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Original Article

Adaptation of the ''Food Allergy Self-Efficacy Scale for Parents''(FASE-P) to Turkish: a validity and reliability study

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ABSTRACT

Background. Food allergy is a public health issue that has a significant impact on the lives of families. Parental self-efficacy/confidence is important in managing food allergies. The aim of this study is to validate the "Food Allergy Self-Efficacy Scale for Parents" (FASE-P) and assess parental self-efficacy in managing their child's food allergy.

Methods. Turkish version of the FASE-P (T-FASE-P) was administered to 347 parents of children aged 0-18 who had been followed for at least one month due to food allergy at the Pediatric Allergy Clinic of Prof. Dr. Cemil Taşcıoğlu City Hospital between September 1 and December 31, 2023, through face-to-face interviews and online surveys for parents of children with food allergies from the general population. Content validity, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) were conducted to evaluate the validity of the scale. General Self-Efficacy Scale (GSES) was used for concurrent criterion validity. Internal consistency analysis, test-retest application, and item analysis were conducted to assess its reliability.

Results. T-FASE-P scale initially contained 21 items, and the Cronbach's alpha coefficient (α) calculated in this form was found to be 0.89. Later, when 4 items were excluded, the 17-item version of the scale was calculated as α=0.90. The intra-class correlation coefficient between the test and re-test was found to be 0.972. The content validity index value of the scale was calculated as 0.99, indicating that the content validity was at a sufficient level. In the EFA, it was determined that the scale formed a three-factor structural model and that this model explained 60.82% of the total variance. As a result of the CFA, the fit indices were calculated as $\chi 2/df$=2.341, GFI=0.919, TLI=0.950, indicating a good level of fit. Based on the analysis results, T-FASE-P consists of 17 items and three subscales.

Conclusion. T-FASE-P scale is a valid and reliable measurement tool that can be used to determine the food allergy self-efficacy of Turkish parents.

Key words: children, food allergy, parents, self-efficacy.

Food allergy is one of the rapidly increasing allergic diseases worldwide and is a public health problem with a significant impact on the lives of families.[1] There is no definitive treatment for food allergy. The goal is to avoid allergens and administer emergency treatments

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in accidental encounters.[2] Symptoms can range from mild to moderate, such as hives, to life-threatening reactions.[3] Since children are mostly diagnosed before the age of 5, parents are largely responsible for managing food allergies, including avoiding allergens, checking food labels, preventing accidental exposures, and carrying an adrenaline auto-injector.[4,5] Therefore, managing food allergies can increase stress and anxiety in parents, particularly mothers, affecting their daily and social activities, and reducing their quality of life.[6-8]

Studies evaluating the quality of life and parental burden of food allergy have found associations between decreased quality of life and factors such as using epinephrine, having multiple food allergies, experiencing anaphylaxis, being younger at the time of reaction, and having milk and egg allergies.[9,10]

In a recent study conducted in our country, mothers of children with food allergies had higher levels of depression and anxiety than mothers in the control group.[11]

Another study recently reported in our country determined that breastfeeding mothers of babies with food allergies are more anxious and prone to depression, and the need for social support for caregivers was emphasized. These findings make us think that we need measurement tools for our country that will identify areas where parents feel inadequate in their social lives.[12]

Informing parents about food allergies is important for protecting the patient from life-threatening reactions, preventing unnecessary eliminations leading to nutritional deficiencies, and preserving the quality of life of the patient/parent.[13]

When other studies in this context are examined, it is found that the lack of knowledge about preventing accidental ingestion of allergens and applying emergency treatment approaches increases anxiety.[14] Most parents report being worried about their children having an anaphylactic reaction and not knowing what to do during anaphylactic shock.[15]

Therefore, parental self-efficacy/confidence is important in managing food allergies and is associated with better parental quality of life.[16]

Self-efficacy is defined as the belief in one's ability to organize and execute actions necessary to manage situations effectively.[17] Developing self-efficacy helps individuals feel more capable of overcoming challenging problems. Enhancing self-efficacy in children with chronic illnesses and their parents can improve their quality of life.[18,19]

Food allergies require constant attention to prevent accidental exposure and potentially life-threatening symptoms, impacting the anxiety levels and quality of life of families.[20]

Existing quality of life scales are good at determining the impact of food allergies on various aspects of life but are insufficient in identifying areas where there is a lack of confidence in managing them. The widely used General Self-Efficacy Scale (GSES) aims to predict coping with daily challenges but does not encompass issues related to managing food allergies. Therefore, there is a need for guiding studies to identify areas of low self-efficacy in managing food allergies. This study will contribute to the literature by adapting and validating the "Food Allergy Parental Self-Efficacy Scale" into Turkish to measure parental self-efficacy in managing food allergies.

Materials and Methods

Study population and design

It is recommended to reach a sample size that is at least 2-10 times the number of items in the scale when adapting a scale to another culture.[18] It was decided to include at least 210 participants, based on a sample size that is 10 times the number of scale items. However, considering potential data losses, 347 volunteers meeting the criteria and in follow-up were included

in the study. Between September 1, 2023, and December 31, 2023, 347 parents of children aged 0-18 who had been followed for at least one month due to food allergy at the Pediatric Allergy Clinic of Prof. Dr. Cemil Taşcıoğlu City Hospital were included in the study. The study aimed to evaluate the reliability and validity of the scale on a large sample through an online survey of parents of children with food allergies from the general population.

Data collection tools

The data collection tools included an introductory information form, the Turkish-translated Food Allergy Self-Efficacy Scale for Parents (T-FASE-P), and the GSES. Participants provided verbal consent, and survey forms were administered face-to-face, online, or over the telephone. It took an average of 8-10 minutes to complete the forms.

FASE-P scale

The scale consists of 5 subscales and 21 items: " Precaution & Prevention" (item numbers 1-6), "Allergic Treatment" (#7-8),"Food Allergy Identification" (#9-11), "Seeking Information About Food Allergy" (#12-15) and "Managing Social Activities" (#16-21). Responses on the scale are collected and then divided by 21 to obtain the total average score. The resulting score has a range of 0-100. Similarly, the items in each subscale are summed and divided by the number of items in that subscale. Each item in the FASE-P is scored on a 100-point visual analog scale; higher scores indicate greater selfefficacy for managing food allergies.[21]

General self-efficacy scale (GSES)

It consists of 10 questions that assess parents' general self-efficacy regardless of the underlying disease. The adaptation, validity, and reliability study of the GSES developed by Sherer and colleagues (1982) into Turkish was conducted by Yıldırım and İnan[17] The scale's internal consistency (Cronbach's alpha) value was found to be 0.80. It is a valid and reliable tool for measuring the general self-efficacy of individuals aged 18 and over who have at least completed primary school. The total score of the scale can range from 17 to 85; an increase in score indicates an increase in self-efficacy beliefs.

Translation process

The adaptation of the scale into Turkish was conducted with permission from one of the authors who developed the scale. The English version of the FASE-P was translated into Turkish following the steps outlined by the World Health Organization guidelines, including: 1) Forward translation into Turkish was conducted by two independent individuals who are native Turkish speakers and fluent in English. Easily understandable words or phrases that convey the same concept as in the original text were selected for translation. 2) The reconciled version was designed by two independent Turkish pediatricians who are fluent in English. 3) The final version was re-translated into English by an independent bilingual translator whose native language is English. The back-translated version was checked by an independent supervisor. 4) Translated questionnaires were pretested on 15 parents to confirm clarity and comprehensibility. Participants provided feedback on whether the terms were difficult to understand or if the questions were ambiguous. Except for a few questions, no question was misunderstood or misinterpreted by the parents at this stage.

Content validity

To evaluate the content validity of the scale, the final version of the translated scale was emailed to 10 experts including 3 pediatrician, 1 psychiatrist, 6 pediatric allergy subspecialists from different institutions (public and private sectors) for their opinions, and the content validity indexes (CVIs) were calculated for each item. Modifications were made to the items based on the experts' suggestions, and the final version of the scale was provided.

Reliability

To determine the internal consistency and reliability of the T-FASE-P, Cronbach's alpha coefficient was measured for each age group and each subscale. A test-retest analysis was conducted to test its stability over time. Test-retest reliability was determined using the intraclass correlation coefficient (ICC) for two surveys conducted with parents whose child's allergy status remained the same between two visits, with a two-week interval.

Construct validity

To determine the factor structure to which the items in the scale are connected, an exploratory factor analysis (EFA) was conducted. Factor analysis is an analytic technique that permits the reduction of a large number of correlated variables to a smaller number of latent dimensions. The goal of factor analysis is to achieve parsimony by using the smallest number of explanatory concepts to explain the maximum amount of common variance in a correlation matrix.[22] Varimax-axis rotation method was used to calculate the factor loads, and confirmatory factor analysis (CFA) was performed to test the compatibility with the original study. Goodness of fit values (adjusted goodness-of-fit index [AGFI], comparative fit index [CFI], goodness-of-fit index [GFI], incremental fit index [IFI], root mean square error of approximation [RMSEA], chi square [$\chi 2/df$], Tucker-Lewis index [TLI]) were examined for CFA.

Concurrent criterion validity

In this study, the GSES was used to determine criterion validity. The scores of parents on the T-FASE-P and GSES were tested using Pearson correlation analysis.

Statistical analyses

The data analyses were conducted using SPSS (Statistical Package for Social Sciences) 23 (SPSS Inc., Chicago, IL, USA) and AMOS (Analysis of Moment Structures) 26 programs. The study employed statistical analyses for validity and reliability (content validity, internal consistency analysis, EFA, CFA, etc.). Descriptive statistics were used to express continuous variables: mean ± standard deviation (SD), minimum and maximum values. Frequency data were presented as counts and percentages (%). Normal distribution of continuous variables was assessed using the Kolmogorov-Smirnov test. Chi-square test was used for comparison of frequency data. Non-parametric tests were used for group comparisons of continuous variables when they did not follow a normal distribution. The Mann-Whitney U test was conducted for continuous variable comparisons between two groups. A significance level of $p < 0.05$ was considered for all statistical comparisons.

Ethical committee approval

The ethical approval for the reliability and validity phase of this study was obtained from the Prof. Dr. Cemil Taşcıoğlu City Hospital Clinical Research Ethics Committee with decision number 2023/214 dated 13/07/2023. Informed consent was obtained from all parents.

Results

The study included 347 parents of children aged 0-18 diagnosed with food allergies. The average age of the children was 48.4±41.8 months, with 64.3% being female. The most common allergies were cow's milk (59.7%), eggs (55.9%), walnuts (26.5%), hazelnuts (25.9%), and peanuts (25.6%). The average age of the parents was 33.6±5.8 years, with 90.8% being mothers and 9.2% fathers. 62.9% of the mothers and 68.8% of the fathers were university graduates. There was no statistically significant difference between the parents in terms of age and education level ($p=0.13$ and $p=0.51$, Table I).

Validity study findings

Content validity

In this study, content validity was established by consulting expert opinions. For this purpose,

Table I. Descriptive characteristics of parents and their food-allergic children.

Parents, n	347
Mother / father, n (%)	315 / 32 (90.8% / 9.2%)
Age, yr, mean±SD (min-max)	33.6±5.8 (18-59)
Education level of mother / father, n (%)	
Primary or high school	117 / 10 (37.1% / 31.2%)
University	198 / 22 (62.9% / 68.8%)
Children	
Age, mo, mean±SD (min-max)	48.4±41.8 (1-120)
Female / male, n (%)	223 (64.3%) / 123 (35.4%)
Common food allergies, n (%)	
Cow milk	207 (59.7%)
Hen egg	194 (55.9%)
Walnut	92 (26.5%)
Hazelnut	90 (25.9%)
Peanut	89 (25.6%)

SD: standard deviation

the opinions of 9 experts were sought. The Davis method was used to consult expert opinions. According to this approach, experts were asked to express their opinions using four different rating options: (a) "item appropriate," (b) "item needs slight revision," (c) "item needs substantial revision," and (d) "item not appropriate." Then, the numbers of experts who selected (a) "item appropriate" and (b) "item needs slight revision" were totaled and divided by the total number of experts to calculate Content Validity Index (CVI).

In the study, the CVI of the scale was calculated as 0.99, indicating that the content validity of the scale was determined to be at a sufficient level.

Concurrent criterion validity

GSES was used to determine criterion validity. It was found that the correlation between the T-FASE-P and the GSES was positive, moderate in strength, and statistically highly significant ($r=0.27$, $p<0.001$).

GSES score was found to have statistically significant weak positive correlations with subscale 1 score (r: 0.24, $p<0.001$), subscale 2 score (r: 0.20, $p<0.001$), and subscale 3 score (r: 0.19, $p<0.001$).

Construct validity

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) coefficient was calculated as 0.86 to assess the suitability of the data for EFA. It was determined that the sample adequacy was at a very good level. Additionally, the result of Bartlett's test of sphericity yielded an approximate chi-square value of 3730.19 ($p<0.001$), indicating that the data in the study were suitable for factor analysis.

When evaluating the results of the factor analysis conducted using the Varimax rotation method, the criterion was considered that items with factor loadings greater than 0.30 and positive should be included in the factor.

In the analysis to determine the items to be included in the factor, when items appeared in more than one factor, if the difference in the loadings they gave to these factors was less than 0.10, the item was eliminated. The factor loadings of the scale range from 0.574 to 0.849 (Table II). Items 4, 16, 17, 18, and 19 were found to be under two factors. It was decided that these items should remain under the factors to which they had higher factor loadings. Therefore, "item 4" was evaluated under Factor 2, and Items 16, 17, 18, and 19 were evaluated

Table II. Exploratory factor analysis results for the T-FASE-P cale.

Items	Factor 1	Factor 2	Factor 3
Item 1		0.576	
Item 2		0.693	
Item 3		0.722	
Item 4	0.386	0.680	
Item 5		0.708	
Item 6		0.691	
Item 7			0.670
Item 8			0.574
Item 9			0.790
Item 10			0.740
Item 11			0.690
Item 16	0.706	0.443	
Item 17	0.705	0.428	
Item 18	0.792	0.312	
Item 19	0.777	0.345	
Item 20	0.849		
Item 21	0.848		
Eigenvalues	6.714	2.330	1.297
Variance %	24.090	20.949	15.785
Cumulative Variance%	24.090	45.039	60.824

T-FASE-P: Turkish version of the Food Allergy Self-Efficacy Scale for Parents

under Factor 1. As a result of the analysis, a three-factor structural model with eigenvalues greater than 1 was observed to emerge. It was found that the factor loadings, which were positive for the 6 items (#16-21) under Factor 1 of the T-FASE-P scale, ranged from 0.705 to 0.849.

There are 6 items (#1-6) under Factor 2, and it was observed that the factor loadings, which were positive, ranged from 0.576 to 0.722. Factor 3 consists of 5 items (#7-11), and it was observed that the factor loadings, which were positive, ranged from 0.574 to 0.790. Factor 1 accounted for 24.09% of the total variance, Factor 2 accounted for 20.95%, and Factor 3 accounted for 15.78%. When all factors were considered together, it was determined that the scale explained 60.82% of the total variance (Table II).

The 17-item, 3-factor structure resulting from EFA was tested using CFA. When examining the fit indices, the following values were obtained: $\chi 2/df=2.341$, RMSEA=0.062, GFI=0.919, CFI=0.958, AGFI=0.891, TLI=0.950, and IFI=0.959. GFI, TLI, IFI, and $\chi 2/df$ indicated good fit, while RMSEA, CFI, and AGFI showed an acceptable fit (Table III). The path diagram of the model for the scale is shown in Fig. 1.

Table III. Results of confirmatory factor analysis.

Model fit	Score
$\chi 2/df$	2.341
RMSEA	0.062
GFI	0.919
CFI	0.958
AGFI	0.891
TLI	0.950
IFI	0.959

AGFI, adjusted goodness-of-fit Index; CFI, comparative fit index; GFI, goodness-of-fit index; IFI, incremental fit index; RMSEA, root mean square error of approximation; $\chi 2/df$, chi-square, TLI, Tucker-Lewis index.

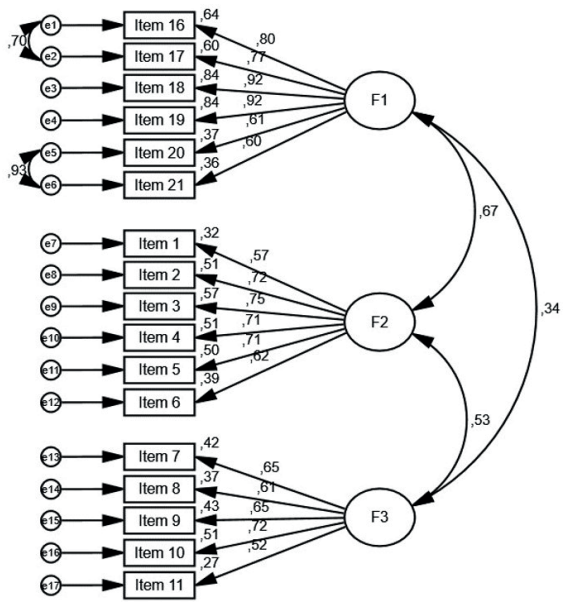

Fig. 1. Path diagram of the T-FASE-P scale.

T-FASE-P: Turkish version of the Food Allergy Self-Efficacy Scale for Parents

Table IV. The results of the internal consistency analysis.

	Corrected item-total correlation	Cronbach's alpha if item deleted
Item 16	0.730	0.878
Item 17	0.704	0.879
Item 18	0.721	0.878
Item 19	0.746	0.877
Item 20	0.599	0.883
Item 21	0.598	0.883
Item 1	0.501	0.886
Item 2	0.608	0.882
Item 3	0.633	0.881
Item 4	0.643	0.881
Item 5	0.607	0.882
Item 6	0.514	0.885
Item 7	0.402	0.888
Item 8	0.472	0.886
Item 9	0.273	0.890
Item 10	0.360	0.890
Item 11	0.273	0.890
Item 12	0.060	0.892
Item 13	0.095	0.892
Item 14	0.097	0.892
Item 15	0.051	0.893

Findings regarding the reliability study

Internal consistency analysis

According to the results of the internal consistency analysis, it was observed that the item-total score correlation coefficients ranged from 0.051 to 0.746 (Table IV). The corrected item-total correlations for the 4 items (#12-15) questioning information acquisition from family doctors or nurses, hospital pediatricians or pediatric allergy specialists, food sellers, and websites regarding food allergies were found to be less than 0.20. Therefore, it was considered that these items didn't move in the same direction as the whole scale. It was decided that these items should be removed from the scale as the Cronbach's alpha value of the scale significantly increased when these items were removed.

Table V. Cronbach's alphas for the T-FASE-P scale and subscales.

T-FASE-P	Cronbach's alfa
Total scale	0.90
Subscales	
Precaution & prevention	0.83
Allergic treatment / Food allergen identification	0.74
Managing social activities	0.91

*Turkish version of the Food Allergy Self-Efficacy Scale for Parents.

The T-FASE-P scale initially contained 21 items, and the Cronbach's alpha coefficient (α) calculated for this version was found to be 0.89. After removing 4 items (#12-15) the 17-item version of the scale was calculated to have an α of 0.90. These results indicate that the scale and its subscales have a high level of reliability. The evaluation in the subsequent stages of the study continued with the 17-item version. The survey questions used in this study are listed in the Supplementary Materials.

The alpha values for the final version of the scale were found to be α=0.83 for the "precaution & prevention" subscale, α=0.74 for the "allergic treatment & food allergen identification" subscale, and α=0.91 for the "managing social activities" subscale (Table V).

Test-retest reliability

For the re-test application, 30 volunteers were asked to respond to the same form using the same method as the initial test. Re-tests were conducted two weeks apart, with the condition that allergy status remained consistent between the two visits. The intraclass correlation coefficient between the first test and retest was found to be 0.97. The intraclass correlation coefficients for subscales 1, 2, and 3 were 0.78 ($p<0.001$), 0.97 ($p<0.001$), and 0.75 ($p<0.001$), respectively.

Discussion

In this study, we aimed to evaluate the reliability and validity of the T-FASE-P. Initially, linguistic equivalence with the original form was achieved through the back-translation method. This result indicated that the process of translating the scale into Turkish was successfully completed.

After the linguistic equivalence study, we examined the psychometric properties of the scale through exploratory and confirmatory factor analysis, test-retest reliability, calculation of internal consistency coefficients, and criterion-related validity methods. We found that T-FASE-P is a valid and reliable scale that can be used in the Turkish population.

According to the reliability analysis, it was observed that the overall alpha value of the scale (0.90) was almost the same as the original scale's value of 0.88, indicating that it has excellent internal consistency.[21]

Prior to factor analysis, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were conducted to assess whether the sample size was adequate for factor analysis. The evaluation indicated that the KMO test was above 0.60 and the result of Bartlett's test of sphericity was statistically significant, indicating that the data were suitable for factor analysis and the sample adequacy was at a very good level.

To determine the factor structure, exploratory and confirmatory factor analyses were conducted. According to the EFA, a three-factor structure was obtained, explaining 60.82% of the total variance. The factor loadings of the 17 items under these three factors ranged from 0.574 to 0.849, and those items with factor loadings below 0.30 were removed from the scale. Similar to our results, the total variance of the original scale was found to be 59.8%, with factor loadings ranging from 0.408 to 0.849.[21] It was determined that the five-factor structure in its original form was reduced to a three-factor structure in the sample of Turkish parents, and the goodness-of-fit indices maintained its appropriateness through the evaluations.

To demonstrate the factor structure of the scale and how well the measurement model fits the data, fit indices were calculated. It is recommended to use multiple indices when evaluating fit.[17,23] Therefore, in the CFA conducted for our scale, the fit indices were calculated as follows: $\chi 2/df=2.341$, GFI=0.919, TLI=0.950, RMSEA=0.062. All indices were evaluated according to the standard criteria recommended by Schermelleh-Engel et al., indicating that the model fit well.[24]

The study found a strong and significant correlation ($p<0.001$) between T-FASE-P and GSES, supporting the criterion validity of the scale. However, the correlation with GSES was lower than expected, possibly because GSES does not specifically address issues relevant to managing food allergies. Previous studies have also found only moderate correlations between general and parental self-efficacy, indicating that generalized self-efficacy may not be sufficiently sensitive in measuring behavior-specific self-efficacy.[25]

Conclusion

The collaboration between allergy specialists and psychologists, as well as education and public health measures supporting food allergy self-efficacy in families, are crucial for the future success of managing food allergies. Identifying areas of insufficient parental self-efficacy may be important for managing food allergies in children and improving their quality of life. Additionally, the T-FASE-P may vary depending on cultural dietary habits and lifestyles, so it is necessary to validate the questionnaire in different societies.

Supplementary materials

Supplementary materials for this article are available online at https://doi.org/10.24953/turkjpediatr.2024.4691

Ethical approval

The ethical approval for the reliability and validity phase of this study was obtained from the Ondokuz Mayıs University Clinical Research Ethics Committee (number 2023/214 date 13/07/2023).

Author contribution

The authors confirm contribution to the paper as follows: study conception and design: NÇ, DÖ; data collection: GY, HG, MFE, ŞİKK, HB, MKŞ; analysis and interpretation of results: ŞG, ÖT; draft manuscript preparation: NÇ, HG, DÖ. All authors reviewed and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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