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Cross-sectional Analysis of Health Quality, Treatment Satisfaction and Adherence in Children with Food Allergy

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ABSTRACT

Objective: Food allergies (FA) significantly affect the quality of life (QoL) in children and their families. Management involves strict allergen avoidance, which can result in high emotional distress and an increased disease burden.

Objective: To evaluate treatment adherence, satisfaction, and disease-specific health-related quality of life (HRQL) in children aged 0-12 years with FA and their parents.

Methods: A cross-sectional study was conducted with 100 children diagnosed with FA by a physician who required allergen avoidance. Parents completed the Food Allergy Quality of Life Questionnaire Parent Form (FAQLQ-PF), Food Allergy Parent Questionnaire (FAPQ), Treatment Satisfaction Questionnaire (TSQM-9), and Modified Morisky Scale (MMS). Demographic and clinical data were obtained.

Results: The median total score for FAQLQ-PF was 39 (IQR 26-54), indicating moderate impairment in QoL. Emotional impact and social/dietary limitations were notably higher in children older than five years and those with multiple FA. The median FAPQ score was 38 (IQR 29-49), reflecting moderate parental stress and anxiety. Treatment satisfaction (TSQM-9) had a median score of 57 (IQR 41-71), with higher scores for parents of children with multisystem involvement. Treatment adherence (MMS) had a median score of 83 (IQR 67-100), indicating good overall adherence. Significant correlations were observed between higher parental anxiety and lower QoL.

Conclusion: Children with FA and their parents experience significant HRQL impairment, stress, and varying levels of satisfaction with treatment. These results underscore the necessity for comprehensive management strategies that encompass psychosocial support and personalized interventions to enhance outcomes for families dealing with FA.

Keywords: Food Allergies, Health Related Quality of Life, Treatment Adherence, Treatment Satisfaction.

1. INTRODUCTION

Food allergy (FA) is a chronic condition that has become increasingly common worldwide, significantly affecting quality of life (QoL) (1). Recent data suggest a substantial increase in the global prevalence of FA, with estimates reaching up to 10% among children in high-income countries (2, 3). Studies indicate that FA prevalence has been increasing by approximately 1-2% per decade in some areas, driven by environmental and genetic factors (2). This growing prevalence highlights the critical need to better understand the factors influencing the quality of life (QoL), and treatment outcomes in affected populations (4). The condition is most commonly triggered by foods such as milk, eggs, wheat, soy, peanuts, tree nuts, fish, and shellfish (5). In Turkey milk and eggs are the predominant allergens (6). The management of FA typically involves strict allergen avoidance and emergency preparedness. However, the chronic nature of the disease, coupled with difficulties in avoiding allergens and the risk of accidental exposure, places a significant burden on both patients and their families (7). This burden is reflected in the psychological distress and increased disease burden experienced by patients and parents, which can adversely affect their health-related quality of life (HRQL) (8). Existing studies highlight that stress and anxiety associated with the constant need to avoid allergens and the risk of severe reactions contribute to a significant decline in HRQL (1, 7). Moreover, the QoL of children with FA is reported to be significantly impaired compared to healthy children (9) and those with other chronic conditions such as type 1 diabetes mellitus (10, 11) and juvenile rheumatoid arthritis (12). Despite this, there is a scarcity of studies that evaluate parent-reported compliance, treatment satisfaction, and the HRQL of families managing FA.

The current study aimed to assess treatment adherence, treatment satisfaction, and disease-specific HRQoL in children with FA aged 0-12 years and their parents, as well as the factors affecting these outcomes. By addressing these key areas, we hope to provide valuable insights into the management of FA and its impact on affected families.

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2. METHODS

This current cross-sectional study enrolled 100 patients aged 0-12 years with FA who required allergen food avoidance between January 2022 and June 2022. Clinical and demographic information was obtained from medical records. Additionally, parents were asked to complete questionnaires assessing disease-specific HRQL using the Food Allergy Quality of Life Questionnaire Parent Form (FAQLQ-PF), Food Allergy Parent Questionnaire (FAPQ), and Treatment Satisfaction Scale (TSQM-9) for treatment satisfaction and the Modified Morisky Scale (MMS) for treatment adherence, either in person or via telephone interviews.

Ethics committee approval of the study taken on 04.03.2022 (protocol number 09.2022.389). Each patient's parents provided written informed consent to participate in this research.

2.1. Study Population

The study population was selected from patients aged 0-12 years who had physician-diagnosed FA according to the guidelines (5, 13), required allergen avoidance, and were admitted to or being followed at the tertiary Pediatric Allergy and Immunology Unit at a university hospital The minimum sample size was initially calculated as 67 with a significance level (α) of 5% and a power of 95% using the G*Power 3.1 software system. To enhance reliability, 100 patients were ultimately included in this study. Patients without a definitive diagnosis of FA, those who were not on an allergen avoidance diet by the time of questionnaires, or those who required food elimination due to another condition were excluded from the study.

2.2. Demographic and clinical data

Demographic and clinical characteristics of the patients, including biological sex, current age, age at onset, age at diagnosis, follow-up period (<1 year, >1 year), type of FA (IgE-mediated, non-IgE-mediated, or mixed), food allergen(s) avoided (multiple, single), number of systems/organs involved (multiple, single), history of anaphylaxis, and outcome (full, partial, null tolerance) were obtained from medical records. The demographic characteristics of the parents were recorded as those of the mother or father of the patient.

2.3. HRQL Questionnaires

Mothers and/or fathers as parents, were asked to respond to two specific questionnaires, FAQLQ-PF (14) was validated and has been used in the Turkish population [13]. On the other hand, the FAPQ questionnaires were translated into Turkish by a bilingual medical professional fluent in English and Turkish, and then independently translated back into English by another bilingual medical professional, which was confirmed for their concordance. To ensure that the questionnaire was comprehensive for Turkish participants, it was administered to five non-medical volunteers and then to the parents of fivee children with FA who were followed in our clinic. Preliminary validation of the HRQL questionnaires was checked prior to the questionnaires being distributed to the parents of all participants.

The FAQLQ-PF, an FA-specific scale, assesses the child's HRQL from the family's perspective. It is a questionnaire administered to families of children with FA aged 0-12 years to evaluate the patient's QoL. The FAQLQ-PF consists of three subgroups: emotional impact (13 items), food-related anxiety (8 items), and social and dietary limitations (9 items). Parents were asked a number of questions that varied depending on age: 12 questions were asked for children under the age of 3, 26 questions for children between the ages of 3-8, and 30 questions for children over the age of 8. The FAQLQ-PF total score and three subdomains (emotional impact, food-related anxiety, and social and dietary limitations) were converted into percentages. (Formula used: (Patient's score – lowest possible score) / (highest possible score – lowest score)*100) The average of the 3 subdomains was determined as the total score. In this questionnaire, higher scores indicated worse HRQL, whereas lower scores reflected better HRQL for the patient. The FAPQ was developed to assess parents' adaptation to their children's FA and how they cope with the condition. Family concerns, coping skills and support levels were evaluated. The survey consisted of 18 questions without any sub-domains (15). FAPQ scores were converted into percentages. (Formula used: (patient's score – lowest possible score) / (highest possible score – lowest score)*100), which resulted in a similar pattern: a high score indicating negative and a low score for positive scale for the patient. For the FAPQ, the total score was calculated and divided by the number of questions. For questions 1, 2, 3, 5, 7, 9 in the FAPQ survey, 0 points = 100%, 1 point: 75%, 2 points: 50%, 3 points = 25%, 4 points = 0%, for questions 4, 6, 8, 10-18, 0 points = 0%, 1 point: 25%, 2 points: 50%, 3 points = 75%, 4 points = 100%. The total score percentage was taken as the average of 18 questions in percentage (total % of 18 questions/18). In this questionnaire, higher scores indicated worse HRQL, whereas lower scores reflected better HRQL.

2.4. TSQM Questionnaire for Treatment Satisfaction

Nine questions in the treatment satisfaction questionnaire (TSQM) used for medication treatment, were modified by altering the word medication to allergen avoidance to assess individual treatment satisfaction for elimination diet, where higher scores indicate more satisfaction (16, 17). The TSQM has been validated and used in the Turkish population (18, 19). For the TSQM-9 questionnaire, three subgroups were separately converted into percentages (formula used: (Patient's score – lowest possible score)/(highest possible score – lowest score)*100). The total score percentage was taken as the average of three subdomains: (sum of three subgroups/3). In this questionnaire, higher scores indicate more positive treatment satisfaction.

2.5. MMS Questionnaire for Treatment Adherence

The Modified Morisky Scale is a commonly used questionnaire for medication adherence in chronic illnesses and consists of six questions. The MMS has also been validated and used in the Turkish population (20). The questions were modified in line with elimination diet adherence instead of medication. For questions 1, 3, 4, and 6 in the MMS questionnaire, yes = 0%, no = 100%; for questions 2 and 5, yes = 100%, no = 0%. Total score is the average of the percentage of six questions (sum of the % value of six questions/6). In this questionnaire, higher scores indicate more positive treatment adherence. For MMS, the total score of the questions was calculated and divided by the number of questions.

2.6. Statistical Analyses

After data collection, analyses were performed using the SPSS software (version 19, SPSS, Inc. Chicago, IL, USA) and Jamovi (version 2.3.26, The Jamovi Project, Australia). Graphs and figures were generated using of GraphPad Prism (version 9.5.1, for MacOS, GraphPad Software, Boston, Massachusetts USA) and Adobe Illustrator 2023 (version 27.9.0, for MacOS, Adobe Inc., California, USA). Continuous variables between groups were not normally distributed, and are presented as median and IQR 25-75%. Groups were compared using the Mann-Whitney U test, and a p value <0.05 was considered significant. For the subgroup analysis, the results of the questionnaires were compared based on parents and patients' sex, current age of patients (≤5 years, >5 years), age at symptom onset (≤6 months, >6 months), follow-up duration (≤1 year, >1 year), food allergen avoidance (single, multiple), presence of anaphylaxis, number of clinically affected systems (single or multiple), and outcome (full, partial, null tolerance).

Spearman correlation analysis was used to evaluate the relationship between questionnaire scores and nominal and continuous predictors, as well as the correlations among different questionnaires. Differences were considered significant at p < .05, and the strength of the correlation was evaluated according to Spearman's rho value (00-0.19 "very weak," 0.20-0.39 "weak," 0.40-0.59 "moderate," 0. 60-0.79 "strong", 0 .80-1.0 "very strong'')

3. RESULTS

3.1. Patient Characteristics

The study included 100 patients, with a majority being male (59.0%, n=59) and a median age of 18.6 months (IQR 11.5-44.3). Most patients (86.0%, n=86) were diagnosed after six months of age, with a median onset age of 3.7 months (IQR 1.3-6). They were followed for an average of 18.6 months (IQR 11.5-43.3), with over half (65.0%, n=65) followed-up for more than a year.

The patients' immunologic FA phenotypes included mixed-type (61.0%, n=61), IgE-mediated (21.0%, n=21), and non-IgE-mediated (18.0%, n=18). Atopic dermatitis affected 65.0% (n=65) of patients, with urticaria (43.0%, n=43), proctocolitis (28.0%, n=28), and anaphylaxis (12.0%, n=12). Multisystemic involvement was seen in 63.0% (n=63) cases, with the skin being the most affected system (90.0%, n=90). Commonly avoided foods were hen's eggs (73.0%, n=73) and cow's milk (55.0%, n=55), with only 13.0% (n=13) achieving full tolerance.

The demographic and clinical characteristics of the patients included in the study are shown in Table 1 and Figure 1A.

3.2. HRQL, Treatment Satisfaction and Adherence Questionnaires

The FAQLQ-PF and FAPQ were used to assess HRQL, while the TSQM-9 and MMS were used to evaluate treatment satisfaction and compliance, respectively. These questionnaires were administered to the mothers of 78 patients, fathers of 32 patients, and both parents of 7 patients (Table 1).

Table 1. *Characteristics of children with food allergies and parent's questionnaires (n=100).*

Current age (mo) median and IQR 25-75%	18.6 (11.5-43.3)
Age at onset (mo) median and IQR 25-75%	3.7 (1.3-6)
Follow-up duration (mo) median and IQR 25-75%	7.5 (3.4-21.5)
Questionnaires replied by n (%)	
Mothers	78 (78)
Fathers	32 (32)
Both Parents	7 (7)
FAQLQ-PF Median and IQR 25-75%	40 (26-54)
FAQLQ-PF-emotional	50 (33-65)
FAQLQ-PF-anxiety	25 (0-50)
FAQLQ-PF-social dietary limitations	43 (20-60)
FAPQ Median and IQR 25-75%	38 (29-49)
TSQM-9 Median and IQR 25-75%	57 (41-71)
TSQM-9 effectivenes	67 (50-100)
TSQM-9 convienence	17 (0-60)
TSQM-9 global satisfaction	75 (57-93)
MMS Median and IQR 25-75%	83 (67-100)

n: number, mo: months-old, IQR: Interquartile Range, FAQLQ-PF: Food Allergy Quality of Life Questionnaire Parent Form, FAPQ: Food Allergy Parent Questionnaire,TSQM-9: Treatment Satisfaction Questionnaire a Medication, MMS: Modified Morinsky Score

The median FAQLQ-PF total score was 39 (IQR 26-54). The median overall scores on the FAQLQ-PF subscales evaluating emotional, anxiety and social dietary limitations were 50 (IQR 33-65), 25 (IQR 0-50), and 43 (IQR 20-60), respectively (Table 1).

When comparing FAQLQ-PF scores based on patients' clinical characteristics, parents of children> 5 years of age at the time of evaluation and those with multiple FA reported higher total scores compared to parents of younger children and those with a single FA (p=.043 and p=.007, respectively). The anxiety subscale scores were also higher for children aged > 5 years, those under observation for > 1 year, and those with a history of anaphylaxis (p<.001, p=.001 and p=.026, respectively). Social/dietary limitation subscale scores were significantly higher for patients with multiple food allergies, multi-system/organ involvement, and those unable to consume whole allergens (p=.005, p=.018, and p=.021, respectively). Furthermore, comparing the total and subscale scores of the FAQLQ-PF between mothers and fathers who responded to the questionnaire, mothers had notably higher scores on the emotional subscale (p=.021). The FAQLQ-PF total and subscale scores are presented in Table 2 and Figure 1B.

Table 2. *Factors affecting quality of life, treatment satisfaction and adherence in children with food allergy. Data is presented with median and IQR: 25-75%.*

	Current Age		Follow-up Duration		Parent Gender		Food Allergy		Organ(s)/system(s) Involved		Anaphylaxis History		Outcome			
													Whole allergen Consumption		Baked allergen Consumption	
	≤5 yo	>5 yo	≤1 y	>1 y	Father	Mother	Single	Multiple	Single	Multiple	No	Yes	Yes	No	Yes	No
FAQLQ-PF	35 25-51	51* 41-62	36 25-44	39 32-51	31 23-42	43 28-55	29 22-48	46* 30-55	34 24-50	44 28-55	36 25-51	52 33-61	28 7-54	39 27-53	39 26-54	37 25-53
Emotional impact	47 33-63	63 39-69	50 33-63	48 37-67	39 18-56	53* 37-68	40 27-63	53 42-67	47 31-63	53 37-66	49 33-65	51 32-67	42 20-65	50 33-64	46 39-63	53 37-69
Food-related anxiety	17 0-42	56* 36-69	8 0-33	36* 15-67	25 0-42	25 0-50	10 0-45	25 0-50	19 0-43	25 0-50	18 0-43	40* 21-77	0 0-43	25 0-50	27 0-50	9 0-40
Social and dietary limitations	43-22 60	49-20 50	40 20-60	50 24-60	30 20-53	48 23-66	33 13-50	53* 28-66	35 20-59	52* 32-66	42 20-60	56 44-62	23 0-54	47* 23-63	45 21-60	43 23-63
FAPQ	37 27-47	40 31-60	36 25-44	39 32-51	37 33-47	38 27-49	36 26-44	37 27-49	37 26-44	40 29-51	37 27-47	46 34-52	35 21-40	37 29-49	36 29-49	37 27-47
TSQM-9	57 41-71	61 42-70	53 42-71	62 41-71	62 46-74	56 41-70	58 45-72	56 40-69	51 41-69	62 45-75	54 41-71	64 53-69	58 32-85	57 42-69	67 42-76	52 41-63
Effectiveness	67 50-100	78 62-86	67 50-100	78 50-100	75 50-100	67 51-99	75 56-100	67 50-100	67 50-89	89* 67-100	67 50-100	83 49-100	72 50-100	61 33-100	78 56-100	67 50-99
Convenience	17 0-53	42 0-69	17 0-56	17 0-64	39 0-67	14 0-50	25 0-67	17 0-50	22 0-61	14 0-50	17 0-56	22 0-62	25 0-79	17 0-53	22 0-61	14 0-56
Global satisfaction	79 57-93	83 43-100	71 55-93	79 54-100	71 57-86	79 52-100	79 57-93	79 50-100	71 50-86	82 57-100	71 50-93	86 73-100	82 45-100	79 57-93	86 64-100	68* 45-86
MMS	83 67-100	83 62-87	83 62-100	83 67-100	83 50-100	83 67-100	83 67-100	83 67-100	67 50-100	100 83-100	83 67-100	100* 83-100	75 67-100	83 67-100	83 50-100	83 67-100

*yo: years-old, IQR: Interquartile Range, FAQLQ-PF: Food Allergy Quality of Life Questionnaire Parent Form, FAPQ: Food Allergy Parent Questionnaire, TSQM-9: Treatment Satisfaction Questionnaire a Medication, MMS: Modified Morinsky Score, *p<0.05, Mann-Whitney U Test*

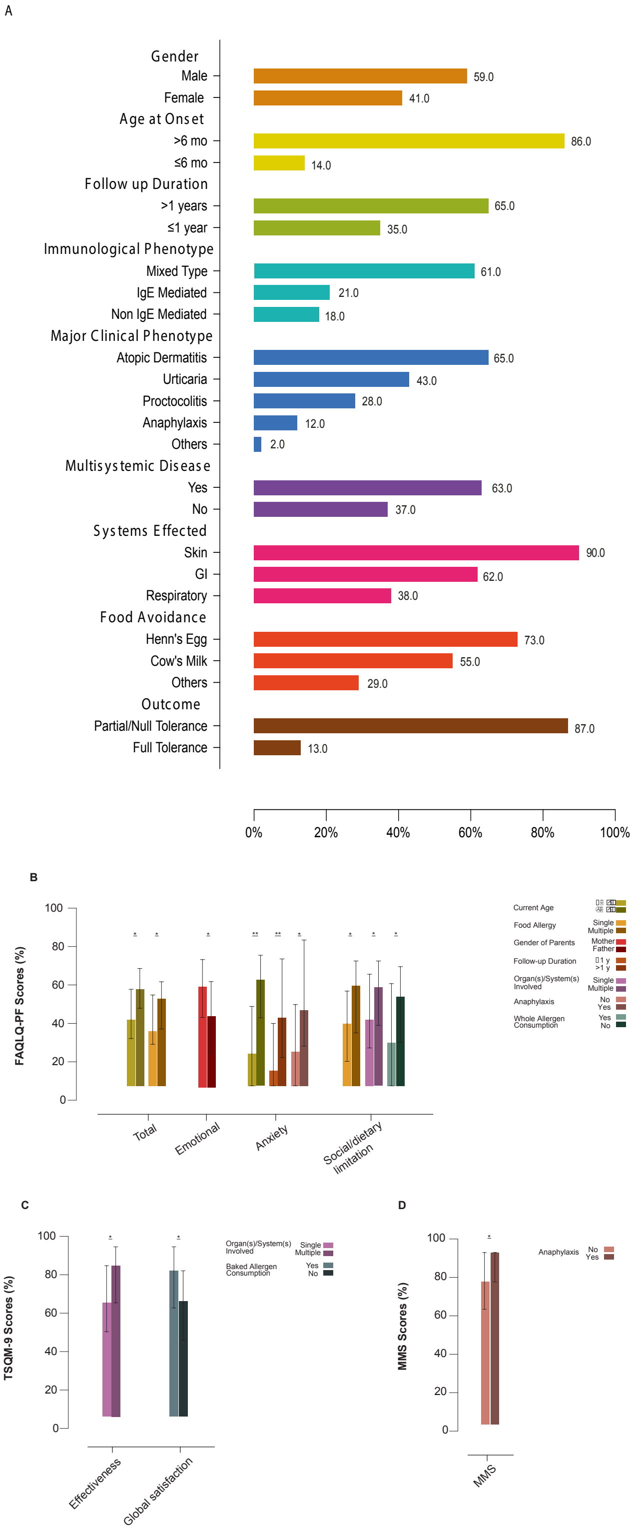
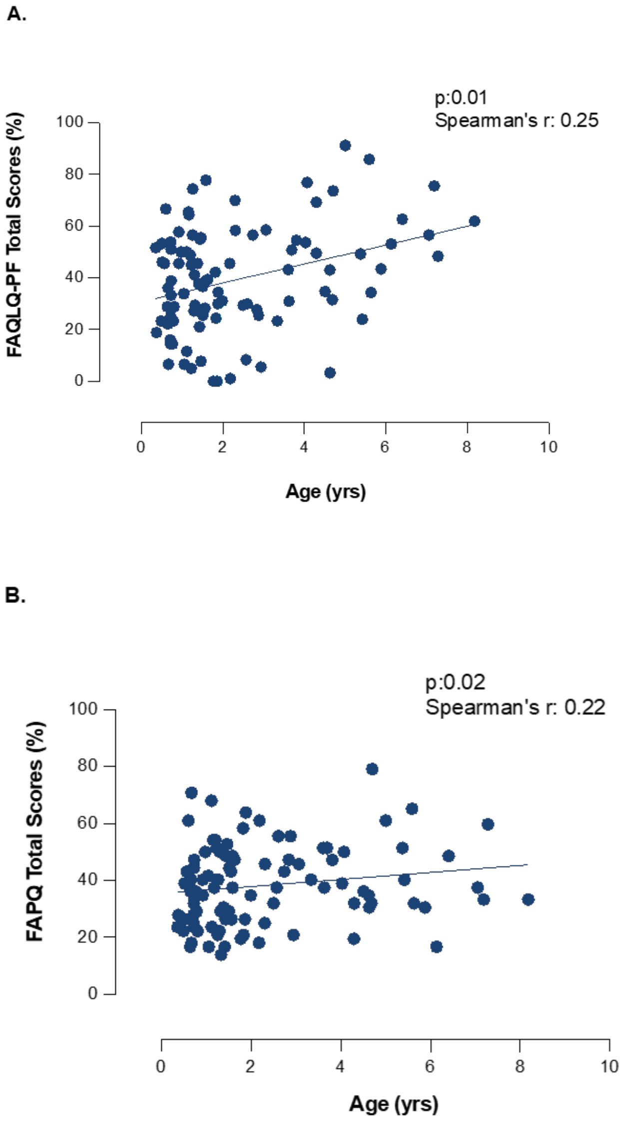


Figure 1. *(A). Clinical characteristics and (B-D). differences between total and subscales scores of the questionnaires according to the clinical characteristics of patients . Data is shown with bars and lines representing percentages and median, IQR 25-75%.p<0.05, Mann-Whitney U Test.*

The median total score of the FAPQ was 38 (IQR 29-49). When the FAPQ scores of the parents were analyzed in relation to the clinical characteristics of the patients and parental sex, no statistically significant disparity was observed (Table 2).

The TSQM-9 questionnaire showed a median total score of 57 (IQR 41-71). The TSQM-9 subscales' effectiveness, convenience, and global satisfaction had median scores of 68 (IQR 50-100), 17 (IQR 0-60), and 75 (IQR 57-93), respectively. When analyzing the TSQM-9 total and subscale scores for patients' clinical characteristics, it was found that higher effectiveness scores were reported by parents of children with multisystem involvement (p=0.011) and lower global satisfaction scores were reported by parents of children unable to consume baked allergens (p=.03) (Table 2, Figure 1C).

The median MMS score was 83 (IQR 67-100), with higher adherence scores among parents of children with a history of anaphylaxis (p=.013) (Table 2, Figure 1D).



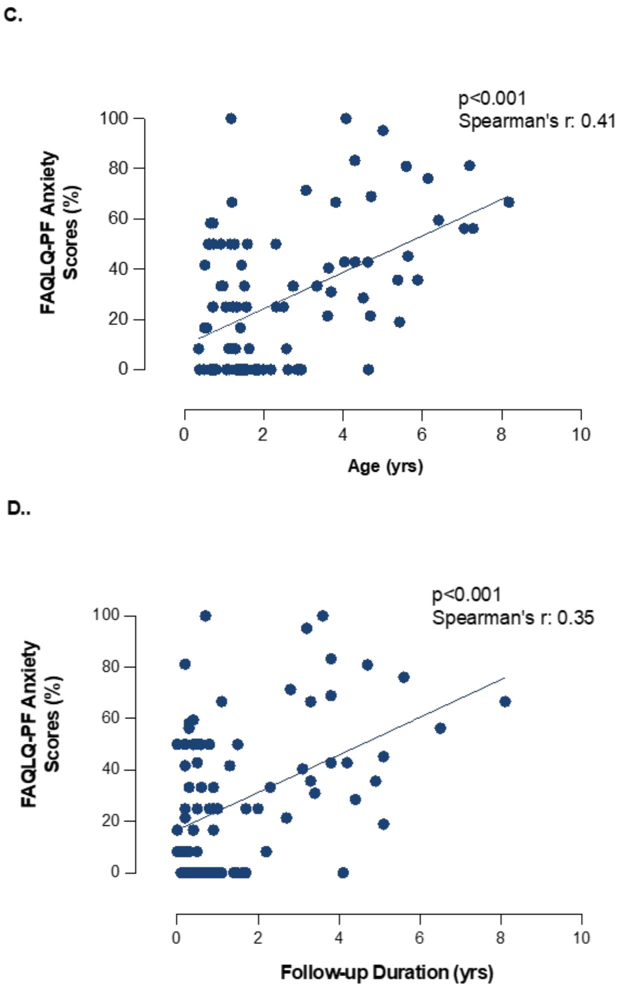


Figure 2. *Scatter plot images demonstrate a correlation between (A) total scores of FAQLQ-PF and (B) FAQLQ questionnaires and the age of patients; (C) anxiety subscale scores of FAQLQ-PF and the age; (D) anxiety subscale scores of FAQLQ-PF and follow-up duration of patients with food allergies.*

3.3. Correlation Analyses of HRQL, Treatment Satisfaction and Adherence Questionnaires' Scores

Patient age revealed a weak correlation between FAQLQ-PF (p=0.01, Spearman's r:0.25) (Figure 2A) and FAPQ total scores (p=0.02, Spearman's r:0.22) (Figure 2B), whereas a moderate correlation was found between FAQLQ-PF anxiety subscale scores (p<.001, Spearman's r:0.41) (Figure 2C). Additionally, the FAQLQ-PF anxiety subscale scores demonstrated a weak correlation between follow-up duration. (p<.001, Spearman's r:0.35) (Figure 2D). Furthermore, a weak correlation was identified between FAQLQ-PF social and dietary limitation subscale scores and the number of systems affected (p=0.024, Spearman's r:0.22).

There was a moderate correlation between the FAQLQ-PF and FAPQ total scores (p<.001, Spearman's r: 0.53). The TSQM total scores were weakly negatively correlated with FAQLQ-PF and FAPQ total scores (p=.006, Spearman's r:-0.27; p=.001, Spearman's r:-0.32, respectively). The scatter plots that depict the correlation among the questionnaire scores are presented in Figure 3A-C.

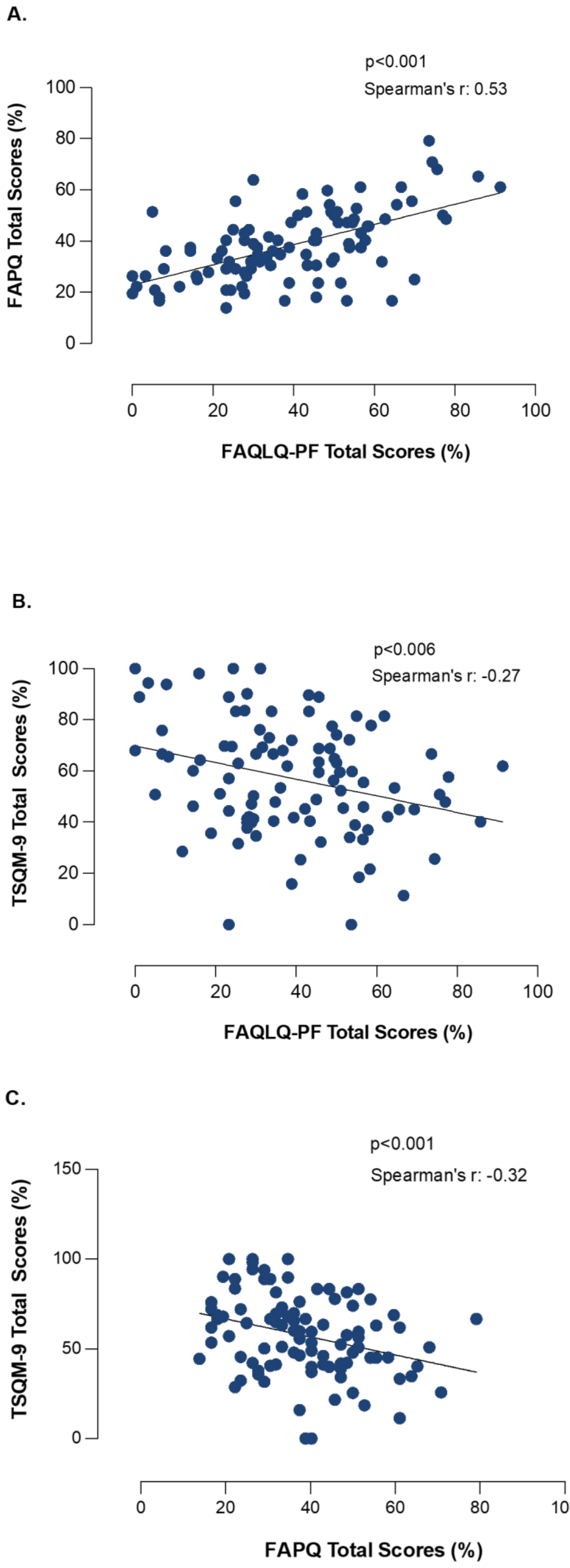


Figure 3. *Scatter plot images demonstrate correlation between total scores of; (A) FAQLQ-PF and FAPQ questionnaries, (B) FAQLQ and TSQM-9 questionnaries, (C) FAPQ and TSQM-9 questionnaries.*

4. DISCUSSION

The current investigation examined HRQL, adherence to allergen avoidance, and treatment satisfaction among a pediatric cohort of patients diagnosed with FA, who were referred to a tertiary care center for ongoing monitoring and management. The majority of patients exhibited a mixed-type FA phenotype starting earlier than 6 months, lasting more than 1 year and were characterized by AD, along with frequent multisystemic involvement. Notably, avoidance of egg and cow's milk was prevalent among patients, with only a small fraction achieving complete tolerance to these foods. The data obtained from our cohort are highly valuable in this respect, as the study encompasses a group of patients with severe FA who have been referred to an expert opinion for further follow-up and evaluated for the impact of allergen avoidance on HRQL, treatment satisfaction, and adherence. The clinical conditions that could influence these outcomes were also analyzed. Based on these data, a strategic plan for nutrition, education, and psychological counselling should be provided to children with FA and their families during follow-up.

In our study population, we found that children with multiple FA and those older than 5 years experienced a significant decline in their HRQL scores. In contrast, another study by Morou et al. demonstrated that the severity of the allergy and a history of anaphylaxis significantly influenced HRQL(21). Specifically, among the subdomains of HRQL, the emotional subdomain of the FAQLQ-PF was particularly impaired in mothers compared to fathers. As noted by Gupta et al., and Warren et al. managing a child's FA often leads to marital strain and emotional burden, particularly for mothers (22, 23). Walkner et al. and Springston et al. reported that FA leads to heightened parental vigilance and stress, affecting family dynamics and social interactions (24, 25). A systematic review by Cheon et al. emphasized the effectiveness of educational interventions in improving the HRQL of children with FA and their parents (26). Despite the heterogeneity and limited number of studies, the analysis highlighted that support and educational materials significantly contributed to better HRQL outcomes.

The anxiety subdomain of HRQL exhibited higher scores, indicating poorer outcomes for FA patients older than five years, those with a follow-up duration exceeding one year, and those with multisystemic involvement in our study group. Additionally, social and dietary limitations were found to be influenced by factors such as multiple FA, a history of anaphylaxis, and an inability to develop full tolerance to allergens. Consistent with our findings, Le Bovidge et al. and Shaker et al. also reported elevated parental anxiety and psychosocial impact in patients with FA (15, 27). Moreover, Shemesh et al. and Lieberman et al. found that children with FA often face bullying and social isolation, further exacerbating their stress and anxiety levels (28, 29). In such a condition, routine daily activities such as grocery shopping, meal preparation, and dining out, may pose significant limitations and additional emotional stress for parents. Tailored interventions addressing these factors individually for patients with FA and their families may lead to improvements in HRQL. Furthermore, examining specific subdomains of HRQL can guide physicians in providing targeted support to enhance their overall HRQL experience.

The participants in the present study illustrated that as the age and follow-up duration of patient with FA increased, their HRQL declined. Additionally, decreased HRQL correlated with impaired treatment satisfaction. As reported by other studies, a notable finding is the strong correlation between parental anxiety and children's QoL scores. Parents' perceptions of their children's allergy severity significantly influenced their anxiety levels and overall family QoL (22, 23). The Chinese FAQL-PB used by Leung et al. also supports the robustness of these findings across different cultures (30). It is apparent that enduring and severe food allergies adversely affect various aspects of HRQL, particularly exacerbating anxiety and imposing social and dietary restrictions. Over the course of follow-up for FA, it is essential to develop effective coping mechanisms and life skills to manage this chronic condition for both pediatric patients and their parents, and to incorporate these strategies into therapeutic approaches.

The literature on treatment satisfaction and adherence in FA management is relatively sparse, although these have recently been evaluated as outcomes in interventional research focused on tolerance development in FA (31). A meta-analysis by Cheon et al. highlighted that educational interventions have the potential to improve treatment adherence and satisfaction (26). Additionally, DunnGalvin et al. and LeBovidge et al. reported similar findings on psychosocial burden and the importance of support systems in improving treatment adherence (15, 32). Our study contributes significantly to this area by highlighting that treatment satisfaction is impaired in FA patients with multiple allergies and allergen avoidance and is promoted in those who are able to consume baked. allergens. Our study was constrained by the relatively small sample size of pediatric patients compared to the prevalence of FA in the general population. This limitation arises from our study population comprising referred severe or persistent food allergy patients from second – or third-level healthcare facilities, thereby restricting the generalizability of our data, which can be attributed to the strength of the current data to recommend the routine evaluation of the HRQL, treatment satisfaction, and adherence during follow-up in such FA patients to improve the tailored management strategies for each patient.

5. CONCLUSION

this study underlines the importance of integrating HRQL assessments, treatment adherence evaluations, and satisfaction surveys into comprehensive management strategies for FA, targeting both patients and parents. These outcomes and their subdomains are closely linked to clinical parameters associated with the severe and persistent phenotypes of FA.

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Author Contributions:

Research idea: EKA, APS, OG

Design of the study: EKA, APS, OG

Acquisition of data for the study: EKA, APS, OG, BU, MYA, EYG, RB, SBE, SB, AO

Analysis of data for the study: EKA, APS, MYA, EYG

Interpretation of data for the study: EKA, APS, MYA, EYG

Drafting the manuscript: EKA, APS

Revising it critically for important intellectual content: EKA, APS, SBE, SB, AO

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REFERANCES

[1] Antolin-Amerigo D, Manso L, Caminati M, de la Hoz Caballer B, Cerecedo I, Muriel A, Rodriguez-Rodriguez M, Barbarroja-Escudero J, Sanchez-Gonzalez MJ, Huertas-Barbudo B, Alvarez-Mon M. Quality of life in patients with food allergy. Clin Mol Allergy. https://doi.org/2016;14:4. 10.1186/s12948.016.0041-4.

[2] Sampath V, Abrams EM, Adlou B, Akdis C, Akdis M, Brough HA, Chan S, Chatchatee P, Chinthrajah RS, Cocco RR, Deschildre A, Eigenmann P, Galvan C, Gupta R, Hossny E, Koplin JJ, Lack G, Levin M, Shek LP, Makela M, Mendoza-Hernandez D, Muraro A, Papadopoulous NG, Pawankar R, Perrett KP, Roberts G, Sackesen C, Sampson H, Tang MLK, Togias A, Venter C, Warren CM, Wheatley LM, Wong GWK, Beyer K, Nadeau KC, Renz H. Food allergy across the globe. J Allergy Clin Immunol. 2021;148(6):1347-1364. https://doi.org/10.1016/j.jaci.2021.10.018.

[3] Warren CM, Turner PJ, Chinthrajah RS, Gupta RS. Advancing Food Allergy Through Epidemiology: Understanding and Addressing Disparities in Food Allergy Management and Outcomes. J Allergy Clin Immunol Pract. 2021;9(1):110-118. https://doi.org/10.1016/j.jaip.2020.09.064.

[4] Protudjer JL, Jansson SA, Ostblom E, Arnlind MH, Bengtsson U, Dahlen SE, Kallstrom-Bengtsson I, Marklund B, Middelveld RJ, Rentzos G, Sundqvist AC, Akerstrom J, Ahlstedt S. Health-related quality of life in children with objectively diagnosed staple food allergy assessed with a disease-specific questionnaire. Acta Paediatr. 2015;104(10):1047-1054. https://doi.org/10.1111/apa.13044.

[5] Allergy TNGoF. Turkish National Guadline of Food Allergy. Asthma Allergy Immunology. 2017;15.

[6] Aksoy AG, Boran P, Karakoc-Aydiner E, Gokcay G, Tamay ZU, Devecioglu E, Baris S, Ozen A. Prevalence of allergic disorders and risk factors associated with food allergy in Turkish preschoolers. Allergol Immunopathol (Madr). 2021;49(1):11-6. https://doi.org/10.15586/aei.v49i1.23.

[7] Cummings AJ, Knibb RC, King RM, Lucas JS. The psychosocial impact of food allergy and food hypersensitivity in children, adolescents and their families: a review. Allergy. 2010;65(8):933-945. https://doi.org/10.1111/j.1398-9995.2010.02342.x.

[8] Knibb R, Halsey M, James P, du Toit G, Young J. Psychological services for food allergy: The unmet need for patients and families in the United Kingdom. Clin Exp Allergy. 2019;49(11):1390-1394. https://doi.org/10.1111/cea.13488.

[9] Cummings AJ, Knibb RC, Erlewyn-Lajeunesse M, King RM, Roberts G, Lucas JS. Management of nut allergy influences quality of life and anxiety in children and their mothers. Pediatr Allergy Immunol. 2010;21(4 Pt 1):586-594. https://doi.org/10.1111/j.1399-3038.2009.00975.x.

[10] Avery NJ, King RM, Knight S, Hourihane JO. Assessment of quality of life in children with peanut allergy. Pediatr Allergy Immunol. 2003;14(5):378-382. https://doi.org/10.1034/j.1399-3038.2003.00072.x.

[11] Flokstra-de Blok BM, van der Velde JL, Vlieg-Boerstra BJ, Oude Elberink JN, DunnGalvin A, Hourihane JO, Duiverman EJ, Dubois AE. Health-related quality of life of food allergic patients measured with generic and disease-specific questionnaires. Allergy 2010;65(8):1031-1038. https://doi.org/10.1111/j.1398-9995.2009.02304.x.

[12] Primeau MN, Kagan R, Joseph L, Lim H, Dufresne C, Duffy C, Prhcal D, Clarke A. The psychological burden of peanut allergy as perceived by adults with peanut allergy and the parents of peanut-allergic children. Clin Exp Allergy 2000;30(8):1135-1143. https://doi.org/10.1046/j.1365-2222.2000.00889.x.

[13] Santos AF, Riggioni C, Agache I, Akdis CA, Akdis M, Alvarez-Perea A, Alvaro-Lozano M, Ballmer-Weber B, Barni S, Beyer K, Bindslev-Jensen C, Brough HA, Buyuktiryaki B, Chu D, Del Giacco S, Dunn-Galvin A, Eberlein B, Ebisawa M, Eigenmann P, Eiwegger T, Feeney M, Fernandez-Rivas M, Fisher HR, Fleischer DM, Giovannini M, Gray C, Hoffmann-Sommergruber K, Halken S, Hourihane JO, Jones CJ, Jutel M, Knol E, Konstantinou GN, Lack G, Lau S, Marques Mejias A, Marchisotto MJ, Meyer R, Mortz CG, Moya B, Muraro A, Nilsson C, Lopes de Oliveira LC, O'Mahony L, Papadopoulos NG, Perrett K, Peters RL, Podesta M, Poulsen LK, Roberts G, Sampson HA, Schwarze J, Smith P, Tham EH, Untersmayr E, Van Ree R, Venter C, Vickery BP, Vlieg-Boerstra B, Werfel T, Worm M, Du Toit G, Skypala I. EAACI guidelines on the diagnosis of IgE-mediated food allergy. Allergy 2023;78(12):3057-3076. https://doi.org/10.1111/all.15902.

[14] DunnGalvin A, de BlokFlokstra BM, Burks AW, Dubois AE, Hourihane JO. Food allergy QoL questionnaire for children aged 0-12 years: content, construct, and cross-cultural validity. Clin Exp Allergy 2008;38(6):977-986. https://doi.org/10.1111/j.1365-2222.2008.02978.x.

[15] Lebovidge JS, Stone KD, Twarog FJ, Raiselis SW, Kalish LA, Bailey EP, Schneider LC. Development of a preliminary questionnaire to assess parental response to children's food allergies. Ann Allergy Asthma Immunol. 2006;96(3):472-477. https://doi.org/10.1016/S1081-1206(10)60916-7.

[16] Atkinson MJ, Sinha A, Hass SL, Colman SS, Kumar RN, Brod M, Rowland CR. Validation of a general measure of treatment satisfaction, the Treatment Satisfaction Questionnaire for Medication (TSQM), using a national panel study of chronic disease. Health Qual Life Outcomes 2004;2:12. https://doi.org/10.1186/1477-7525-2-12.

[17] Atkinson MJ, Kumar R, Cappelleri JC, Hass SL. Hierarchical construct validity of the treatment satisfaction questionnaire for medication (TSQM version II) among outpatient pharmacy consumers. Value Health 2005;8 Suppl 1:S9-S24. https://doi.org/10.1111/j.1524-4733.2005.00066.x.

[18] Eltan SB, Keskin O, Deveci MF. Safety, efficiency, and treatment satisfaction in children with primary immunodeficiency receiving subcutaneous immunoglobulin treatment. North Clin Istanb. 2022;9(3):228-34. https://doi.org/10.14744/nci.2020.16870.

[19] Kaplan MD, Kasnakoüğlu BT, Yigitbasi T, Kaplan YC. Evaluation of satisfaction with over-the-counter weight loss supplements. Journal of Medical Marketing: Device, Diagnostic and Pharmaceutical Marketing. 2013;13(2):68-73. https://doi.org/10.1177/174.579.0413480521.

[20] Bekir Vural ÖrTA, Pınar Topsever, Müge Filiz. Reliability And Validity of Turkish Version of Modified Morisky Scale. Turkish Family Physician. 2012;3/4.

[21] Morou Z, Vassilopoulou E, Galanis P, Tatsioni A, Papadopoulos NG, Dimoliatis IDK. Investigation of quality of life determinants in children with food allergies. Int Arch Allergy Immunol. 2021;182(11):1058-1065. https://doi.org/10.1159/000516875.

[22] Gupta RS, Warren CM, Smith BM, Blumenstock JA, Jiang J, Davis MM, Nadeau KC. The public health ımpact of parent-reported childhood food allergies in the United States. Pediatrics 2018;142(6):e201811235. https://doi.org/10.1542/peds.2018-1235.

[23] Warren CM, Gupta RS, Sohn MW, Oh EH, Lal N, Garfield CF, Caruso D, Wang X, Pongracic JA. Differences in empowerment and quality of life among parents of children with food allergy. Ann Allergy Asthma Immunol. 2015;114(2):117-125. https://doi.org/10.1016/j.anai.2014.10.025.

[24] Springston EE, Smith B, Shulruff J, Pongracic J, Holl J, Gupta RS. Variations in quality of life among caregivers of food allergic children. Ann Allergy Asthma Immunol. 2010;105(4):287-294. https://doi.org/10.1016/j.anai.2010.08.003.

[25] Walkner M, Warren C, Gupta RS. Quality of life in food allergy patients and their families. Pediatr Clin North Am. 2015;62(6):1453-1461. https://doi.org/10.1016/j.pcl.2015.07.003.

[26] Cheon J, Cho CM, Kim HJ, Kim DH. Effectiveness of educational interventions for quality of life of parents and children with food allergy: A systematic review. Medicine (Baltimore). 2022;101(36):e30404. https://doi.org/10.1097/MD.000.000.0000030404.

[27] Shaker MS, Schwartz J, Ferguson M. An update on the impact of food allergy on anxiety and quality of life. Curr Opin Pediatr. 2017;29(4):497-502. https://doi.org/10.1097/MOP.000.000.0000000509.

[28] Shemesh E, Annunziato RA, Ambrose MA, Ravid NL, Mullarkey C, Rubes M, Chuang K, Sicherer M, Sicherer SH. Child and parental reports of bullying in a consecutive sample of children with food allergy. Pediatrics. 2013;131(1):e10-7. https://doi.org/10.1542/peds.2012-1180.

[29] Lieberman JA, Weiss C, Furlong TJ, Sicherer M, Sicherer SH. Bullying among pediatric patients with food allergy. Ann Allergy Asthma Immunol. 2010;105(4):282-286. https://doi.org/10.1016/j.anai.2010.07.011.

[30] Leung TF, Yung E, Wong YS, Lam CW, Wong GW. Parent-reported adverse food reactions in Hong Kong Chinese pre-schoolers: epidemiology, clinical spectrum and risk factors. Pediatr Allergy Immunol. 2009;20(4):339-346. https://doi.org/10.1111/j.1399-3038.2008.00801.x.

[31] Demidova A, Drewitz KP, Kimkool P, Banjanin N, Barzylovich V, Botjes E, Capper I, Castor MAR, Comberiati P, Cook EE, Costa J, Chu DK, Epstein MM, Galvin AD, Giovannini M, Girard F, Golding MA, Greenhawt M, Ierodiakonou D, Jones CJ, Khaleva E, Knibb RC, Macit-Celebi MS, Mack DP, Mafra I, Marchisotto MJ, Mijakoski D, Nekliudov N, Ozdemir C, Patel N, Pazukhina E, Protudjer JLP, Rodriguez Del Rio P, Roomet J, Sammut P, Schoos AM, Schopfer AF, Schultz F, Seylanova N, Skypala I, Sorensen M, Stoleski S, Stylianou E, Upton J, van de Veen W, Genuneit J, Boyle RJ, Apfelbacher C, Munblit D, Consortium C. Core Outcome Set for IgE-mediated food allergy clinical trials and observational studies of interventions: International Delphi consensus study 'COMFA'. Allergy. 2024;79(4):977-989. https://doi.org/10.1111/all.16023.

[32] DunnGalvin A, Treneva M, Pampura A, Grebenko A, Makatsori M, Munblit D. Quality of life associated with maternal anxiety disorder in Russian children and adolescents with food allergy. Pediatr Allergy Immunol. 2020;31(1):78-84. https://doi.org/10.1111/pai.13130.

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