

ORIGINAL ARTICLE

Maternal anxiety and internet-based food elimination in suspected food allergy

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Abstract

Background: Food allergy is associated with stress, anxiety, and impairment in quality of life in both children and families. This study aimed to assess the anxiety of mothers in the case of suspected food allergy in their children and the influence of Internet usage on their levels of anxiety and food elimination.

Methods: Ninety-two patients aged 0-2 years presented at a pediatric allergy department following either a physicians' presumptive diagnosis or family's suspicion of food allergy (Group 1) and 99 healthy controls (Group 2) were evaluated. The clinical diagnosis of food allergy was confirmed or excluded by oral food challenge (OFC). The validated Turkish version of Spielberger State-Trait Anxiety Inventory (STAI) was applied to the mothers of both groups on admission and to Group 1 3 months after OFC.

Results: The state and trait anxiety (STAI-S and STAI-T) scores were significantly higher in Group 1 than Group 2 ($P < 0.001$, $z = 5.410$, and $P = 0.021$, $z = 2.304$, respectively). Seventy-nine mothers (85.9%) had been eliminating foods on admission. Thirty-seven (40.2%) mothers had eliminated foods on their own. The performance of food allergy-related Web searches was significantly higher among mothers who eliminated foods by themselves than those who did not ($P = 0.004$, $\chi^2 = 8.391$, $df = 1$). The second STAI-S score was significantly lower among mothers whose children's food allergy diagnosis was excluded than confirmed (effect size = 1.06 (95% CI: 0.56-1.57), $P = 0.001$, $z = 3.442$).

Conclusion: It is important to make a correct food allergy diagnosis with a detailed allergy work-up, including OFC, to avoid anxiety and not cause unnecessary food elimination.

KEYWORDS

anxiety, food allergy, internet

1 | INTRODUCTION

Food allergy is a growing problem with a prevalence increasing up to 10% in some highly industrialized countries.¹⁻⁸ At present, there

is no cure for food allergy, and treatment involves a strict avoidance of the food and appropriate treatment of symptoms resulting from accidental exposure. Food allergy is related to high levels of stress, anxiety, and impairment in health-related quality of life (HRQL) both in children and in their parents as a result of the dietary and lifestyle changes required.^{9,10} Parents of children with food allergy have poorer mental health compared to healthy controls, irrespective of

Abbreviations: HRQL, health-related quality of life; OFC, oral food challenge; OFCs, oral food challenges; sIgE, specific immunoglobulin E; SPT, skin prick test; STAI-S, State Anxiety Inventory; STAI-T, Trait Anxiety Inventory.

whether the allergy is diagnosed medically or by the parent(s).¹¹ Not only proven food allergy but also suspicion of food allergy is associated with high levels of anxiety and depression.¹²

Usage of the Internet as a source of medical information has become a common practice. It has been estimated that 80% of Americans use the Internet to access medical information,¹³ which can result in either relief¹⁴ or fear and heightened arousal.¹⁵ Repeated Internet searches for medical information result in excessive concerns about physical health, a clinical phenomenon dubbed "cyberchondria."^{16,17} Internet addiction is also associated with depression, anxiety, and HRQL impairment.^{17,18} The effect of Internet usage on anxiety related to allergic diseases has not been investigated.

In our study, we aimed to evaluate maternal anxiety in cases of food allergy suspicion and examine the relationship between Internet usage on maternal levels of anxiety and food elimination.

2 | METHODS

2.1 | Study design and participants

The study was carried out at Trakya University Pediatric Allergy and Immunology Department between November 2016 and November 2017. Ninety-two patients aged between 0 and 2 years visiting the allergy clinic for the first time, either following a physicians' (pediatrician/dermatologist) presumptive diagnosis or upon the family's suspicion of food allergy, were included in the study (Group 1). Ninety-nine healthy children aged between 0 and 2 years who had applied to general practitioners for a routine physical examination or vaccination were included as a control group (Group 2).

All the mothers (Groups 1 and 2) completed a study-related questionnaire form and the validated Turkish version of Spielberger State-Trait Anxiety Inventory (STAI) on admission (Time 1). 3 months after a complete allergy evaluation, patients were recalled to the hospital and the STAI re-applied (Time 2). Fifty-eight patients completed the second evaluation.

Ethical approval was obtained from the local ethical committee, and written informed consents were given by all participants and controls.

2.2 | Study-related questionnaire

The mothers of the patients were required to complete a study-related questionnaire for demographic information, symptoms of food allergy, the foods mothers or physicians suspected the child was allergic to, foods they had eliminated, by whom they had been referred, the length of time from onset of symptoms to admission to our department, their information source about the food allergy (doctor, family, books/magazine, TV or Internet), and the time spent on food allergy-related searches during the last four weeks before admission.

2.3 | State-trait anxiety inventory

The validated Turkish version of the Spielberger State-Trait Anxiety Inventory (STAI) was used to access the anxiety of mothers.¹⁹ The

Key Message

Food allergy is a growing problem all around the world and food allergy diagnosis is associated with anxiety, stress, and impairment in health-related quality of life. Using internet as a source of medical information has become a common practice in recent years. To the best of our knowledge, the effect of internet usage on allergic disease-related anxiety has not been investigated. Food allergy suspicion is related to unnecessary food elimination and internet usage is one of the factors responsible for that. We believe our study is important to emphasize the importance of correct food allergy diagnosis not to cause anxiety and unnecessary food elimination.

STAI is a Likert-type scale with two parts measuring the anxiety at a point in time (state STAI or STAI-S) and overall anxiety (trait STAI or STAI-T). The state anxiety statements indicate how people feel at that time (eg, "I'm worried" or "I'm tense"). The trait anxiety statements indicate general feelings (eg, "I generally worry too much about things that don't really matter" or "I wish I could be as happy as others seem to be"). There are 20 statements in each part, and the scores range between 20 and 80, with higher scores indicating higher anxiety levels. The internal reliability for Turkish version of the Spielberger STAI was reported as 0.94-0.96 for STAI-S and 0.83-0.87 for STAI-T.¹⁹ The scale also demonstrated good internal consistency and reliability in our sample (Cronbach's alpha 0.92 for STAI-S and 0.83 for STAI-T).

2.4 | Evaluation of food allergy

All patients were evaluated with a detailed history of food allergy and feeding properties (breastfeeding, formula feeding, time of weaning). A skin prick test (SPT) with food allergens was performed on 69 (75%) patients. A definite food allergy diagnosis was made based on an oral food challenge (OFC), the gold standard method used for both IgE- and non-IgE-mediated food allergy.²⁰ One patient with a clear history of anaphylaxis was also included in the food allergy group following a positive SPT (ie, without OFC).

2.5 | Statistical analysis

The software package SPSS, version 20.0, was used for statistical analysis. Numerical variables were shown using mean $\pm$ standard deviation, while median (min-max) and categorical variables were shown using numbers and percentages. The normality distribution of numerical variables was evaluated using the one-sample Kolmogorov-Smirnov test. Categorical data of the patient and control groups were compared using the chi-square test (χ^2). The Student *t* test was used for comparison of normally distributed numeric variables, and the Mann-Whitney *U* test was used for comparison of non-normal distributed numerical variables between the groups. A paired Student's *t* test was used to compare the measurements at

the two STAI score time points (Times 1 and 2). The Spearman correlation analysis was used to investigate the associations between non-normally distributed and ordinal variables. All analyses were two-tailed, and $P < 0.05$ was considered statistically significant. A change in STAI scores over time (between the clinical visit at Time 1 and Time 2) was defined as "STAI-Alteration score." A post hoc power analysis was applied based on the STAI-S alteration score, and the power of the study was calculated as 99.5%, with an alpha level of 5% and effect size of 0.661.

3 | RESULTS

3.1 | Patients

The study group comprised 92 patients (Group 1) and 99 healthy controls (Group 2). Eighty-two (89%) of the patients had been referred by a pediatrician and six (7%) by a dermatologist. Four (4%) were admitted due to the mother's suspicion of food allergy. Median time from the onset of symptoms to admission was 3.5 months (min-max: 1 day-23 months). Seventy-nine mothers (85.9%) were already eliminating one or more foods from their children's and/or their own diets on admission. The breastfeeding mothers had eliminated foods from both their children's and their own diets, while suspected foods were eliminated from the children's diets only where they were formula-fed. The clinical characteristics, nutritional status, and food elimination properties of the patients and sources of food allergy-related information are shown in Table 1.

3.2 | Evaluation of the patients for food allergy

The SPTs showed food sensitization in 19 (27.5%) of the 69 (Group 1) patients checked. A total of 83 OFCs were performed on 70 patients for suspected foods (cow's milk, egg, fish). Based on the OFCs and including the patient with a severe anaphylactic reaction and positive SPT, a diagnosis of food allergy was made for a total of 28 (40%) patients (Figure 1).

3.3 | Anxiety scores

There were no significant differences in terms of age of child or mother, sex, maternal educational status, or monthly income of the family between the patient and control groups (Groups 1 and 2) (Table 2). Both the STAI-S and STAI-T scores were significantly higher in Group 1 than Group 2 ($P < 0.001$, $z = 5.410$, and $P = 0.021$, $z = 2.304$, respectively) (Table 3). From the univariate analysis, no correlation was found between maternal anxiety (both state and trait) and any of the following: maternal age, years of maternal education, number of children, child's age on admission and at symptom onset, time period prior to admission, time spent searching food allergy-related information on the Internet, or number of foods eliminated. We also found no association between maternal anxiety and symptoms (eczema, proctocolitis, urticaria/angioedema,

TABLE 1 Characteristics of the patients

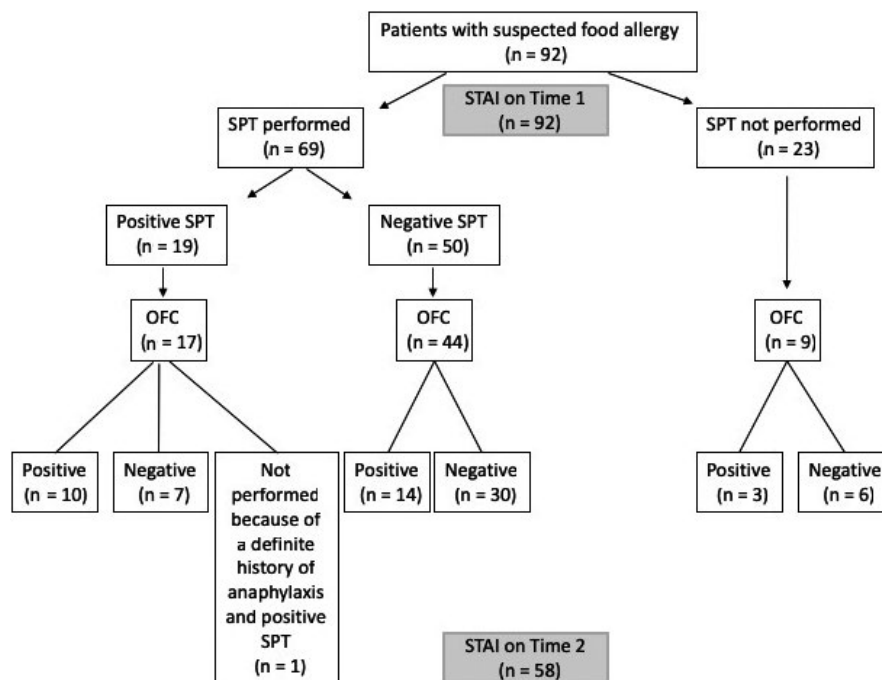
	Total (n = 92)
Median age on admission(mo) (minimum-maximum)	7 (1.5-24)
Median age on symptom onset (mo) (minimum-maximum)	3.1 (0.1-14)
Sex	
Female	44 (47.8%)
Male	48 (52.2%)
Parental atopy ^a	5 (5.2%)
Symptom	
Eczema	41 (44.6%)
Proctocolitis	16 (17.4%)
Eczema+proctocolitis	16 (17.4%)
Urticaria-Angioedema	7 (7.6%)
Anaphylaxis	6 (6.5%)
Other	6 (6.5%)
Infant feeding characteristics on admission	
Completely breastfeeding	19 (20.7%)
Formula feeding	7 (7.6%)
Breastfeeding + formula	5 (5.4%)
Breastfeeding + complementary foods	41 (44.6%)
Formula + complementary foods	8 (8.7%)
Breastfeeding + formula + complementary foods	8 (8.7%)
Complementary foods	4 (4.3%)
Food elimination	
Food elimination by physician	42 (45.7%)
Food elimination by mother	15 (16.3%)
Food elimination by physician + mother	22 (23.9%)
None	13 (14.1%)
Multiple food elimination ^c	42 (45.6%)
Multiple food elimination by physician ^b	5 (5.4%)
Multiple food elimination only by mother	37 (40.2%)
Source of food allergy-related information	
Internet	77 (83.7%)
Family/friend	1 (1.1%)
None	14 (15.2%)

^aAsthma/Allergic rhinitis/Atopic dermatitis/Food allergy in mother/father.

^bPediatrician/dermatologist.

^cFoods are grouped as dairy products, egg, meat, fish, vegetables, fruits, and cereals. "Multiple food eliminations" is determined as eliminating more than 1 food group.

and anaphylaxis), family food allergy history, individual taking food elimination decision (physician or mother), multiple food elimination, or food allergy-related Web search (Table 4). We did not find any correlation between the state or trait anxiety scores and the number of foods eliminated by mothers (respectively, $P = 0.511$, 0.326 , and $r = 0.069$, 0.104).

FIGURE 1 Food allergy evaluation of the patients

Regarding the second STAI (3 months after the whole allergy work-up including OFC), the maternal STAI-S score was significantly lower for those whose children had tested negative in the OFC (so were not considered food allergic) than those who had tested positive (effect size = 1.06 (95% CI: 0.56-1.57), $P = 0.001$, $z = 3.442$). The mean decrease in the STAI-S score among the positive OFC group was 8.9 ± 22 , while for the negative OFC group, it was 25.7 ± 25.4 , making the STAI-S score reduction of the negative group significantly higher (effect size = 0.69 (95% CI: 0.20-1.18), $P = 0.009$, $z = 2.623$) (Table 5).

3.4 | Food allergy-related Web search

Seventy-seven (83.7%) of the Group 1 mothers had performed a food allergy-related Web search, the median time for this being 7 hours/week (min-max: 0.5-70 hours/week) prior to admittance (Time 1). Food allergy-related Web searches were performed by 36 of the 37 mothers (97.2%) who had eliminated food by themselves and 41 of the 55 (74.5%) who had not. While the proportion of food allergy-related Web searches among mothers who eliminated foods by themselves was significantly higher than those who did not ($P = 0.004$, $\chi^2 = 8.391$, $df = 1$), there was no difference between these two groups in the median time spent on the Internet search, which was 10 hours/week (min-max: 1-49 hours/week) in the mothers who eliminated foods by themselves and 7 hours/week (min-max: 0.5-70 hours/week) in the latter ones ($P = 0.239$, $z = 1.777$). No correlation was found between the time spent on the Internet and the state or trait anxiety scores at Time 1 ($P = 0.313$, 0.915 , and $r = 0.116$, -0.012 , respectively).

Following the allergy diagnosis clarification (at Time 2), the number of mothers performing food allergy-related Web searches decreased to 24 (41.4%), with a median time of 5.0 hours/week (min-max: 0.5-84 hours/week). Eight of the 23 mothers (34.8%) of children with a confirmed food allergy diagnosis continued their food allergy-related Web searches, with a median time of 7.0 hours/week (min-max: 2-28 hours/week), while 16 of 35 (45.7%) mothers whose children were deemed non-food allergic continued the searches, with a median time of 2.0 hours/week (min-max: 0.5-84 hours/week). We did not find a difference between the mothers in the food allergy-confirmed and food allergy-excluded groups in terms of the numbers of them performing food allergy-related Web searches and the time spent on the Internet ($P = 0.408$, $\chi^2 = 0.684$, $df = 1$, and $P = 0.122$, $z = 1.545$, respectively).

4 | DISCUSSION

Food allergy diagnosis has a negative impact on both children's and their parents' lives. The parents of children with a food allergy experience emotional stress and limitations on their daily activities.⁹ Even after being informed by healthcare professionals, parents report feeling insecure about their knowledge and their ability to cope with risky situations, such as anaphylaxis.²¹

The present study is the first to investigate the anxiety of Turkish mothers in cases of suspected food allergy in their children and the influence of Internet usage on their levels of anxiety and food elimination.

Food allergy suspicion was clearly found to be associated with maternal state and trait anxiety here. The state anxiety reflects the

	Patient (n = 92)	Control (n = 99)	Test statistics	P
Age of children (mo) ^a	7 (1.5-24)	8 (0.5-24)	$z = 0.266$	0.790
Female/Male	44/48	52/47	$\chi^2 = 0.456$, $df = 1$	0.500
Age of mothers (ys) ^b	29 ± 4.4	30 ± 4.4	$t = 0.516$	0.607
Maternal education				
Primary school (6-14 ys of age)	15 (16.3%)	17 (17.2%)	$\chi^2 = 0.043$, $df = 2$	0.979
High school (15-18 ys of age)	28 (30.4%)	29 (29.3%)		
University	49 (53.3%)	53 (53.5%)		
Monthly income of the family ^c				
Low	12 (13%)	16 (16.1%)	$\chi^2 = 1.127$, $df = 2$	0.569
Medium	44 (47.8%)	40 (40.4%)		
High	36 (39.2%)	43 (43.5%)		

^aMedian (minimum-maximum).

^bMean ± standard deviation.

^cLow income < 1500 Turkish lira, medium income = 1500-4500 Turkish lira, and high income > 4500 Turkish lira.

TABLE 2 Demographic characteristics and anxiety scores of patient and control groups

	Patient (n = 92)	Control (n = 99)	Effect size (95% Confidence interval)	z	P
STAI-S score Time 1	41.5 ± 9.8	33.6 ± 9.1	0.83 (0.54-1.13)	5.410	<0.001
STAI-T score Time 1	42 ± 7.1	38.8 ± 8.2	0.42 (0.13-0.70)	2.304	0.021

TABLE 3 Mean state and trait anxiety scores of patient and control groups: time 1

mothers' anxiety at the time they came for food allergy evaluation. As trait anxiety reflects the overall anxiety of a person and is related to personality type, we can speculate that more anxious mothers tend to be more suspicious that their children have a food allergy. We showed that the state anxiety of mothers decreased upon testing (between Times 1 and 2) in both food allergy-confirmed and food allergy-excluded groups, although this reduction was significantly smaller for the former. Knibb et al reported no significant differences in anxiety scores of parents suspecting food allergy before and after clinic visits. They performed the second anxiety scale 4-6 weeks after the allergy workup, and they did not perform OFC.¹² As found in our study, Kajornrattana et al also reported that parent-reported food allergy is associated with high parental stress and that OFC reduces this.²² Zijlstra et al reported a reduction of state anxiety after OFCs regardless of positive or negative outcome.²³ Here, we also found significant relief among mothers even when the allergy diagnosis was confirmed.

Forty percent of the mothers in our study had eliminated at least one food by themselves (ie, independently of physicians' suggestions). Pyrhonen et al found that 26% of children with parent-perceived food hypersensitivity were on elimination diets.²⁴ Knibb et al found that 67% of parents suspecting food allergy removed foods from their children's diet and that the experience of the parents and thus knowledge gained about their children's food allergy were correlated with dietary changes.¹² Most of these mothers were found to have gained information from the Internet, as here, but the influence of the Internet on maternal anxiety was not investigated.

Investigating that relationship in this study, we did not find a correlation between maternal anxiety scores and time spent on the Internet; but food allergy-related Web searches were found to be significantly higher among mothers who eliminated foods by themselves; and the number of mothers using the Internet reduced by half after the OFCs, in both the OFC-positive and OFC-negative groups.

With developing technology, increasing Internet usage, and the proliferation of Web sites along with other Internet communication routes (blogs, forums, etc), an ever-increasing number of people have easy access to health-related information. The Internet has taken the place of traditional sources used for health information, such as the immediate social environment, mass media, and health-care providers.²⁵ Some Web sites are designed unprofessionally and lack correct information; these and other forms of Internet communication can mislead parents with inaccurate and/or inappropriate information. Cuervo-Pardo et al²⁶ reported finding 701 apps related to food allergy, such as tool apps (food scanners, food diaries, symptom trackers), information apps, or both. Tool apps were the most common type with only six apps containing food allergy education material, and none enabled the creation of a personalized food allergy action plan. They remarked that most of the available apps were an insufficient source of information for patients. Conversely, however, some (eg, university- or government-related) sources contain well-presented, useful, scientifically based information. Both accurate and inaccurate information may increase or decrease anxiety. Thus, from among the possible combinations, information derived from the Internet may increase parents' self-confidence about

TABLE 4 Univariate analysis of selected variables in relation to maternal anxiety

STAI-S			P	STAI-T		P
Maternal age	$r = 0.079$		0.452		$r = -0.015$	0.885
Years of education	$r = -0.008$		0.936		$r = 0.078$	0.460
Number of children	$r = 0.134$		0.204		$r = -0.170$	0.876
Child age on admission	$r = 0.005$		0.960		$r = -0.038$	0.720
Child age on symptom onset	$r = 0.035$		0.739		$r = 0.099$	0.350
Time between the onset of symptoms and admission to our department	$r = 0.017$		0.873		$r = -0.004$	0.972
Time spent on Internet (h/wk)	$r = 0.116$		0.313		$r = -0.012$	0.915
Number of eliminated foods	$r = 0.069$		0.511		$r = 0.104$	0.326
Food allergy in the family						
Yes (n = 20)	39.8 ± 11.6	$z = 0.777$	0.437	40.8 ± 5.7	$z = 0.517$	0.605
No (n = 72)	42 ± 9.3			42.4 ± 7.4		
Eczema						
Yes (n = 57)	41.7 ± 10	$z = 0.004$	0.997	42.5 ± 7.1	$z = 0.745$	0.456
No (n = 35)	41.2 ± 9.6			41.3 ± 7.1		
Proctocolitis						
Yes (n = 32)	42 ± 10.2	$z = 0.431$	0.667	41.9 ± 6.5	$z = 0.127$	0.899
No (n = 60)	41.2 ± 9.7			42.1 ± 7.5		
Urticaria/angioedema						
Yes (n = 7)	37.8 ± 13	$z = 0.257$	0.257	42.8 ± 5	$z = 0.404$	0.404
No (n = 85)	41.8 ± 9.5			42 ± 7.3		
Anaphylaxis						
Yes (n = 6)	39.8 ± 5.4	$z = 0.483$	0.629	40.3 ± 4.7	$z = 0.658$	0.511
No (n = 86)	41.6 ± 10.1			42.2 ± 7.2		
Food elimination by						
Physician (n = 42)	41.5 ± 10.5	$z = 0.526$	0.599	41.1 ± 6.8	$z = 0.672$	0.501
Mother (n = 15)	42.9 ± 11.1			43.5 ± 8.1		
Multiple food elimination						
Yes (n = 42)	42.1 ± 9.8	$z = 0.639$	0.523	43.1 ± 7.9	$z = 0.880$	0.379
No (n = 50)	41 ± 9.8			41.2 ± 6.3		
Food allergy-related Web search before admission						
Yes (n = 77)	41.6 ± 9.7	$z = 0.444$	0.657	42.3 ± 7.5	$z = 0.514$	0.607
No (n = 15)	40.8 ± 10.7			40.8 ± 4.8		

Note: Data are presented as mean ± standard deviation or as a correlation coefficient. Differences between groups were compared using Mann-Whitney U test.

Abbreviations: r, Spearman's rank correlation coefficient; STAI, State-Trait Anxiety Inventory.

their suspicions of food allergy and so reduce anxiety, as found by Lemiere et al¹⁴ We cannot conclude that from the data gained here, however as there are several limitations to our study. The Internet usage was not assessed with a standardized, validated questionnaire (eg, with an Internet Addiction or Cyberchondria Severity Scale). We also did not investigate the type of Internet source (Web site, social

media, apps, etc) and the food allergy-related information featured. It would also be useful to evaluate the impact of the Internet on maternal lifestyle changes and food elimination attitudes.

Families on strict elimination diets at their first admission for a suspected food allergy are frequently encountered in pediatric allergy clinics. For unclear symptoms, such as discomfort, colic

TABLE 5 Mean anxiety scores of the mothers before and after confirmed/excluded food allergy diagnosis by oral food challenges

Spielberger state-trait anxiety inventory (STAI)	Food allergy (+)	Food allergy (–)	Effect size (95% confidence interval)	z	P
STAI-1 (Time 1)	(n = 28)	(n = 43)			
State	40.8 ± 10.8	41.9 ± 9.3	–0.11 (–0.59–0.37)	0.453	0.650
Trait	42.2 ± 6.2	42.5 ± 7.2	–0.04 (–0.52–0.43)	0.000	1.000
STAI-2 (Time 2)	(n = 23)	(n = 35)			
State	37.9 ± 10.5	28.5 ± 7.4	1.06 (0.56–1.57)	3.442	0.001
Trait	37.9 ± 5.1	35.8 ± 8.5	0.29 (–0.19–0.77)	1.457	0.140
	(n = 23)	(n = 35)			
STAI-Alteration*					
State	–8.9 ± 22	–25.7 ± 25.4	0.69 (0.20–1.18)	2.623	0.009
Trait	–7.7 ± 16.6	–14.9 ± 19	0.39 (–0.09–0.87)	1.804	0.070

Abbreviation: STAI, State-Trait Anxiety Inventory.

*Change in STAI scores over time (between the clinical visits on Time 1 and Time 2).

pain, or discoloration of the stool, mothers can eliminate a large number of foods from their own and/or from their children's diet, and it can sometimes be difficult to convince these mothers that there is no food allergy. Most of the patients in the present study were first seen and directed to our department by pediatricians. They were not thoroughly evaluated, and OFC had not been performed in any of them. After an allergy work-up, including OFCs, we excluded food allergy diagnosis in 60% of the patients. We also showed a significant decrease in maternal anxiety after a negative OFC. Manifestly, it is important to make a correct food allergy diagnosis not to cause anxiety in parents and nutritional deficiencies in their children. Accurate diagnosis is particularly important since food allergy is observed mostly in infancy, a period that is vital for growth and development.

We found that almost ninety percent of the mothers in the OFC-negative group had been unnecessarily eliminating foods from their and/or their child's diet, with 10% eliminating multiple foods. The unfortunate impact of this can be gauged from the fact that children with multiple food allergies have a higher risk of impaired growth and may have a higher risk of inadequate nutrient intake when compared to children without food allergies.^{27,28} Although it was not the aim of this study to evaluate nutritional status, unnecessary food elimination is clearly an important issue in this context.

In conclusion, food allergy suspicion clearly causes anxiety in mothers and a proper clinical diagnosis reduces anxiety. Internet-based medical information is increasingly used by patients and families. Patient education can be beneficial to empower individuals to engage in self-management and to achieve better outcomes. However, the quality of information found online varies greatly and can be incorrectly interpreted by consumers.²⁶ Healthcare providers should be aware that the Internet, as an active tool, can lead to patient anxiety and unnecessary food elimination. It is thus important to encourage open communication and to direct patients and families to more evidence-based information sources along with the clarification of food allergy diagnosis.

CONFLICT OF INTEREST

The authors have no conflict of interest related to the manuscript.

AUTHOR CONTRIBUTIONS

BB and MY designed the study and wrote the manuscript. BB, VC, PGO, and IG contributed to data collection. NS performed the statistical analyses. All authors read, corrected, and approved the final manuscript.

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