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The impact of earthquake preparedness training on mothers with physically disabled children: a randomized controlled study

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This study aimed to evaluate the effect of earthquake preparedness training on the psychological resilience and earthquake preparedness levels of mothers with physically disabled children. The study was conducted at a special education and rehabilitation center in a province in eastern Turkey between January and April 2024, using a pre-test/post-test control group experimental design. A total of 78 mothers participated, with 39 randomly assigned to the experimental group and 39 to the control group. The experimental group received earthquake preparedness training. Data were analyzed using SPSS version 26. It was determined that 38.5% of the mothers in the experimental group were between 32–39 years of age, equal numbers of primary (35.9%) and secondary (35.9%) school graduates, 84.6% had nuclear families and 89.7% lived in urban areas. In the control group, 38.5% of the mothers were between 25–31 years of age, 33.3% were primary school graduates, 79.5% had nuclear families and 97.4% lived in urban areas. The experimental and control groups were similar in terms of baseline characteristics. Before the training, Adult Psychological Resilience Scale (APRS) scores were comparable between groups. After the training, the experimental group showed a significant increase in psychological resilience compared to the control group ($p < .05$). Similarly, Disaster Preparedness Scale (DPS) scores were comparable before the training, but the experimental group showed a significant increase in earthquake preparedness after the training ($p < .05$). The training enhanced both psychological resilience and earthquake preparedness in mothers, increasing their knowledge and awareness about earthquakes. Developing earthquake preparedness training and materials specifically for families with physically disabled children will contribute to the safety and well-being of both families and their children.

Keywords Earthquake, Mothers, Physically disabled children, Preparedness, Psychological resilience, Training

Earthquakes are among the most destructive and deadly natural disasters worldwide[1,2]. While earthquakes have economic, physical, social, and psychological impacts on the general population, research indicates that disadvantaged groups, such as children and individuals with special needs, are disproportionately affected[3–5]. Around 7 million children with disabilities are affected by disasters worldwide every year. Their special physical, psychological and health needs make them vulnerable to negative impacts during a disaster, such as delayed evacuation and lack of social support systems[6]. Individuals with special needs often encounter multiple barriers during emergency response and recovery efforts, which exacerbate the challenges they face. Studies show that during earthquakes, these individuals struggle to access basic necessities such as electricity, clean water, and healthcare services[5,7]. Specifically, children with physical disabilities and their families are reported to be three times more likely to face difficulties in obtaining medical assistance during and immediately after a disaster[7,8].

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Disability is defined as having a long-term and limiting illness, disability or impairment, as self-reported by the individual, unless otherwise specified. The global prevalence of disability increases with age, from 5.8% in children and adolescents aged 0–14 years to 34.4% in adults aged 60 years and over[9]. In Turkey, in the report published by the Ministry of Family and Social Services (ASHB), it was reported that 33,185 children aged 0–4, 91,059 children aged 5–9, 122,807 children aged 10–14 and 134,078 children aged 15–19 were disabled[10]. These data show that a total of 381,129 children in Turkey have disabilities. In addition, in the Turkey Health Survey 2022 report published by the Turkish Statistical Institute (TÜİK), it is stated that 1.5% of children between the ages of 2–14 have difficulty walking[11].

Parenting a child with a disability imposes various burdens on families, including economic challenges, educational needs, health issues, social exclusion, and care demands associated with the child's condition[12]. Numerous studies have reported that parents of children with disabilities experience heightened levels of stress, anxiety, frustration, and loneliness[13–16]. These challenges have been shown to negatively impact the psychological resilience of parents in families with disabled children[17,18]. Psychological resilience enables people to cope better during disasters and accelerate their post-disaster recovery processes. In this context, trainings to enhance psychological resilience have been shown to improve stress coping strategies and strengthen the ability to respond more adaptively during disasters. It is also emphasized that psychological preparedness promotes long-term psychological recovery and resilience by enabling better response to stressful disaster-related stimuli[19].

Disaster and Emergency Management Presidency (AFAD), Search and Rescue Association (AKUT), local governments and non-governmental organizations organize trainings and prepare various publications for disaster preparedness for individuals with disabilities. As a part of teamwork, healthcare personnel contribute to the disaster preparedness, protection, treatment and rehabilitation processes of persons with disabilities[20]. Guides and training materials for persons with disabilities were prepared within the scope of the reports prepared by AFAD[21,22]. However, these guides are generally part of general disaster management practices and are not defined as a disability-specific model. Some local governments have developed special projects aiming to protect persons with disabilities in disasters. For example, it is aimed to provide accessibility standards for persons with disabilities in disaster assembly areas[22].

Despite the significant body of research on the effects of earthquakes on the general population, studies focusing on the specific impact of earthquakes on children with physical disabilities and their families are limited[23,24]. It was stated that earthquake preparedness training given to hearing impaired children helped to improve their preparedness for earthquakes and created earthquake awareness[6]. Additionally, research has indicated that families with disabled children tend to have low levels of disaster preparedness, and there is a need to raise their awareness and support them through targeted training programs[24–26]. In a phenomenological study, it was stated that the majority of the parents of individuals with intellectual disabilities pointed out that they did not have adequate preparations for the earthquake, they could not meet many of their needs during and after the earthquake, and they could not find a special unit where they could tell their problems to the disabled individuals[27]. Türk[24] emphasized the importance of developing holistic disaster management models that include specialized training and programs for individuals with disabilities. In this context, it is crucial to increase awareness among mothers of children with physical disabilities about how to prepare for earthquakes and how to cope during such disasters. In addition, it is thought that this research will have an important place in the literature in terms of providing a basis for new ideas in the development of intervention strategies by paving the way for studies to be conducted in other disabled groups.

The aim of this study is to enhance the earthquake preparedness of mothers of children with physical disabilities through targeted training, while also improving their psychological resilience. Additionally, the study aims to evaluate the impact of this training on their levels of earthquake preparedness and psychological resilience.

H_1: Earthquake preparedness training improves the psychological resilience of mothers of children with physical disabilities.

H_2: Earthquake preparedness training improves the earthquake preparedness levels of mothers of children with physical disabilities.

Results

Comparison of the characteristics of the mothers in the experimental and control groups

In the experimental group, 38.5% of mothers were aged 32–39. Education levels were equal among primary (35.9%) and secondary (35.9%) school graduates. Most mothers (84.6%) lived in nuclear families, and 61.5% reported incomes lower than their expenses. Additionally, 92.3% were unemployed, 89.7% resided in urban areas, 43.6% had three or more children, 53.8% were not related to their spouses, 74.4% did not have chronic diseases, and 69.2% had no other disabled individuals in their families. Upon learning of their child's physical disability, 56.4% experienced shock, 71.8% reported life changes, 50% faced restrictions, 76.9% had no marital issues due to the disability, and 97.4% engaged in various activities with their disabled child. Regarding earthquake preparedness, 94.9% had earthquake experience, 53.8% knew how to protect themselves and their children, 56.4% lacked earthquake preparation, 56.7% of those prepared maintained an emergency kit and first aid supplies, and 71.8% had not received earthquake training (Table 1).

In the control group, 38.5% of mothers were aged 25–31, and 33.3% were primary school graduates. Most (79.5%) lived in nuclear families, and 62.2% reported incomes equivalent to their expenses. Moreover, 94.9% were unemployed, 97.4% lived in urban areas, and there were equal numbers of mothers with two (43.6%) and three or more children (43.6%). Additionally, 64.1% were not related to their spouses, 74.4% had no chronic diseases, and 82.1% had no other disabled individuals in their families. In response to their child's physical disability, 48.7% felt shock, 74.4% experienced life changes, 50% faced restrictions, and 74.4% reported no marital issues due to the disability. All mothers engaged in various activities with their disabled child. Regarding

	Experiment (n = 39)		Control (n = 39)		Total (n = 78)		Test	p
	N	%	N	%	N	%		
Age								
21–24	4	10.3	4	10.3	8	10.3		
25–31	12	30.8	15	38.5	27	34.6	1.095[a]	0.814
32–39	15	38.5	11	28.2	26	33.3		
40–48	8	20.5	9	23.1	17	21.8		
Education status								
Primary education	14	35.9	13	33.3	27	34.6		
Secondary Education	14	35.9	9	23.1	23	29.5	2.535[a]	0.484
High School	5	12.8	9	23.1	14	17.9		
University	6	15.4	8	20.5	14	17.9		
Employment status								
Working	3	7.7	2	5.1	5	6.4	0.000[a]	1.000
Not working	36	92.3	37	94.9	73	93.6		
Family type								
Nuclear family	33	84.6	31	79.5	64	82.1	0.087[a]	0.768
Extended family	6	15.4	8	20.5	14	17.9		
Place of residence								
Urban	35	89.7	38	97.4	73	93.6	0.855[a]	0.355
Rural	4	10.3	1	2.6	5	6.4		
Income status								
Income less than expenditure	24	61.5	10	25.6	34	43.6	10.79[a]	**0.02***
Income equals expenditure	15	38.5	27	69.2	42	53.8		
Income more than expenditure	-	-	2	5.1	2	2.6		
Number of children								
One	7	17.9	5	12.8	12	15.4		
Two	15	38.5	17	43.6	32	41.0	0.495[a]	0.791
Three or more	17	43.6	17	43.6	34	43.6		
Consanguineous marriage status								
Yes	18	46.2	14	35.9	32	41.0	0.477[b]	0.490
No	21	53.8	25	64.1	46	59.0		
Parental chronic disease status								
Yes	10	25.6	7	17.9	17	21.8	0.301[b]	0.583
No	29	74.4	32	82.1	61	78.2		
Other disabled persons in the family								
Yes	12	30.8	10	25.6	22	28.2	0.253[b]	0.801
No	27	69.2	29	74.4	56	71.8		
The first time it is learnt that a child has a physical disability								
I didn't want to accept it	6	15.4	3	7.7	9	11.5		
I went into shock	22	56.4	19	48.7	41	52.6		
I blamed myself	8	20.5	9	23.1	17	21.8	5.729[a]	0.297
I blamed my wife	1	2.6	-	-	1	1.3		
I blamed the doctor	2	5.1	6	15.4	8	10.3		
I accepted	-	-	2	5.1	2	2.6		
Change in life situation								
Yes	28	71.8	29	74.4	57	73.1	0.065[b]	0.799
No	11	28.2	10	25.6	21	26.9		
Changes in life**								
Restriction	28	50.0	28	50.0	56	50.0		
Social isolation	18	32.1	19	33.9	37	33.0	0.104[a]	0.991
Stigmatization	7	12.5	6	10.7	13	11.6		
Engage in a research process for treatment	3	5.4	3	5.4	6	5.4		
Problems in the relationship with the spouse after learning about the disability								
Yes	9	23.1	10	25.6	19	24.4	0.070	0.792
Continued								
No	30	76.9	29	74.4	59	75.6		

	Experiment (n = 39)		Control (n = 39)		Total (n = 78)		Test	p
	N	%	N	%	N	%		
Changes in the relationship with the spouse**								
Increasing controversy	9	52.9	5	33.3	14	43.7		
Mutual apathy	8	47.1	5	33.3	13	40.6	5.910[a]	0.083
Depression	-	-	2	13.3	2	6.2		
Increased commitment	-	-	3	20.0	3	9.3		
Activity with the child								
Yes	38	97.4	39	100.0	77	98.7	0.000[a]	1.000
No	1	2.6	0	0.0	1	1.3		
Activities carried out**								
Playing with a toy	34	40.5	38	41.3	72	40.9		
Physical activity	31	36.9	34	37.0	65	36.9	0.023[a]	0.989
Social activity	19	22.6	20	21.7	39	22.2		
Previous earthquake experience								
Yes	37	94.9	36	92.3	73	93.6	0.000[a]	1.000
No	2	5.1	3	7.7	5	6.4		
Knowing how to protect themselves and their children from earthquake								
Yes	21	53.8	24	61.5	45	57.7	0.473[b]	0.647
No	18	46.2	15	38.5	33	42.3		
Preparation for earthquake at home								
Yes	17	43.6	13	33.3	30	38.5	0.867[b]	0.352
No	22	56.4	26	66.7	48	61.5		
Preparation**								
Bag and first aid kit	17	56.7	11	64.7	28	59.6	0.291[b]	0.589
Stabilization of furniture	13	43.3	6	35.3	19	40.4		
Status of receiving training on earthquake								
Yes	11	28.2	15	38.5	26	33.3	0.923[b]	0.337
No	28	71.8	24	61.5	52	66.7		
Places where earthquake-related training is received								
School	5	45.5	9	60.0	14	53.8	1.826[a]	0.800
Course	-	-	1	6.7	1	3.8		
Social media	2	18.2	2	13.3	4	15.4		
TV	4	36.4	3	20.0	7	26.9		

Table 1. Comparison of the descriptive characteristics of the mothers between the groups. a = Fisher's Exact Test, b = 2 Chi-square-Test, *p < 0.05, **Multiple Response.

earthquake preparedness, 92.3% had earthquake experience, 61.5% knew how to protect themselves and their children, 66.7% lacked earthquake preparation, and 61.5% had not received earthquake training (Table 1).

When comparing the descriptive characteristics of mothers in the experimental and control groups, all characteristics except income status were similar, with no statistically significant differences observed between the groups (p > 0.05, Table 1).

Comparison of the characteristics of children in the experimental and control groups

It was found that 38.5% of the children of mothers in the experimental group were aged 11–18, 84.6% did not have any other chronic diseases, and 53.8% had congenital physical disabilities. In the control group, 30.8% of the children were aged 11–18, 76.9% did not have any other chronic diseases, and 79.5% had congenital physical disabilities. No statistically significant differences were observed between the experimental and control groups regarding other characteristics, except for congenital physical disability (Table 2).

Comparison of psychological resilience and earthquake readiness levels according to pre-post intervention and experimental—control groups

A statistically significant difference was observed between the pretest mean of the APRS (74.1 ± 9.1) and the posttest mean (77.2 ± 9.1) prior to the intervention (t = -7.005, p < 0.05). Furthermore, while there was no significant difference between the groups before the intervention (p > 0.05), a significant difference emerged between the experimental and control groups after the intervention (t = 2.321, p < 0.05). Similarly, a significant difference was noted between the pretest mean of the DPS (31.8 ± 7.6) and the posttest mean (35.8 ± 7.9) (p < 0.05). Although no significant difference existed between the groups before the intervention (p > 0.05), a significant difference was found between the experimental and control groups after the intervention (t = 6.156,

	Experiment (n = 39)		Control (n = 39)		Total (n = 78)		Test	p
	N	%	N	%	N	%		
Child's age								
0–2 years	8	20.5	7	17.9	15	19.2		
3–5 years	10	25.6	14	35.9	24	30.8	1.067[b]	0.785
6–10 years	6	15.4	6	15.4	12	15.4		
11–18 years	15	38.5	12	30.8	27	34.6		
Chronic disease status of the child								
Yes	6	15.4	9	23.1	15	19.2	0.743[b]	0.389
No	33	84.6	30	76.9	63	80.8		
Congenital physical disability of the child								
Yes	21	53.8	31	79.5	52	66.7	5.769[b]	**0.030***
No	18	46.2	8	20.5	26	33.3		

Table 2. Comparison of descriptive characteristics of children between groups. a = Fisher's Exact Test (FET), b = 2 Chi-square test, *p < 0.05.

p < 0.05). Significant differences were also observed between the groups on the DPP, P, DA, and AWS subscales of the DPS following the intervention (p < 0.05, Table 3, Fig. 1).

Discussion

In this study, it was aimed to evaluate the psychological resilience and earthquake preparedness levels with earthquake preparedness training given to mothers of children with physical disabilities. For this purpose, earthquake preparedness and psychological resilience levels were evaluated.

Having children with physical disabilities is a challenging process for all family members. Families with such children face various psychological conditions, including difficulties, stress, and fear. Research has indicated that the level of psychological resilience among parents of children with disabilities is low due to the challenges they experience[28,29]. Additionally, it has been reported that the level of disaster preparedness in families with children with disabilities is also low, highlighting the need for increased awareness and support through training[25,26].

In this study, which aimed to enhance psychological resilience and earthquake awareness among mothers of children with physical disabilities by providing earthquake preparedness training, it was determined that the training positively affected both psychological resilience and earthquake preparedness levels in the mothers. These results supported the hypothesis: "Earthquake preparedness training for mothers of children with physical disabilities affects their level of psychological resilience." As no studies evaluating the effects of disaster preparedness training on psychological resilience were found in the literature, the findings were discussed in relation to studies examining the effectiveness of various training types on psychological resilience.

When evaluating the APRS pre-test data, no statistically significant difference was found between the experimental and control groups; however, there was a statistically significant difference in favor of the experimental group in the post-test data (p < 0.05). Additionally, it was found that the earthquake preparedness training increased the post-test APRS score average within the experimental group, and this difference was statistically significant (p < 0.05, d = 0.692, medium effect size, Table 3). Psychological resilience is defined as an individual's capacity to cope with stressful and challenging situations and to adapt to life in a healthy manner[30–32]. Studies have shown that families with children with disabilities exhibit lower levels of psychological resilience due to stress, fear, anxiety, and physical challenges compared to families without such children[33–35]. In this context, various interventions, such as art activities[36], emotional intelligence training[37], cognitive-behavioral approaches[38], and mindfulness-based self-compassion training[39], have been reported to enhance the psychological resilience of parents with special needs children. It is known that the difficulties experienced by families with children with disabilities after earthquakes due to reasons such as access to health care and meeting basic needs negatively affect their psychological resilience[5,19]. Earthquake preparedness training provided to mothers with children with physical disabilities increases both individual and family psychological resilience by providing skills such as composure, planning and solution-orientedness in times of crisis, increases their effectiveness in ensuring the safety of individuals with disabilities, strengthens family solidarity and contributes to the spread of social awareness through learning from traumatic experiences. It should also be kept in mind that these processes have implementation challenges such as socio-economic level, lack of social support, special needs of the child with disabilities and accessibility to education.

The second hypothesis of the study posited that "Earthquake preparedness training for mothers of children with physical disabilities affects their level of earthquake preparedness." Disaster preparedness is defined as the measures taken to prepare society by developing response and recovery plans to mitigate the impact of disasters, ensuring effective implementation of these plans, and maintaining continuous public awareness[40,41]. Some literature suggests that individuals with special needs have inadequate knowledge about disaster preparedness and that more training is necessary for them and their families in disaster management[26,42,43].

When the DPS pre-test data were evaluated, no statistically significant difference was observed between the experimental and control groups, whereas a statistically significant difference in favor of the experimental group was found in the post-test data (p < 0.05). Furthermore, it was determined that the earthquake preparedness

Scale	X ± SD	t	p	Experiment X ± SD	Control X ± SD	t	P
APRS Pre-test	74.1 ± 9.1	-7.005[a]	**0.000***	74.17 ± 8.0	74.1 ± 8.0	0.012[b]	0.990
Post-test	77.2 ± 9.1			79.5 ± 7.4	74.9 ± 10.1	2.321[b]	**0.023***
Within Group Mean Differences:				**-5.410**	-0.769		
				(6.731[b], **p = 0.000***, d = 0.692)			
DPS Pre-test	31.8 ± 7.6	-8.402[a]	**0.000***	33.1 ± 8.3	30.5 ± 6.6	1.488[b]	0.141
Post-test	35.8 ± 7.9			40.3 ± 6.6	31.2 ± 6.4	6.156[b]	**0.000***
	Within Group Mean Differences:			**-7.256**	-0.692		
				(11.259[b], **p = 0.000***, d = 0.960)			
DPP Pre-test	14.5 ± 4.2	-6.825[a]	**0.000***	14.9 ± 4.9	14.1 ± 3.3	0.814[b]	0.418
Post-test	16.1 ± 3.8			16.1 ± 3.8	14.6 ± 3.1	3.640[b]	**0.000***
	Within Group Mean Differences:			**-2.667**	-0.564		
				(5.117[b], **p = 0.000***, d = 0.237)			
P Pre-test	6.2 ± 2.7	-2.032[w]	**0.042***	6.7 ± 2.7	5.8 ± 2.6	640.50[u]	0.149
Post-test	6.4 ± 2.6			7.1 ± 2.3	5.8 ± 2.5	562.50[u]	**0.038***
	Within Group Mean Differences:			**-0.385**	0.000		
				(663.00[u], **p = 0.022***, d = 0.159)			
DA Pre-test	8.2 ± 1.5	-4.035[w]	**0.000***	8.5 ± 1.5	7.9 ± 1.5	622.50[u]	0.068
Post-test	8.6 ± 1.5			9.1 ± 1.3	8.0 ± 1.2	426.50[u]	**0.000***
	Within Group Mean Differences:			**-0.692**	-0.128		
				(519.50[u], **p = 0.000***, d = 0.073)			
DWS Pre-test	2.9 ± 1.5	-7.535[a]	**0.000***	3.0 ± 1.5	2.7 ± 1.4	0.847[b]	0.400
Post-test	4.6 ± 2.2			6.5 ± 0.7	2.7 ± 1.4	14.820[b]	**0.000***
	Within Group Mean Differences:			**-3.513**	0.000		
				(14.604[b], **p = 0.000***, d = 2.990)			

Table 3. Comparison of psychological resilience and earthquake preparedness and their sub-dimensions according to pre-post intervention and experimental-control groups. a = Dependent groups t test, w = Dependent groups Wilcoxon signed-rank test, b = Independent groups t test, u = Independent groups Mann–Whitney U test, d = Cohen's d, *p < 0.05. APRS: Adult Psychological Resilience Scale, DPS: Disaster Preparedness Scale, DPP: Disaster Physical Protection, P: Disaster Planning, DA: Disaster Assistance, DWS: Disaster Warning and Signals.

training provided to the mothers in the experimental group significantly increased the post-test DPS score average within the group ($p < 0.05$, $d = 0.960$, large effect size, Table 3). Toor, et al.[44] reported that individualized disaster education helps families with children dependent on parenteral nutrition not only to prepare for potential earthquakes but also to become more confident in coping with any disaster. Similarly, Bagwell, et al.[45] found that educational disaster materials for parents of children with special needs raised awareness and increased knowledge about disaster preparedness. Baker, et al.[46] noted that disaster preparedness training using brochures improved the disaster preparedness of families with children with special needs. These findings support existing literature and suggest that training can enhance disaster awareness among parents and guide their planning for their children. It has been stated that awareness of disasters can be temporarily increased by an intervention, but such a level is difficult to sustain in the long term and tends to return to its original state after one month[47]. B This suggests that awareness-raising efforts should be supported by reinforcement strategies focused on continuity, repetition, and practice.

Physical protection measures, first aid training, and disaster planning during the earthquake preparation phase are vital for both the moment of the earthquake and the aftermath. Key components of disaster risk management include preparing emergency bags, securing non-structural elements, ensuring the earthquake resistance of buildings, and evacuation planning[24,48,49]. A study by Bilik and Akdağ[5] discussed the challenges faced by mothers of children with special needs during disasters, revealing that their pre-earthquake preparations were inadequate, and they encountered difficulties during the evacuation process, as well as deficiencies in planning and meeting basic life needs.

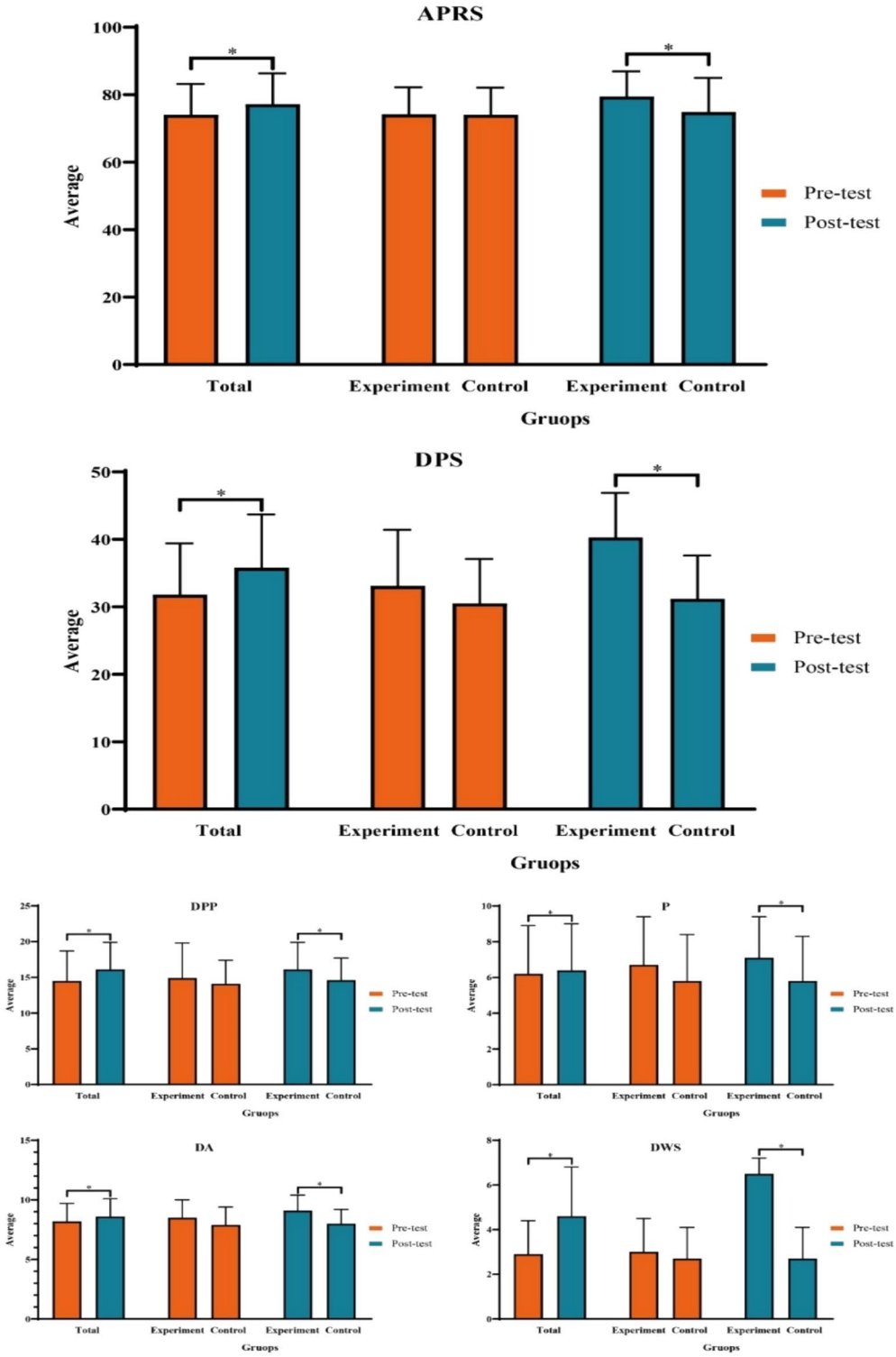


Fig. 1. Graphical representation of the comparison of psychological resilience and earthquake preparedness and their sub-dimensions according to pre-post intervention and experimental-control groups (APRS: Adult Psychological Resilience Scale; DPS: Disaster Preparedness Scale; DPP: Disaster Physical Protection; P: Planning; DA: Disaster Assistance; DWS: Disaster Warning and Signals; *: $p < 0.05$).

In the DPS sub-dimensions, the DPP, P, DA, and DWS scores of the experimental and control groups were similar before the intervention; however, a statistical difference was observed in the experimental group in the post-test results ($p < 0.05$). It was determined that the training provided to the experimental group significantly impacted the changes in the post-test DPP, P, DA, and DWS total scores ($p < 0.05$). Analysis of the effect sizes

for the sub-dimensions showed that DPP (d = 0.237), P (d = 0.159), and DA (d = 0.073) had small effect sizes, while DWS (d = 2.990) exhibited a high effect size (Table 3). A statistically significant difference in DPP, P, DA, and DWS scores was reported for individuals who received disaster-related training compared to those who did not[50]. In a study conducted with university students, it was found that students who received disaster training had higher DPP, P, DA, and DWS scores than those who did not[51]. Additionally, it was reported that the disaster preparedness of individuals who received first aid training was superior to those who did not, with higher awareness of physical protection, planning, and first aid[52]. The increases in DPP, P, DA, and DWS sub-dimension scores observed in this training are consistent with existing literature, suggesting that the awareness generated by the training content contributed to these improvements.

Integration of disability-specific interventions and strategies into the disaster management model can contribute to the protection of both the disabled individual and his/her family from earthquakes and other disasters. However, this can only be possible with the development of national and international perspectives. As a matter of fact, the Sendai Framework for Disaster Risk Reduction 2015—2030 report published by the United Nations (UN) provides a guide by exhibiting transformational leadership on the effective inclusion of persons with disabilities in disaster management[53]. For the success of this process, the UN needs to develop a comprehensive strategy supported by scientific and interdisciplinary data and work in transparency and harmony by establishing effective partnerships with international Non-Governmental Organizations (NGOs) and local communities[54].

Strengths and limitations of the study

One of the strengths of the study is that it is the first study to evaluate the effect of earthquake preparedness training on families with physically disabled children. This situation is thought to be a guide for future studies. In addition, the training raised awareness about earthquake preparedness in mothers of children with physical disabilities and increased their psychological resilience. In this context, it was emphasized that vulnerable groups should be taken into consideration in the literature. In addition, the evaluation and analysis of the effectiveness of the training by an expert statistician is one of the strengths of the study. Since the study was experimental, conducted in a single center and the number of participants was insufficient, the 0–18 age group was included and this constituted the limitation of the study. In addition, the age range of the children of the mothers included in the sample varied between 0–18 years and the results were not analyzed stratified by age.

Conclusion

In the study evaluating the effect of earthquake preparedness training on the psychological resilience and earthquake preparedness levels of mothers with physically disabled children, it was found that both psychological resilience and earthquake preparedness levels increased following the training.

Disaster physical protection training was found to be effective and increased the level of knowledge, attitudes and behaviors about disaster planning, first aid, warnings and signals. In this context, health service providers (nurses, physicians, emergency response teams, etc.) should play an active role in trainings for families of children with physical disabilities. Especially pediatric nurses should prepare families with children with disabilities for earthquakes and other disasters by fulfilling their roles and responsibilities such as advocacy, counseling, educating, rehabilitating and comforting. They should take responsibility for improving the quality of post-disaster services by providing support to increase the psychological resilience of parents against disasters. In addition, it is important to develop materials and resources by healthcare providers to make trainings accessible and continuous.

Policy makers should make the necessary legal arrangements to increase community-wide awareness about disaster preparedness and the psychological support services that develop accordingly. Policies can be developed to address the educational needs of families with physically disabled children and these trainings can be made widespread. Ensuring that training materials and resources are accessible increases effective intervention during a disaster. In addition, identification of families of children with disabilities, implementation of trainings, provision of necessary psychological support before, during and after the earthquake should be realized within the scope of family support services.

Rehabilitation centers should provide trainings to support the disaster preparedness of children with physical disabilities and their families. These trainings can help families become sensitive to disasters and take special measures to address the needs of children with disabilities. In addition, it is important that rehabilitation centers contribute to increasing the psychological resilience of families by providing post-disaster psychological support services.

Family Support Services should help families with children with physical disabilities gain the necessary knowledge and skills to be prepared for disasters. Regular trainings and drills for families can improve their quality of life after disasters. Training materials and guides should be made continuously available to ensure that families are prepared for disasters. In addition, family support services can contribute to post-disaster coping processes by offering psychological support programs to increase the psychological resilience of families.

This study filled an important gap in the literature in terms of raising awareness about how mothers of children with physical disabilities should prepare for earthquakes, how they should cope with earthquakes, and providing a basis for new ideas in the development of intervention strategies by paving the way for studies to be conducted in other disabled groups. In addition, it is recommended to conduct studies on the subject in larger samples, specific and age groups.

Financial support

No financial support was received from any institution, organisation or individual.

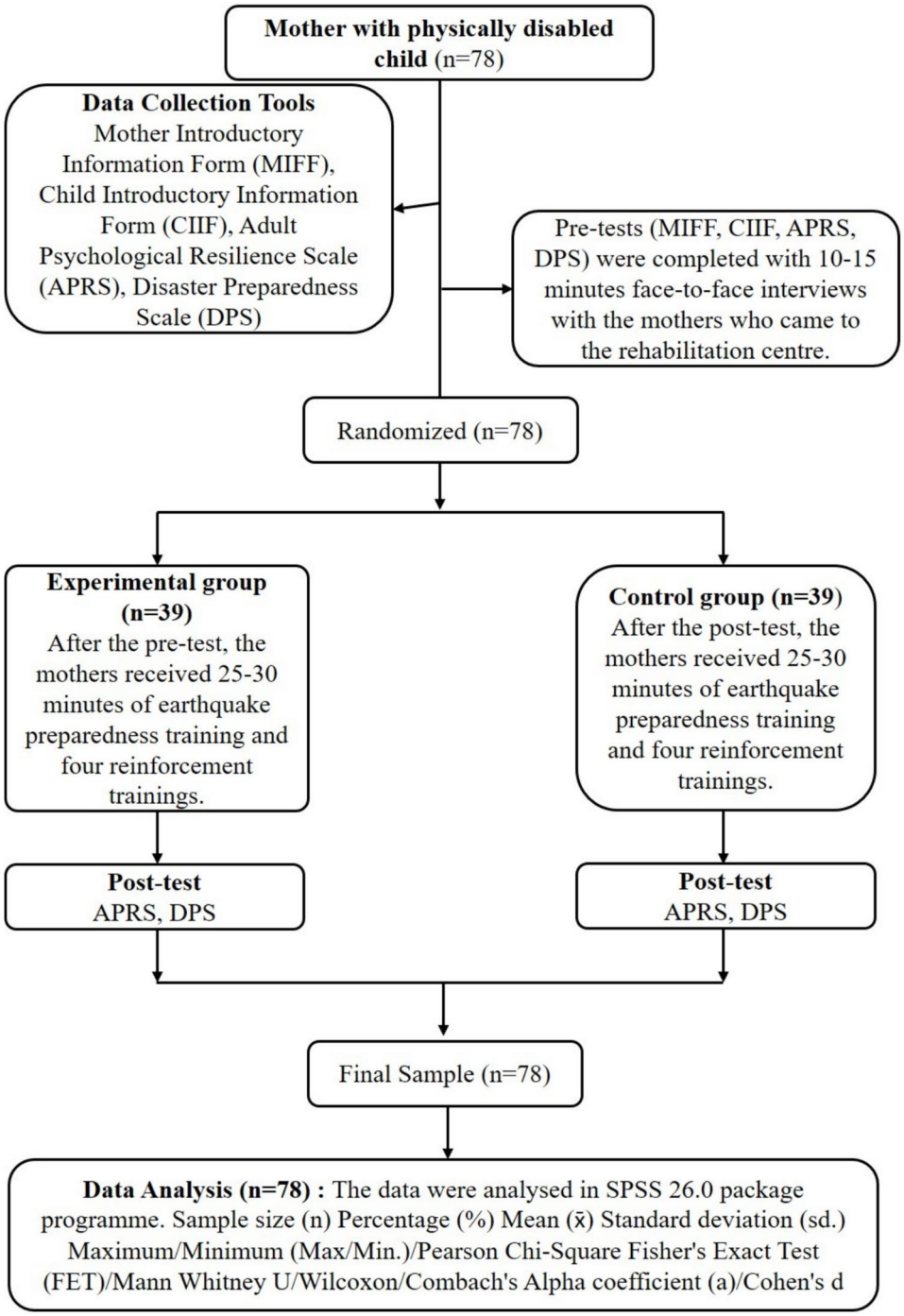


Fig. 2. CONSORT diagram of the study.

Subjects and methods

Design

The study was conducted as experimental (pretest–posttest control group). The study was registered with the ClinicalTrials.gov Registry in 08/11/2023 (registration number: NCT06122350). First trial registration of date 15/02/2024. The CONSORT diagram of the study is shown in Fig. 2.

Place and time

The study was conducted at a special education and rehabilitation center under the Directorate of National Education in a province in eastern Turkey. Data were collected between January 2024 and April 2024 from mothers of children with physical disabilities who met the inclusion criteria.

Sample and population

The study was designed as a randomized controlled trial with two groups: an "Experimental Group" and a "Control Group," to determine the effect of earthquake preparedness training provided to mothers of children with physical disabilities on psychological resilience and earthquake preparedness levels. The research sample was composed of mothers since most of the care responsibilities of children with disabilities are undertaken by mothers[55,56]. It was identified that there were 56 special education and rehabilitation centers in the province where the research was conducted. The mothers of 2,688 children with physical disabilities in these institutions constituted the study population. After contacting the institutions, it was determined that six centers met the sampling criteria based on the number of children receiving ongoing education and treatment. The rehabilitation center for data collection was selected through a lottery method.

The study's power was calculated using the G*Power 3.1.9.4 application[57]. Based on the Power analysis, with an effect size of Δ 74 derived from a reference study[36], a power of 0.80, and alpha levels of α 0.05 and β 0.20, it was found that a sample size of 60 mothers (30 in each group: Experimental and Control) would be sufficient. Data collection was ultimately completed with 78 mothers.

Inclusion and exclusion criteria

Inclusion criteria

- Mothers of physically disabled children aged 0–18,
- Ability to communicate effectively,
- No diagnosed psychiatric illness or disability,
- Child currently receiving rehabilitation services.

Exclusion criteria

- Mothers who do not have a physically disabled child,
- Those who are closed to communication,
- Those who do not accept voluntary participation,
- Mothers who have any chronic or psychiatric illness.

Data collection tools

The data were collected using two forms: the Mother Introductory Information Form (MIFF), consisting of 23 questions, and the Child Introductory Information Form (CIIF), consisting of 3 questions. Both forms were designed based on the literature to assess socio-demographic characteristics. Additionally, two scales were used as data collection tools: the Adult Psychological Resilience Scale (APRS), comprising 21 questions, and the Disaster Preparedness Scale (DPS), consisting of 15 questions.

Mother introductory information form (MIFF)

This form was developed based on the literature and includes 23 questions assessing socio-demographic characteristics such as age, gender, income status, chronic disease status, number of children, and the family's place of residence[6,48,49,58].

Child introductory information form (CIIF)

Developed using the literature, this form consists of 3 questions aimed at identifying child-related characteristics, including age and chronic disease status[59,60].

Adult psychological resilience scale (APRS)

The APRS consists of 21 items and uses a five-point Likert scale, ranging from "Completely describes me (5)" to "Does not describe me at all (1)." Higher scores reflect greater psychological resilience. The Turkish validity and reliability of the scale were established by Arslan (2015) with a sample of 470 participants aged 21–48. The Cronbach's Alpha coefficient for the scale was 0.94. The validity and reliability results indicated that the scale is suitable for assessing psychological resilience in adults in Turkey[61]. In this study, the Cronbach's Alpha coefficient was 0.81 for the pre-test and 0.82 for the post-test.

Disaster preparedness scale (DPS)

The Disaster Preparedness Scale, developed by Şentuna and Çakı[41], was utilized in this study. The scale consists of 15 items and is divided into four sub-dimensions: Disaster Physical Protection (DPP), Planning (P), Disaster Assistance (DA), and Disaster Warning and Signals (DWS). The Cronbach's Alpha coefficient for the overall scale was reported as 0.82, indicating good reliability. In this study, the Cronbach's Alpha values for the DPS were 0.87 in both the pre-test and post-test phases, confirming the scale's reliability in this context.

Training booklet

The training booklet, Earthquake Preparedness Guide for Families with Physically Disabled Children, was developed using resources from the literature, the Disaster and Emergency Management Presidency (AFAD), and the Search and Rescue Association (AKUT). The content of the booklet was structured according to the disaster risk management model, incorporating visuals to support practices before, during, and after an earthquake. The pre-earthquake training includes topics such as communication with local authorities, structural safety of buildings, securing hazardous items, creating a safe area for children with physical disabilities, evacuation and communication plans, safeguarding important documents (e.g., policies, passports, ID cards, title deeds), and

earthquake and first aid training for family members. During an earthquake, the training emphasizes remaining calm, moving to a safe area, adopting the correct protective position, staying away from doors, windows, and elevators, and being mindful of fire hazards. After the earthquake, it includes advice on keeping calm, assessing hazards, using telephones only for emergencies, following authorities' instructions, gathering in designated areas, providing first aid, and ensuring safety[5,21,22,24,45,46,48,62–64].

Application of data collection tools

Data were collected by the psychological counseling and guidance teacher at the rehabilitation center through face-to-face interviews, each lasting 10–15 min. The MIFF, CIIF, APRS, and DPS assessments were used for pretests. After administering the pretests, each mother was assigned a unique identification number. To reduce selection bias and control for variables that might affect the outcome measures, mothers were randomly assigned to experimental and control groups. The assignment was conducted using a simple randomization method via Random Allocation Software (İsfahan University of Medical Sciences, Isfahan, Iran).

The researcher interviewed each mother in the experimental group (n = 39) and provided earthquake preparedness training lasting 25–30 min. This training was conducted face-to-face in a question-and-answer format and utilized the "Earthquake Preparedness Guide for Families with Physically Disabled Children." At the conclusion of the training, participants received the training materials and were encouraged to read them. Additionally, mothers were given a contact number and informed that they could reach out with any questions.

To ensure that mothers in the control group were unaware of the training, only the experimental group received this intervention, facilitated by the teacher in charge at the rehabilitation center. Reinforcement training sessions were conducted four times in total, with visits to the rehabilitation center every two weeks. At the end of the eight-week period, post-tests were administered to both the experimental and control groups by the psychological counseling and guidance teacher at the rehabilitation center, using the APRS and DPS assessments.

After completing the post-tests, earthquake preparedness training was provided to the control group, and the study concluded with the distribution of educational materials to all mothers. No data loss occurred during the research process, and complete data were collected from all participating mothers.

Data evaluation

Although the researcher was aware of the group assignments of the mothers, third-party blinding was ensured by arranging the data so that it was not possible to determine the group affiliation. The data were analyzed using SPSS version 26.0. Basic descriptive statistics included sample size (n), percentage (%), mean ($\bar{x}$), standard deviation (SD), and maximum and minimum values. For cross-tabular analyses, Pearson Chi-Square was employed when the expected frequency in the cells was greater than 5, while Fisher's Exact Test (FET) was used when the expected frequency was 5 or fewer. In comparisons of independent groups, a t-test was conducted if parametric conditions were met; otherwise, the Mann–Whitney U test was used. For dependent groups, a t-test was applied when parametric conditions were met, and the Wilcoxon signed-rank test was used when they were not. The reliability of the scales was assessed using Cronbach's Alpha coefficient (α). A significance level of $p < 0.05$ was accepted for all comparison tests. Effect size was evaluated using Cohen's d, with values interpreted as follows: < 0.2 indicates a weak effect, 0.2–0.5 indicates a small effect, 0.5–0.8 indicates a moderate effect, and > 0.8 indicates a large effect size.

Ethical approach

Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee (dated 14.07.2023 and numbered 2023/07–15) for the study to be conducted. Later, a study permit was obtained from the provincial Directorate of National Education (dated 06.12.2023 and numbered 91,449,811). The principles of the World Medical Association (WMA) Declaration of Helsinki were adhered to during the research process. Mothers were informed about the purpose of the study (Informed Consent Principle). After written and verbal informed consent was obtained from the mothers, they were informed that they could withdraw from the study at any time (Respect for Autonomy Principle). In addition, mothers were informed that personal information would not be collected and that their participation in the study would be carried out within the framework of the principle of confidentiality.

Data availability

The data that support the fndings of this study are available on request from the corresponding author.

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Author contributions

Conceptualization: AA, VC; Data curation, Funding acquisition, Methodology, Resources, Writing – original draft, Writing – review and editing: AA, VC, AS; Formal analysis, Investigation, Software, Supervision, Validation: VC, AS; Project administration: VC; Visualization: AA.

Declaration

Competing interests

The authors declare no competing interests.

Additional information

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