North Clin Istanb 2026;13(1):87–97
doi: 10.14744/nci.2025.29560

Original Article EMERGENCY MEDICINE

A multidimensional tool in disaster medicine: Development of the disaster anxiety scale

Fatih Cemal Tekin,[1] Yasemin Durduran,[2] Yusuf Cokunlu[3]

[1]Department of Emergency Medicine, Konya City Hospital, Konya, Turkiye
[2]Department of Public Health, Necmettin Erbakan University Faculty of Medicine, Konya, Turkiye
[3]Department of Psychiatry, Konya Numune Hospital, Konya, Turkiye

ABSTRACT

OBJECTIVE: This study aimed to develop a multidimensional scale to assess disaster-related anxiety, addressing the limitations of generic and disaster-specific anxiety instruments. The new tool, the Multidimensional Disaster Anxiety Scale (MDAS), was designed to enable a comprehensive and practical evaluation of anxiety across all disaster types, with the potential to improve identification of vulnerable groups and inform psychosocial interventions.

METHODS: The methodological study followed a systematic process: item pool development, pilot testing, data collection, and assessment of reliability and validity. The initial item pool was generated through literature review and expert consultations, resulting in a draft with 30 items. These were reviewed for content validity by multidisciplinary experts, and items with low Content Validity Ratio (CVR) or deemed irrelevant were excluded. The sample, determined as 600 individuals, was selected using the cluster sampling method. After performing the Exploratory Factor Analysis (EFA), the sample was equally divided into two groups in order to collect data for the Confirmatory Factor Analysis (CFA). Statistical analyses included item-total correlations, Cronbach's alpha, split-half reliability, EFA, CFA, composite reliability (CR), and average variance extracted (AVE).

RESULTS: After validity and reliability analyses, the MDAS was finalized with 18 items across two subdimensions: Cognitive (Ideational) and Reactive. EFA revealed two factors, accounting for 57.1% of the total variance, with all factor loadings above 0.50. Cronbach's alpha demonstrated high internal consistency for the total scale (0.917), as well as the Cognitive (0.909) and Reactive (0.899) subscales. CFA confirmed the two-factor model with good fit indices (CFI=0.99, TLI=0.99, RMSEA=0.071, SRMR=0.071). CR and AVE values exceeded recommended thresholds for construct reliability and validity. The scale uses a 5-point Likert response format; scores range from 18 to 90, with higher scores indicating greater disaster anxiety.

CONCLUSION: The MDAS is a valid, reliable, and sensitive instrument for the multidimensional assessment of disaster-related anxiety in the general population. Its generic structure allows application across various disaster contexts, supporting its utility in disaster preparedness, response, and recovery phases. The scale facilitates identification of individuals at risk, evaluation of intervention effectiveness, and clinical follow-up after disasters. Future research should further assess its psychometric properties, diagnostic performance, and establish cut-off values for clinical use.

Keywords: Anxiety; decision making; diagnose; disaster medicine; emergency medicine; multidimensional scaling; public health; scales.

Cite this article as: *Tekin FC, Durduran Y, Cokunlu Y. A multidimensional tool in disaster medicine: Development of the disaster anxiety scale. North Clin Istanb 2026;13(1):87–97.*

Disasters have significant impacts on human life, including injury, disability, death, as well as economic and environmental damage. One of the less obvious but highly important outcomes of disasters is their psychological impact [1–3]. Unlike physical effects, psychological consequences are not limited to direct survivors. The

Received: November 03, 2025 *Revised:* November 23, 2025 *Accepted:* December 08, 2025 *Online:* February 12, 2026

Correspondence: Fatih Cemal TEKIN, MD. Konya Sehir Hastanesi, Acil Tip Klinigi, Konya, Turkiye.
Tel: +90 532 407 77 17 e-mail: fatihcemaltekin@gmail.com

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repeated exposure of healthcare workers to disaster victims, along with the experiences of relatives of survivors, may also cause indirect psychological effects on those not directly affected by the event. Moreover, the widespread sharing of traumatic disaster-related events through mass media and social media can worsen these effects and considerably increase the number of individuals psychologically affected [4, 5].

Post-disaster psychological effects include sleep disturbances, social withdrawal, depression, post-traumatic stress disorder, nightmares, substance or alcohol dependence, and psychosis. Anxiety disorders are also common consequences of disasters [3, 6, 7]. Anxiety is defined as an emotional state characterized by the anticipation of potential danger, often with somatic symptoms, and is frequently seen as a stress response. While mild anxiety can sometimes be helpful, anxiety disorders develop when threats are perceived or interpreted as more severe than they are, causing disproportionate or inappropriate reactions. Common anxiety disorders include generalized anxiety disorder, social anxiety disorder, agoraphobia, separation anxiety disorder, and panic disorder [8, 9].

The prevalence of anxiety disorders following disasters has been reported to reach as high as 48% underscoring the importance of managing post-disaster anxiety. In recognition of this, the World Health Organization (WHO) and international guidelines emphasize the significance of mental health and psychosocial support (MHPSS) interventions during emergencies [6–8]. However, addressing disaster-related anxiety requires the ability to measure it accurately. Although several instruments exist, such as the COVID-19 Anxiety Scale [10], the Earthquake Anxiety Scale [11] and the Anxiety Scale for Natural Disasters [12] these tools are specific to particular disaster types. Other disaster-related anxiety scales have also been developed [13] yet no instrument comprehensively evaluates disaster anxiety across all disaster types in a multidimensional manner. Considering that general anxiety scales may produce inconsistent results across specific anxiety subtypes [14, 15], there is a clear need for specialized tools that can measure disaster-related anxiety more accurately and comprehensively.

Against this background, the present study was designed to develop a multidimensional scale to assess disaster anxiety. Unlike disaster-specific tools, this scale aims to capture the broader and multifaceted nature of anxiety across all disaster types, offering potentially more precise and practical results. Moreover, given the reported association between disaster anxiety and disaster preparedness [16, 17], such a tool could serve multiple purposes: identifying vulnerable groups, selecting individuals for psychological first aid and psychosocial interventions, and monitoring the effectiveness of these interventions over time.

Highlight key points

- The 18-item Multidimensional Disaster Anxiety Scale (MDAS) is developed to assess disaster anxiety across Cognitive and Reactive dimensions.
- Both Cognitive and Reactive sub-dimensions demonstrated high internal consistency and construct validity.
- The scale's two-factor structure explained 57.1% of the total variance, with excellent CFA fit indices.
- MDAS provides a practical tool for identifying at-risk individuals and monitoring the effectiveness of psychosocial interventions across all disaster types.

MATERIALS AND METHODS

Study Design

This study was designed as a methodological research project. To assess disaster-related anxiety, a 5-point Likert-type scale was developed, with items scored as follows: 1: Never, 2: Rarely, 3: Sometimes, 4: Frequently, 5: Nearly Always.

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Necmettin Erbakan University Medicine and Non-Pharmaceutical And Non-Medical Device Research Ethics Committee. (number: 2022/4063, approval date 02.12.2022).

Sample and Procedures

There are different perspectives on determining appropriate sample size in scale development studies. For Confirmatory Factor Analysis (CFA), it is often recommended that the sample size should be at least 10 times the number of items, whereas for both Exploratory Factor Analysis (EFA) and CFA, an absolute sample size of 500 is considered "very good" [18, 19]. Based on these recommendations, a total of 600 participants were targeted for this study. Based on these recommendations, a total of 600 participants were targeted for this study. The cluster sampling method was used for sample selection. After completing the exploratory factor analysis (EFA), the sample was divided equally into two groups in order to collect data for the confirmatory factor analysis (CFA).

Inclusion criteria were: age ≥18 years, minimum literacy, and voluntary participation. Individuals with a psychiatric diagnosis or those using psychiatric medication were excluded.

Cluster sampling was applied. District neighborhoods in Selcuklu, Konya, were considered as clusters, weighted according to population size. The number of participants to be recruited from each neighborhood was determined proportionally. Households were randomly selected using a random number table, and only one participant per household was included. When individuals were unavailable after two visits (n=41), declined participation or provided incomplete data (n=35), or met exclusion criteria (n=27), replacement households were identified using the same method until the planned sample size of 600 was reached.

Scale development followed the following steps: generation of the item pool, assessment of content validity, pilot testing, data collection, and validity and reliability analyses. Data were collected through face-to-face interviews in the community between January 1, 2023, and September 1, 2024.

Data Collection Tools

Participants completed a sociodemographic form and the draft version of the Disaster Anxiety Scale. The sociodemographic form included 12 items on demographic and health-related characteristics (e.g., age, sex, employment status, chronic illness) and 7 items on disaster exposure and preparedness (e.g., "Have you ever experienced a disaster?"), totaling 19 questions.

The draft scale was developed based on the Beck Anxiety Inventory, Hamilton Depression Rating Scale, DSM-5 diagnostic criteria, and relevant literature. Items included statements such as "The thought of experiencing a disaster disturbs me" and "I am afraid of suffering financial loss due to a disaster."

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics 21.0 (IBM Corp., Armonk, NY, USA) for descriptive and exploratory analyses, and Jamovi (Version 2.6.26) for CFA. Categorical variables were summarized using frequencies and percentages, while continuous variables were presented as mean ± standard deviation. Normality of distributions was tested with the Kolmogorov-Smirnov and Shapiro-Wilk tests. A p-value <0.05 was considered statistically significant.

Content validity was assessed using the Lawshe technique, in which expert reviewers evaluate item relevance and representativeness. Each item's Content Validity Ratio (CVR) ranges from 1 to +1, with +1 indicating complete agreement. With 40 expert raters in this study, the minimum acceptable CVR was 0.33. The overall Content Validity Index (CVI) was also calculated, with values ≥0.80 considered ideal and ≥0.50 as the critical minimum [20–23].

Prior to EFA and CFA, the suitability of data for factor analysis was tested using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity (BTS). A KMO >0.50 and a BTS p <0.05 indicated adequacy. Principal Component Analysis with Varimax rotation was applied. Item–total score correlations were assessed with Pearson correlation, and the 27% lower–upper group comparison was tested with Student's t-test. Items with corrected item–total correlation ≥0.30 were retained.

Reliability was evaluated with Cronbach's alpha, Spearman-Brown, and Guttman coefficients, with thresholds ≥0.70 considered acceptable. Factor loadings ≥0.50 and eigenvalues >1.0 were set as criteria for retention. Total explained variance above 50% was considered adequate. Composite Reliability (CR>0.70), Average Variance Extracted (AVE >0.50), and CR>AVE were required for construct reliability [19, 24–30]. Model fit in CFA was assessed using Chi-square, Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI) [28, 29, 31–34].

RESULTS

Development of Candidate Scale Item Pool

A comprehensive literature review and consultations with field experts were conducted to generate the initial item pool. Based on evaluations of the conceptual framework and content, it was planned for the scale to consist of two subdimensions. Accordingly, a pool of 30 items was created. During the validity stage, items were reviewed by 25 evaluators from diverse disciplines, including linguists. Based on their recommendations, the draft candidate scale comprising 30 items was finalized.

In order to assess the comprehensibility, linguistic clarity, and cultural appropriateness of the scale, feedback was obtained from 25 individuals from different segments of society and with diverse interests, including

Table 1. Socio-demographic and general characteristics of the participants

Characteristics	Total participants n=600 (%)	Reliability and exploratory factor analysis group n=300 (%)	Confirmatory factor analysis group n=300 (%)
Gender			
Male	50.0	50.0	50.0
Female	50.0	50.0	50.0
Educational status			
Primary school	15.3	16.7	14.0
Secondary school	11.8	12.3	11.3
High school	37.5	37	38.0
University	35.3	34	36.7
Marital status			
Married	58.3	59.7	57.0
Single	41.7	40.3	43.0
Having children			
Yes	52.0	50.3	53.7
No	48.0	49.7	46.3
Employment status			
Yes	59.2	57.0	61.3
No	40.8	43.0	38.7
Income level			
Income<Expenses	35.7	35.3	36.0
Income=Expenses	51.5	51.3	51.7
Income>Expenses	12.8	13.3	12.3
Health insurance			
Yes	75.8	20.3	20.0
No	24.2	79.7	80.0
Chronic disease			
Yes	20.2	72.7	79.0
No	79.8	27.3	21.0
Regular medication use			
Yes	21.8	23.0	20.7
No	78.2	77.0	79.3
Type of residence			
Detached house	21.0	19.3	22.7
Apartment	79.0	80.7	77.3

linguists. For each item, written suggestions were collected. Based on this feedback, revisions were made to the items in terms of language, meaning, and grammar.

For content validity, the draft scale was reviewed by 30 experts from relevant fields, including emergency medicine, public health, disaster management, psychiatry, clinical psychology, social work, and linguistics. Items with a CVR below 0.33 and deemed insignificant in terms of content validity were removed (n=8). The CVI of the candidate scale was calculated as 0.87, exceeding the CVR threshold. After revision, the candidate scale consisted of 22 items.

Table 2. Item-Total correlations and Cronbach's alpha coefficients after removal of ıtems 11 and 22

Item no	Item-total correlation	Cronbach's alpha if item deleted
1	0.601	0.915
2	0.523	0.917
3	0.576	0.916
4	0.650	0.914
5	0.490	0.918
6	0.523	0.917
7	0.507	0.917
8	0.509	0.918
9	0.506	0.917
10	0.329	0.921
11	0.521	0.917
12	0.710	0.913
13	0.689	0.913
14	0.574	0.916
15	0.680	0.913
16	0.575	0.916
17	0.650	0.914
18	0.699	0.913
19	0.676	0.913
20	0.611	0.915

Table 3. Results of the exploratory factor analysis

Factor	Item no (before EFA)	Item no (after EFA)	Item factor loading
1. Cognitive	19	17	0.820
	15	13	0.804
	13	11	0.780
	20	18	0.735
	18	16	0.734
	17	15	0.721
	14	12	0.712
	12	10	0.700
	16	14	0.622
	1	1	0.618
2. Reactive	4	4	0.796
	8	8	0.778
	5	5	0.765
	7	7	0.757
	6	6	0.732
	3	3	0.705
	9	9	0.644
	2	2	0.592

EFA: Exploratory Factor Analysis. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.915; Bartlett's Test of Sphericity: p<0.001, Approx Chi-Square=3000.38: Extraction Method: Principal component; Rotation method: Varimax; Total Variance Explained: 57.1%.

A pilot study was conducted with 20 voluntary participants from the emergency department series. Questions that participants had difficulty understanding or found ambiguous were analyzed. At this stage, no items were removed; instead, revisions were made to improve language and grammar.

The candidate scale was administered to a total of 600 participants aged ≥18 years: 300 for reliability testing and EFA, and 300 for CFA. The mean age of the participants was 35.04±11.95 years, with 34.95±11.9 years in the EFA group and 35.12±12.01 years in the CFA group. Overall, the sample was evenly distributed by sex: 50% (n=300) male and 50% (n=300) female. Similarly, in both the EFA and CFA groups, 50% (n=150) were male and 50% (n=150) were female (Table 1).

Item Analysis and Reliability Assessment

According to the results of the item analysis, Item-Total Correlation values below 0.300 and items negatively correlated with the overall scale were considered for removal. Accordingly, Item 11 (I am not disturbed by listening to news about disasters) and Item 22 (Thoughts about the possibility of leaving my environment after a disaster do not disturb me) were excluded from the scale.

Following their removal, the total number of items in the candidate scale decreased from 22 to 20, and the order of items was reorganized. Cronbach's alpha coefficient increased from 0.875 to 0.922, indicating excellent internal consistency. Further item-by-item exclusion analyses demonstrated that the removal of additional items did not yield further improvement in Cronbach's alpha (Table 2).

Item–total correlation analysis of the 20-item candidate scale demonstrated that all items were statistically significantly correlated with the total score (p<0.001). In the item discrimination analysis, comparisons between the upper 27% and lower 27% groups showed statistically significant differences for all items (p<0.001), confirming their discriminative capacity.

Table 4. Model fit indices of the candidate disaster anxiety scale confirmatory factor analysis and interpretations

Fit index	Candidate scale values	Comment[1]
Chi-Square	p<0.001 χ^2=333, df=134, χ^2/df=2.49	χ^2/df <2 Good Fit 2<χ^2/df<3 Acceptable Fit
SRMR	0.071	SRMR<0.05 Good Fit 0.05<SRMR<0.08 Acceptable Fit
RMSEA	0.071	RMSEA<0.05 Good Fit 0.05<SRMR<0.08 Acceptable Fit
CFI	0.99	CFI>0.95 Good Fit CFI>0.90 Acceptable Fit
TLI	0.99	TLI>0.95 Good Fit TLI>0.90 Acceptable Fit

SRMR: Standardized Root Mean Squared Residual; RMSEA: Root Mean Square Error of Approximation; CFI: Comparative Fit Index; TLI: Trucker-Lewis Index. 1: Resource: 28, 29, 32–34.

The split-half reliability coefficient of the candidate scale was 0.889. Both the Spearman-Brown coefficient and the Guttman split-half coefficient were calculated as 0.941, further indicating strong internal consistency.

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.915, while Bartlett's Test of Sphericity yielded a result of p<0.001. These results indicate that the data are suitable for factor analysis and validity assessment.

Validity Analysis

Following EFA, Item 10 (I avoid talking to people who have experienced disasters) and Item 11 (When I hear news of disaster-related deaths, I feel as if I cannot breathe) were found to have factor loadings below 0.50 and were therefore removed. After their exclusion, the candidate scale was reduced to 18 items, and the item order was revised.

The repeated factor analysis revealed that all items had factor loadings above 0.50 and that the candidate scale consisted of two primary factors. These factors were conceptualized as Cognitive (Factor 1) and Reactive (Factor 2) dimensions. The cognitive factor accounted for 42.71% of the total variance, while the reactive factor explained 14.36%, yielding a cumulative variance explained of 57.07% (Table 3).

The CFA indicated that the model demonstrated a good fit according to the desired fit indices (Table 4). No model modifications were applied. The path diagram for the CFA is presented in Figure 1.

For the CR, it was 0.92, and the AVE was 0.53. For the Reactive subdimension, the CR was 0.90 and the AVE was 0.52, both exceeding the recommended thresholds, thereby supporting the construct validity of the scale.

Subdimensions of the Scale

The item–total correlations, item–subscale correlations, and Cronbach's alpha coefficients for each subdimension of the scale are presented in Table 5.

Correlation analysis of the scale subdimensions revealed a statistically significant, positive, and moderate correlation between the Cognitive and Reactive factors (p<0.001, Spearman's rho=0.504).

The final version of the Disaster Anxiety Scale is presented in the appendix.

DISCUSSION

As is well known, scale items represent the smallest measurable unit, and item analysis determines whether each item adequately measures the intended construct. It also evaluates the consistency of an item with the rest of the scale, thereby clarifying whether the item truly belongs within the instrument. In item–total correlation analysis, negatively correlated items should be removed. Furthermore, items with correlations between 0.200 and 0.300 are generally recommended for revision, while items below 0.200 are suggested for exclusion [27, 35–37]. In accordance with these principles, Items 11 and 22, which demonstrated negative correlations with the total score, were excluded from the candidate scale.

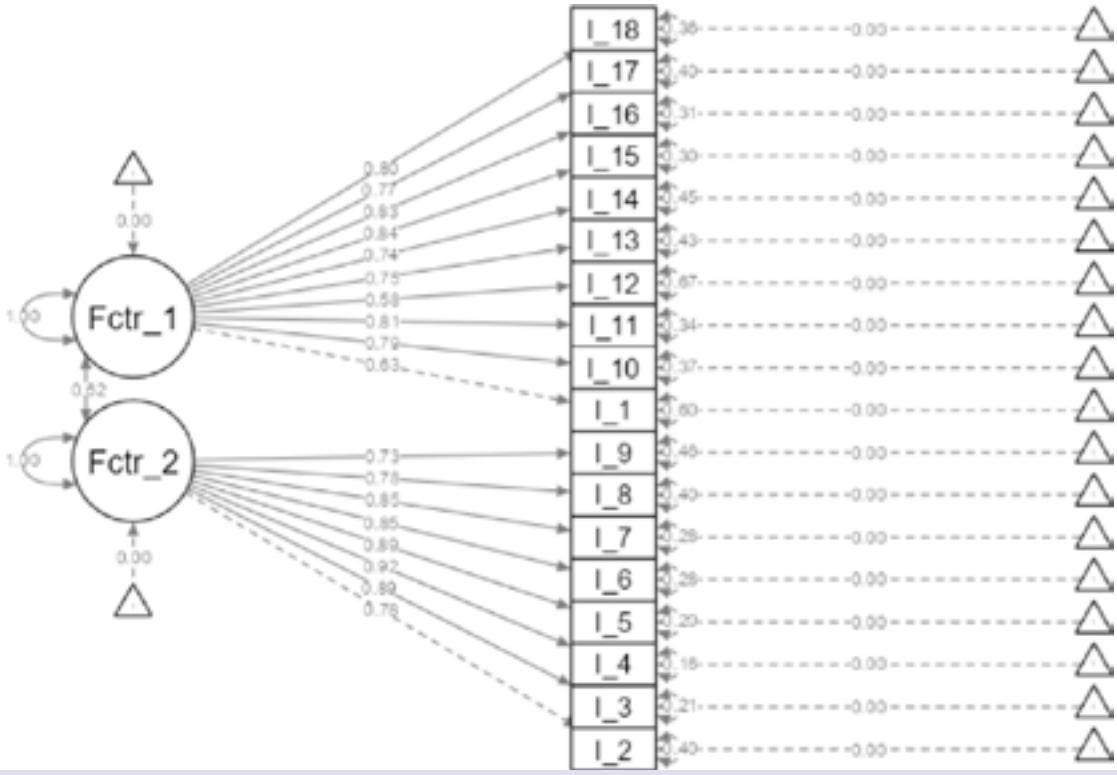

FIGURE 1. Path diagram of the candidate scale confirmatory factor analysis.

Fctr: Factor; I: Item.

TABLE 5. Item-subscale correlations, item-total score correlations, and Cronbach's alpha coefficients by subscales

Subscale	Item no	r[1]	p	Item-subscale correlation	Cronbach's alpha if item deleted (subscale)	Subscale Cronbach's alpha
1. Cognitive	1	0.652	<0.001	0.573	0.906	0.909
	10	0.753	<0.001	0.689	0.899	
	11	0.791	<0.001	0.733	0.897	
	12	0.676	<0.001	0.586	0.906	
	13	0.790	<0.001	0.727	0.897	
	14	0.670	<0.001	0.589	0.905	
	15	0.772	<0.001	0.707	0.898	
	16	0.752	<0.001	0.684	0.900	
	17	0.804	<0.001	0.744	0.896	
	18	0.759	<0.001	0.689	0.899	
2. Reactive	2	0.709	<0.001	0.578	0.578	0.917
	3	0.804	<0.001	0.723	0.723	
	4	0.851	<0.001	0.791	0.791	
	5	0.792	<0.001	0.728	0.728	
	6	0.755	<0.001	0.685	0.685	
	7	0.787	<0.001	0.704	0.704	
	8	0.739	<0.001	0.661	0.661	
	9	0.679	<0.001	0.591	0.591	

1: Pearson Correlation Coefficient.

Another important step in item analysis is item discrimination testing, which evaluates the extent to which each item can differentiate between individuals in terms of the construct being measured—in this case, disaster anxiety. Among several methods, one of the most commonly employed approaches involves comparing the mean scores of the upper 27% and lower 27% of participants [19, 38]. In the present study, all items demonstrated statistically significant discrimination between these extreme groups, indicating that the candidate items effectively distinguished individuals with different levels of disaster anxiety.

Reliability is a crucial aspect of scale development, with Cronbach's alpha being the most widely used indicator of internal consistency. A Cronbach's alpha coefficient between 0.80 and 1.00 is considered indicative of high reliability [19, 27, 29]. In this study, the Cronbach's alpha of the candidate scale was 0.922, confirming its strong internal consistency. Item-by-item exclusion analyses also revealed that the removal of any additional items would not further improve the reliability coefficient.

Split-half reliability analysis provides another important perspective on internal consistency by comparing the correlation between two halves of the scale. Both the Spearman-Brown and Guttman Split-Half coefficients are recommended for evaluation [26, 27, 29]. In this study, these coefficients were found to be high, further confirming the internal consistency and reliability of the candidate Disaster Anxiety Scale.

Reliability and validity are interrelated yet distinct properties of a measurement tool. While reliability is often a prerequisite for validity, a reliable instrument is not necessarily valid. Validity generally refers to the extent to which the tool accurately measures the intended construct [39, 40]. The first step of validity assessment is that items are clear, relevant, easy to answer, and free from offensive, intrusive, or judgmental language. Content validity requires expert evaluation of each item's conceptual alignment with the theoretical framework and its representativeness of the construct [41, 42]. Both the number and disciplinary diversity of experts are critical in this process, with the literature suggesting that between 3 and 40 experts may be appropriate [43]. In this study, items that failed to meet these requirements were revised or eliminated before the item analysis stage, thereby strengthening content validity.

Factor analysis is used to identify latent variables within a construct and the relationships among them. Before conducting factor analysis, the adequacy of the dataset must be tested. KMO coefficient is commonly used, with values >0.50 considered acceptable and values between 0.90 and 1.00 interpreted as excellent [27, 28, 44]. In this study, the KMO value was 0.918, indicating excellent sampling adequacy. Bartlett's Test of Sphericity (BTS) further confirmed the suitability of the correlation matrix for factorization (χ^2=3194.57, p<0.001), supporting the transition to EFA and CFA.

EFA aims to determine the factor structure of a scale by examining relationships among items. While thresholds vary depending on sample size, factor loadings ≥0.50 are generally accepted as meaningful [26, 27, 45]. In this study, EFA revealed that the items loaded onto two primary factors. Conceptually, France and Robson described anxiety as comprising three components: worry-related cognitions, physiological responses, and behavioral reactions [46]. Similarly, the Hamilton Anxiety Scale identifies two domains, psychic and somatic anxiety, that resemble the structure observed here [47]. Guided by these frameworks, the two-factor structure of the Disaster Anxiety Scale was conceptualized as Cognitive (Thought-related) and Reactive (Behavioral/Physiological) dimensions.

In multidimensional scales, explained variance of at least 40% is considered acceptable, while values above 50% are preferable [27, 29, 48]. The 18-item candidate scale explained 57.1% of the total variance, with all items demonstrating factor loadings above 0.50 and loading onto two significant factors. This justified the subsequent CFA.

CFA serves to confirm the structure suggested by EFA by testing how well items represent the proposed latent factors and evaluating the relationships among them [49]. Although there is no universal consensus on which fit indices should be used, the most frequently applied include Chi-square, SRMR, RMSEA, CFI, and TLI [28, 29, 32–34]. In this study, CFA supported the two-factor, 18-item structure, indicating good model fit and confirming the construct validity of the candidate scale.

In addition to Cronbach's alpha, CR is recommended for multidimensional scales, as it reflects the consistency of items within each factor. Thresholds of CR>0.70 and AVE >0.50 are generally accepted [25, 29]. Both subdimensions of the candidate scale met these criteria, and item–total correlations further supported internal consistency. Finally, the positive correlation observed

between the cognitive and reactive subdimensions was interpreted as theoretically meaningful: as cognitive preoccupation with disasters increases, behavioral and physiological reactions are also expected to rise, highlighting the interconnectedness of disaster-related anxiety dimensions.

The newly developed Multidimensional Disaster Anxiety Scale (MDAS) (Appendix 1) is expected to have a broader range of applications compared to scales designed for specific types of disaster-related anxiety. In addition, due to its multidimensional structure and the richness of its items and content, it is anticipated that the scale will hold a significant place alongside other disaster anxiety scales in the literature. Its importance is also expected to increase as it is used in different regions and for various types of disasters.

Limitations

Although the study was not conducted in a small population, it was still carried out within a specific region. The sample size was adequate according to the literature, and the analyses indicated that the sample size was sufficient. Moreover, although participants were selected using a systematic sampling method, the results should still be interpreted with caution regarding regional differences and generalizability. Since the participants consisted of individuals over the age of 18, there is insufficient information regarding the use and results of the new scale in children and adolescents. A major methodological limitation of the study is the lack of test-retest reliability. However, this limitation was mitigated by conducting multiple analyses of both internal and external consistency. The region where the study was conducted is not one where all types of disasters occur; rather, certain types of disasters are more likely to be observed. Furthermore, the possibility of cultural adaptation issues for the scale should also be considered. Nevertheless, as mentioned, a rigorous methodology was followed during the research to minimize this limitation. Although different types of disasters were observed, comparative statistical analyses of the scale's characteristics across disaster types could not be performed. Therefore, application of the developed scale in different communities and regions would be valuable, as this may yield additional insights into the scale's properties. Comparing the psychometric properties of the new scale with those of other established or disaster-specific anxiety scales would allow for a more detailed evaluation of the new scale. Additionally, such comparisons would provide data to determine its diagnostic performance and appropriate cut-off values. This study did not address conditions associated with disaster anxiety, as such an analysis was beyond the scope of the current research.

Conclusion

In this study, a new scale was developed to measure disaster-related anxiety. Named the Multidimensional Disaster Anxiety Scale, the instrument demonstrated item discriminability, sensitivity, consistency, stability, and a high degree of reliability, while also achieving acceptable to good levels of construct validity. The MDAS comprises 18 items grouped under two subdimensions. It is structured as a 5-point Likert-type scale, with response options scored between 1 and 5. The scale does not contain any reverse-scored items; thus, the minimum obtainable score is 18, while the maximum is 90. Higher scores indicate greater levels of disaster anxiety.

The ability of the MDAS to be applied across different types of disasters, particularly in complex or overlapping disaster contexts, offers practical utility. Furthermore, its capacity to provide a multidimensional assessment of disaster anxiety and its development based on a community-based approach are notable strengths. The scale is expected to be useful in various phases of disaster management, including preparedness, risk reduction, mitigation, and response. Additionally, it may contribute to clinical follow-up of individuals who experience psychological impacts after disasters, thereby supporting the recovery phase of disaster management.

Ethics Committee Approval: The Necmettin Erbakan University Medicine and Non-Pharmaceutical And Non-Medical Device Research Ethics Committee granted approval for this study (date: 02.12.2022, number: 2022/4063).

Informed Consent: Written informed consents were obtained from patients who participated in this study.

Conflict of Interest: The authors declare that there is no conflict of interest.

Financial Disclosure: The authors declared that this study has received no financial support.

Use of AI for Writing Assistance: Not declared.

Authorship Contributions: Concept – FCT, YD, YC; Design – FCT, YD, YC; Supervision – YD; Data collection and/or processing – FCT, YC; Analysis and/or interpretation – FCT, YD; Literature search – FCT, YD, YC; Writing – FCT, YD; Critical review – FCT, YD, YC.

Peer-review: Externally peer-reviewed.

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Appendix 1. Multidimensional Disaster Anxiety Scale

No	Statements	Evaluation				
		1: Never	2: Rarely	3: Sometimes	4: Frequently	5: Nearly always
1	I have thoughts that worry me about experiencing a disaster.	1	2	3	4	5
2	I avoid being alone in enclosed spaces because of my fear of experiencing a disaster.	1	2	3	4	5
3	I have trouble sleeping because of my fear of experiencing a disaster.	1	2	3	4	5
4	I have trouble sleeping because of my fear of experiencing a disaster.	1	2	3	4	5
5	I experience hot flashes and sweating due to my anxiety about experiencing a disaster.	1	2	3	4	5
6	My anxiety about experiencing a disaster causes me to become indifferent to life.	1	2	3	4	5
7	My anxiety about experiencing a disaster causes my heart to beat rapidly.	1	2	3	4	5
8	My anxiety about experiencing a disaster causes me to experience problems such as indigestion, heartburn, bloating, nausea, and stomach pain.	1	2	3	4	5
9	My anxiety about experiencing a disaster reduces my self-confidence and makes me avoid taking responsibility.	1	2	3	4	5
10	I have worrying thoughts that my home will be damaged by a disaster.	1	2	3	4	5
11	I have worrying thoughts that there could be safety issues during disasters.	1	2	3	4	5
12	Keeping some money aside in case of a disaster makes me feel better.	1	2	3	4	5
13	I have thoughts that worry me about the possibility of me and my family being injured in a disaster.	1	2	3	4	5
14	I have thoughts that make me anxious about losing my job or being unable to work due to a disaster.	1	2	3	4	5
15	I have thoughts that worry me about not being able to meet my needs, such as using the toilet or bathroom, in the event of a disaster.	1	2	3	4	5
16	I have thoughts that worry me about staying in crowded areas such as camps during disasters.	1	2	3	4	5
17	I have thoughts that worry me about not being able to contact my loved ones or reach them during disasters.	1	2	3	4	5
18	I have thoughts that worry me about not being able to access healthcare services during disasters.	1	2	3	4	5

Ek 1. Çok Boyutlu Afet Kaygı Ölçeği

No	Maddeler	Değerlendirme				
		1: Hiçbir zaman	2: Çok nadir	3: Bazen	4: Çoğu zaman	5: Neredeyse her zaman
1	Afet yaşayabileceğime dair beni endişelendiren düşüncelerim var.	1	2	3	4	5
2	Afet yaşama endişesiyle tek başıma kapalı alanlarda kalmaktan kaçınırım.	1	2	3	4	5
3	Afet yaşama endişesinden dolayı uyku problemleri yaşarım.	1	2	3	4	5
4	Afet yaşama endişesinden dolayı dikkatimi toplamakta zorlanırım.	1	2	3	4	5
5	Afet yaşama kaygısıyla ateş basmaları, terleme şikâyetleri yaşarım.	1	2	3	4	5
6	Afet yaşama endişesi hayata karşı ilgisiz kalmama neden olur.	1	2	3	4	5
7	Afet yaşama endişesi kalbimin hızlı çarpmasına neden olur.	1	2	3	4	5
8	Afet yaşama endişesi hazımsızlık, mide yanması, şişkinlik, bulantı, karın ağrısı gibi sorunlar yaşamama neden olur.	1	2	3	4	5
9	Afet yaşama endişesinden dolayı kendime güvenim azalır, sorumluluk almaktan kaçınırım.	1	2	3	4	5
10	Afet nedeniyle evimin zarar göreceğine dair endişe veren düşüncelerim var.	1	2	3	4	5
11	Afetlerde güvenlik sorunu yaşanabileceğine dair beni endişelendiren düşüncelerim var.	1	2	3	4	5
12	Afet yaşama ihtimaline karşı bir miktar para bulundurmak beni rahatlatır.	1	2	3	4	5
13	Afetlerde benim ve ailemin yaralanma ihtimaliyle ilgili endişe veren düşüncelerim var.	1	2	3	4	5
14	Afet nedeniyle işsiz kalacağıma ya da çalışamayacağıma dair beni tedirgin eden düşüncelerim var.	1	2	3	4	5
15	Afet olaylarında tuvalet, banyo gibi ihtiyaçlarımı karşılayamayacağıma dair beni endişelendiren düşüncelerim var.	1	2	3	4	5
16	Afetlerde kamp gibi toplu alanlarda kalacağıma dair beni tedirgin eden düşüncelerim var.	1	2	3	4	5
17	Afetlerde yakınlarımla irtibat kuramayacağıma, onlara ulaşamayacağıma dair beni endişelendiren düşüncelerim var.	1	2	3	4	5
18	Afetlerde sağlık hizmetlerinden faydalanamayacağıma dair beni kaygılandıran düşüncelerim var.	1	2	3	4	5