($r = -0.671$; $P < 0.001$). A linear and moderate correlation was observed between the EQ-5D-5L index value and the EQ-VAS score ($r = 0.492$; $P < 0.001$). As there is a different measurement method in NHP than EQ-VAS and EQ-5D-5L, sections of the NHP are expected to show a

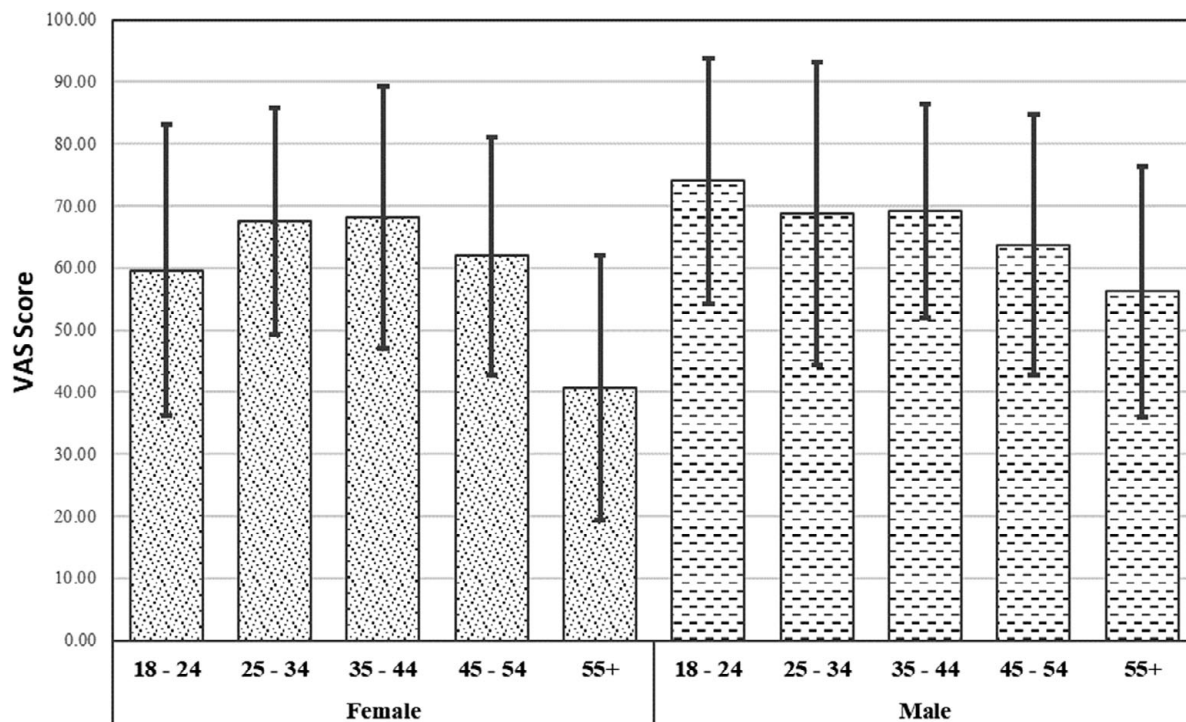


Figure 1 EQ-VAS scores of participants (mean±SD).

Table 3. Correlation between sections of the NHP scores and the EQ-VAS score

	EN	P	EM	SL	SO	PM	Distress
<i>r</i>	-0.441	-0.335	-0.545	-0.449	-0.399	-0.326	-0.577
<i>p</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

EN: energy level; P: pain; EM: emotional reactions; SL: sleep; SO: social isolation; PM: physical mobility.

low score in a situation where EQ-5D-5L and EQ-VAS have high scores. Therefore, the correlations obtained show that the measurement tools give consistent results.

Discussion

Participants experience the most problems in the Anxiety/Depression dimension of the EQ-5D-5L index dimensions. Another dimension with the most problems experienced is Pain/ Discomfort. In various studies researching post-natural disaster QoL, it is reported that negative conditions such as depression and anxiety, as well as complaints of pain, are frequently experienced post-disaster.⁶⁻⁸ People may experience problems such as pain and discomfort due to both the effects of natural disasters and the struggle of finding a shelter after natural disasters, and subsequently feel psychological discomfort.

In this study, it was observed that females reported lower QoL than males. In a study conducted with tsunami survivors in Southeast Asia, it was concluded that females had significantly higher QoL and more post-traumatic stress than males.⁷ Another study conducted with survivors of the earthquake in Italy determined that the physical QoL score was higher among males and the psychological QoL score was higher among females.⁸ It can be argued that these differences may be related to social characteristics and roles attributed to females.

In a study researching post-earthquake QoL in Türkiye, it was concluded that females had lower QoL scores.²⁰ In addition, it was concluded that the quality of life and academic achievement of earthquake victims were significantly lower than those who were not exposed to the earthquake.²⁰ In this study, academic success was not evaluated, but similar results were obtained regarding quality of life.

According to Section of the NHP, it was concluded that females and age groups over 55+, regardless of gender, had worse QoL scores. EN is significantly different among females, and P and PM are significantly different among age groups. In a study, it was concluded that the elderly population faced significant mobility limitations and pain problems after the earthquake.²¹ In the study conducted by Siqveland et al., no significant relationship was found between both gender and age and QoL.⁶

Strengths and Limitations

The strengths of the study are the use of different measurement tools in measuring the quality of life after the earthquake and the investigation of the relationship or differences between the results. The fact that it was conducted in 2 cities and that it was a cross-sectional study and that a comparison before and after the earthquake could not be made also reveals its limitations.

Conclusions

Although elderly people with poor QoL were more likely to be evacuated or migrated from earthquake zones after the earthquake in Türkiye, it was possible to obtain results for different cohorts of earthquake victims staying in the earthquake zone. Thus, significant evidence has been obtained to measure the QoL of earthquake victims and to support the development of policies that can increase QoL accordingly.

As a result of the study, it was observed that females perceived lower quality of life than males. It was also revealed that the elderly population perceived lower quality of life than the young population. In both measurement tools, it was determined that physical mobility and psychological status were more common problems.

When the correlations between the measurement tools were examined, it was determined that the strongest relationship was between the NHP-D score and the EQ-5D-5L index value. Therefore, it is predicted that NHP-D score and EQ-5D-5L index value may be a better predictor than EQ-VAS in determining the QoL of earthquake victims. However, the facility of implementation and evaluation of EQ-VAS should not be ignored. To accurately determine the QoL of earthquake victims, it is thought that it would be advantageous to apply EQ-VAS rapidly, especially for people with low EQ-VAS scores, and that NHP and EQ-5D-5L could be utilized for more detailed examinations by allocating extra time.

Although the measurement tools used were not developed specifically for natural disasters, they gave consistent results in the QoL measurement of earthquake survivors. The measurement tools used can provide detailed information about QoL of certain cohorts, as they measure different dimensions. It has been detected that various measurement tools can be useful in detecting different situations and that the factors affecting QoL after the earthquake differ according to demographic characteristics.

Funding statement. There is no funding.

Competing interest. The authors have no conflicts of interest to declare.

Ethical standard. In order to conduct the research, Ethics Committee Approval was obtained from Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee with the decision number 04 dated 13.04.2023.

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