

Characteristics of patients with food-related complaints

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Forty-five patients with classic food-allergic symptoms and/or subjective food-related complaints not traditionally associated with food allergy underwent evaluation. On the basis of a comprehensive clinical history, skin testing, and placebo-controlled, double-blind food challenges, patients were assigned to one of two groups: patients with reactions highly suggestive of IgE-mediated food hypersensitivity (group A, N = 22) and patients with atypical adverse food reactions that could not be confirmed by double-blind food challenge (group B, N = 23). Most patients in both groups were female, 77.3% and 91.3% of patients in group A and B, respectively. In group B, onset of symptoms occurred at an older age than in group A, 28.9 years $\pm$ 17.2 versus 17.1 $\pm$ 12.1 ($p = 0.0015$), respectively, and involved more foods, 25.6 $\pm$ 22.1 versus 5.2 $\pm$ 5.5 ($p = 0.0002$). Foods causing most prominent symptoms among patients in group A included legumes, tree nuts, crustaceans, and fish. In group B, milk, white sugar, wheat, egg, smoked/cured meat, and yeast were among the most troublesome foods. All but one patient in group A gave a positive skin test response to food; only four patients in group B had a positive response. We conclude that a subset of patients with food-related complaints can be accurately predicted to have a negative double-blind challenge with suspected foods on the basis of information obtained by history and skin testing. (J ALLERGY CLIN IMMUNOL 1990;86:503-11)

To date a number of studies have investigated various aspects of adult patients with adverse reactions to foods. Bernstein et al.¹ reported the results of double-blind challenges among adult patients with food-related complaints. More recently, Atkins et al.^{2,3} detailed demographic, laboratory, and prick skin test data as well as reaction patterns of patients with immediate adverse food reactions. Other investigators have focused on the psychiatric assessment of patients attributing a wide variety of symptoms to food hypersensitivity.^{4,5}

Abbreviation used

DBPC: Double-blind, placebo-controlled

As noted by May,⁶ there is the tendency among investigators who study food allergy to exclude patients with subjective or atypical food-related complaints. Although such patients pose problems in diagnosis, given their tendency to report vague symptoms that are often chronic or delayed in onset,⁷ they represent a quantitatively important group in need of additional study.

The present investigation involved comprehensive evaluation of 45 adult allergy-clinic patients. Some patients had classic food-allergic disease, whereas other patients experienced subjective food-related complaints that did not fit commonly accepted criteria of food allergy.^{4,8} Initial evaluation included a clinical history, physical examination, and skin testing. Those patients in whom oral food challenge did not pose a significant risk were additionally evaluated by DBPC food challenges. Results indicate that those patients with reactions highly suggestive of IgE-mediated food hypersensitivity and patients with atypical adverse

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TABLE I. Incriminated food(s), skin test responses, and major presenting complaints of subjects in group A who did not undergo food challenge

Sex/age (yr)	Food(s)	Skin test response	Major symptoms
F/56	Shrimp	+	Chest tightness
	Lobster	+	Difficulty breathing
F/26	Clams, fish	+	Swelling of eyes, throat
M/31	Shrimp	+	Urticaria, chest tightness, angioedema
F/34	Fish, shrimp	+	Generalized itching, swelling, chest tightness
M/28	Lobster	+	Swelling of eyes and throat, wheezing, chest tightness
F/29	Crab	+	Generalized itching, swelling of throat, chest tightness, wheezing, loss of consciousness
F/31	Walnuts	+	Swelling of throat
M/23	Nuts	+	Urticaria, swelling of throat, wheezing, generalized itching, chest tightness, and vomiting
F/18	Peanut	+	Urticaria, chest tightness, swelling of eyes
F/22	Nuts (Brazil)	+	Generalized itching, swelling, wheezing, chest tightness
F/28	Peanut	+	Swelling of throat and eyes, wheezing
F/25	Peanut	+	Itching and swelling of throat, chest tightness
M/57	Nuts	+	Swelling of throat
F/33	Sunflower seed	+	Urticaria, itching and swelling of throat
F/46	Beans, lentils	+	Chest tightness, swelling of throat
F/43	Mustard seed	+	Wheezing, swelling of throat
F/50	Walnuts, almonds	+	Wheezing, chest tightness
F/38	Mango	+	Urticaria, itching, swelling of eyes and nose
M/28	Apple	+	Chest tightness, itching eyes and throat

food reactions and negative food challenges, in addition to differing in response to skin testing, symptoms, and food challenge, also differed in the number and type of offending foods and reported more adverse reactions to medications.

MATERIAL AND METHODS

Sample

Subjects for the study were patients attending allergy clinics for suspected adverse reactions to foods. These included both new (first observed during conduct of the study) and current patients selected from the files of three allergists affiliated with University of Toronto teaching hospitals. Subjects were restricted to adults 18 to 60 years of age.

Screening criteria excluded (1) patients with potentially interfering medical conditions, such as pregnancy, diagnosed lactose intolerance, coeliac disease, diabetes, or renal disease, (2) patients with diagnosed eating disorders, such as anorexia nervosa, (3) patients not fluent in English, and (4) patients not offering voluntary informed consent.

Protocol

The protocol for the study was approved by the University of Toronto Human Ethics Committee. Subjects were clinically evaluated by a medical history, physical examination, skin prick testing, and, if this were necessary, DBPC food

challenges. Relevant demographic data were collected by means of a standardized questionnaire at the outset of the study.

Informed written consent was obtained from each subject. Withdrawal from the study or refusal to complete any portion of the study was at the discretion of each subject.

Historical data

The clinical history detailed information on the type, time of onset, duration, frequency, and severity of symptoms elicited by suspect foods. Symptomatology and reaction patterns were limited to a maximum of those five foods considered to cause most severe symptoms.

To collect information on the number and type of offending foods, irrespective of the nature or severity of symptoms, a questionnaire was used consisting of an alphabetized list of 121 common foods and food components. Patients indicated those items causing adverse reactions and the overall duration of symptoms, that is, whether symptoms had been restricted to childhood/adolescence, whether symptoms had been experienced lifelong, or whether onset of symptoms had first occurred as an adult.

Skin testing

Aqueous extracts of food allergens and common inhalants (Bencard Allergy Laboratories, Cooksville, Ontario) were used in the study. Choice of foods for skin testing was based

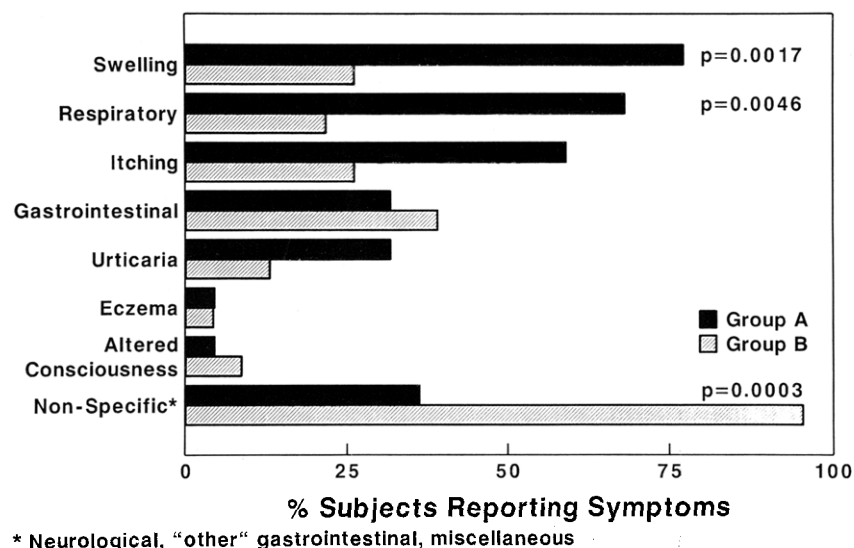


FIG. 1. Major categories of symptoms reported by subjects in groups A and B.

on the clinical history. Subjects also were skin tested for common inhalants.

Skin testing was done by the prick through drop method.⁹ A wheal reaction with net diameter 3 mm larger than the control response was considered a positive test.

Food challenges

After the initial evaluation, patients were instructed to avoid suspect foods beginning 2 weeks before the first challenge and continuing for the duration of the study. The procedure used to administer the double-blind food challenges was adapted from May¹⁰ and Bernstein et al.¹

Foods used in the double-blind challenges were regular grocery items obtained in dry form, dry foods obtained from food industry sources, or freeze-dried foods (Freeze-Dry Foods, Oakville, Ontario). When it was necessary, foods were pulverized before they were encapsulated in size 00, dye-free, opaque gelatin capsules. Patients were challenged under medical supervision with at least one food chosen from among those foods reported in the clinical history to be most troublesome. Each food challenge was placebo controlled (D-xylose).

The initial challenge dose was two capsules. If no symptoms developed in 15 minutes, the dose was increased by two capsules for a dose of four capsules, and the patient was observed for another 15 minutes. The procedure was continued until the patient had received a maximum of 20 capsules, or a cumulative dose of 7 to 16 gm, depending on the ease with which individual foods could be pulverized and packed into capsules. Each patient was observed for at least 1 hour after the final dose. Patients returned home with a diary in which to keep a detailed record of all foods, medication, or nutritional supplements taken and any symptoms experienced during the following 7 days. The identical procedure was followed for placebo challenges.

Patients classified as exhibiting a positive food challenge reproduced those symptoms attributed to the challenge food

TABLE II. Nonspecific symptoms reported by subjects in group B

Neurologic
Dizziness
Weakness
Migraine
Headache
Numbness
Loss of concentration
Confusion
Difficulty sleeping
Depression
Gastrointestinal
Generalized bloating
Abdominal distension
Gas
Miscellaneous
Muscle cramps/aches
Stiff joints
Sweating/flushing
Chills
"Pins and needles"
Hyperirritability
Mood swings
Hearing impairment
Memory loss
Tooth sensitivity
Sluggishness
Constipation
Pain in chest
Swollen gums
Fatigue
Vasculitis
Burning mouth
Itching earlobes
"Swelling within"

and reacted negatively to the placebo. Subjects classified as exhibiting a negative food challenge included subjects who did not react to either the challenge food or placebo, subjects who reacted positively to the placebo and negatively to the challenge food, and subjects who reacted equally to challenge food and placebo. In instances in which interpretation of the challenge was unclear, a placebo-controlled challenge was repeated with the same food to clarify the challenge result.

Statistical method

Statistical analyses were conducted with version 5 of the SAS software system for data analysis.¹¹ Procedures used were the Student's *t* test and the continuity-adjusted chi-square.¹²

RESULTS

A total of 92 (14 male and 78 female patients) were considered to be potentially eligible for the study. Of these patients, nine were later excluded because of interfering medical problems and two patients because of language difficulties. Another 26 patients who were contacted regarding the study refused to participate in the study, chiefly because of other time commitments or did not respond. Of the 55 individuals who agreed to participate, 10 did not complete all necessary procedures, three because of illness, and seven patients because of lack of time. The final patient population consisted of 45 patients with food-related complaints observed at three University of Toronto teaching hospital allergy clinics between March 1985 and June 1986. Of these patients, 22 (five male and 17 female patients) were assigned to group A (19 patients with symptoms and skin prick tests highly suggestive of IgE-mediated food hypersensitivity and three with positive food challenges). The remaining 23 patients (two male and 21 female patients), all of whom had atypical symptoms not usually attributed to food-allergic disease accompanied by negative food challenges, were assigned to group B.

Assignment results

Diagnostic criteria used to define groups A and B were history, skin test response to relevant foods, and, when this was appropriate, DBPC food challenges.

Of the 45 patients who participated in the study, 19 were considered inappropriate for food challenges given the serious nature of their symptoms, including swelling of the throat and eyes, angioedema, and difficulty breathing. These patients were assigned to group A on the basis of their medical history and positive specific food skin tests (Table I).

Of the remaining 26 patients, two reported relatively mild symptoms of IgE-mediated, immediate-onset food allergy, and 24 patients reported a variety

of subjective complaints. Symptoms reported by patients in groups A and B are illustrated in Fig. 1. The symptoms most commonly reported by group B fell into the nonspecific category. This category included various neurologic, gastrointestinal, and miscellaneous symptoms (Table II).

As expected from our classification, group A demonstrated significantly more positive food skin test reactions ($p < 0.0002$). Of those 29 foods that were administered as skin tests in this group, all but five produced a positive skin test response in at least one subject. Those foods failing to do so were banana, corn, oysters, tomato, and wheat. In contrast, only four patients in group B gave a positive skin test response to food. Foods producing a positive skin test response in this group were wheat, crab, lobster, shrimp, and soy. Skin test responses to common inhalants indicated that patients in group A were more likely to be atopic, 87.5% (14 of 16 patients skin tested), than patients in group B, 54.5% (12 of 22 patients skin tested) ($p < 0.025$).

The two patients with mild symptoms suggesting an IgE-mediated food allergy and the 24 patients with a history unlikely to reflect an IgE-mediated response underwent double-blind food challenges as outlined above. The most frequently used challenge foods were whole cow's milk (10 challenges), whole wheat flour, white sugar (four challenges each), baker's yeast, whole egg, green beans, beef (two challenges each), orange, peanut, pecan, salmon, corn, pea, clams, and soy flour (one challenge each).

Of the 26 subjects challenged, only three (11.5%) reacted positively to a challenge food, that is, reproduced those symptoms initially reported for the challenge food and did not react to the placebo. Foods provoking positive challenges were clams, green beans, and soy flour. Details regarding the food challenges are presented in Table III.

With the exception of one subject who reported diarrhea, no objective responses to a placebo challenge were observed, although subjective complaints were commonly reported. These complaints included feelings of anxiety, crying spells, headache, burning sensations, confusion, itchiness, chest tightness, fatigue, dizziness, tingling feelings in the legs, and hot spells.

Demographic and historical profile of patient populations

Most subjects in both groups were female, 77.3% and 91.3% of subjects in group A and B, respectively. Subjects in group A were significantly younger than subjects in group B, 34.8 years $\pm$ 10.9 years as compared to 41.5 years $\pm$ 9.6 years ($p < 0.05$). The two

TABLE III. Testing of reported adverse reactions by double-blind food challenge

Sex/age (yr)	Challenge food	Major complaints reported in the clinical history	Skin test reponse	Result of food challenge
F/33	Clams	Abdominal pain, nausea	+	+
			(mussels)	
F/58	Wheat	Abdominal pain, diarrhea, burning mouth	-	-
M/46	Wheat	Vasculitis/skin rash	-	-
F/45	Wheat	Swelling of limbs	-	-
F/30	Wheat	Nausea	+	-
F/43	Milk	Migraine	-	-
F/42	Milk	Nausea, wheezing	-	-
F/35	Milk	Swollen joints	-	-
F/45	Milk	Itchy earlobes	-	-
M/28	Milk	Migraine, confusion, lack of concentration	-	-
F/38	Milk	Abdominal pain, diarrhea, numbness	-	-
F/54	Beef	Fatigue, weakness	-	-
F/30	Beef	Diarrhea, flushing	-	-
F/60	Salmon	Swelling of throat	-	-
F/39	Egg	Itchy hands, nausea, diarrhea, flushing, bloating	-	-
F/51	Egg	Migraine, abdominal pain	-	-
F/22	Orange	Swelling of throat and eyes	-	-
	Peanut		-	-
F/40	Pecan	Migraine	-	-
F/34	White sugar	Weakness, confusion, depression, lack of concentration, difficulty sleeping	N/A	-
F/46	White sugar	Flushing, bloating, weakness, migraine, numbness	N/A	-
F/50	White sugar	Pain at temples	N/A	-
F/45	Corn	Confusion, lack of concentration, mood swings	-	-
F/34	Baker's yeast	Generalized itching	-	-
F/42	Green pea	Swelling of throat, urticaria, itchy eyes	-	-
	Green bean	Urticaria, itchy eyes	+	+
F/45	Soy flour	Migraine	-	+

+, Reproduction of symptoms reported for challenge foods; no reaction to placebo; -, no reaction to challenge food; N/A, not applicable.

groups were similar in other demographic characteristics (Table IV).

The two groups of patients also differed in the age of onset, frequency, and perceived severity of symptoms. Onset of symptoms occurred at a significantly older age among patients in group B as compared to patients in group A, 28.9 ± 17.2 versus 17.1 ± 12.5 years ($p = 0.0115$). Patients in group B also were significantly more likely to report symptoms occurring on a daily to weekly basis than were patients in group A, 45.4% versus 4.8% ($p = 0.0013$). Patients in group A were more likely

to report that foods caused symptoms that required medical treatment; patients in group B were more likely to report that foods caused symptoms that either interfered with or prevented them from continuing with their usual activities (Table V).

Patients in group A were more likely than patients in group B to report having experienced eczema, hay fever, or episodes of wheezing. Patients in group A were more likely than patients in group B to report asthma, hay fever, and eczema occurring among their offspring but less likely to report food allergy among family members. Although 11.1% of patients in group

TABLE IV. Demographic profile of subjects in groups A and B

Characteristic	Subject group		<i>p</i> value
	Group A (N = 22)	Group B (N = 23)	
Sex (%)			
M	22.7	8.7	NS
F	77.3	91.3	
Age (yr)	34.8 ± 10.9	41.5 ± 9.6	<i>p</i> < 0.05
(mean ± SD)			
Education (yr)	15.7 ± 2.4	15.5 ± 4.3	NS
(mean ± SD)			
Marital status (%)			
Married	54.5	39.1	NS
Unmarried	45.4	60.9	NS
Employment status (%)			
Employed	68.2	69.6	NS
Unemployed	31.8	30.4	

NS, Not significant.

TABLE V. Characteristics associated with symptoms reported by subjects in groups A and B

Characteristic	Subject group		<i>p</i> value
	Group A (N = 22)	Group B (N = 23)	
Age of onset (yr)	17.1 ± 12.5	28.9 ± 17.2	0.0115
(mean ± SD)			
Frequency (%)			
Daily to weekly	4.8 (1/21)	45.4 (10/22)	0.0013
Less than weekly	95.2 (20/21)	45.4 (10/22)	
Severity (%)*			
Continue usual activities	36.4 (8/22)	30.4 (7/23)	NS
Continue with difficulty	40.9 (9/22)	78.3 (18/23)	0.024
Cannot continue	31.8 (7/22)	60.9 (14/23)	NS
Medical treatment required	68.2 (15/22)	13.0 (3/23)	0.001

NS, Not significant.

*Severity of symptoms was reported on the basis of individual offending foods; therefore, percentages do not add up to 100.

TABLE VI. Number of offending foods by duration of complaints among subjects in groups A and B

Duration of complaints (mean ± SD)	Subject group		<i>p</i> value
	Group A (N = 22)	Group B (N = 23)	
Childhood/ adolescence	1.1 ± 2.5	0.2 ± 0.5	NS
Lifelong	3.6 ± 4.5	5.3 ± 13.1	NS
Adulthood	5.2 ± 5.5	25.6 ± 22.1	0.0002

NS, Not significant.

A reported food allergy occurring among parents, 30% or more of patients in group B reported food allergy not only in parents but also in their own children.

Offending foods

The two groups differed markedly in the number and type of foods reported to cause symptoms. Overall, patients in group B reported significantly more offending foods than patients in group A, 31.2 ± 22.5 versus 9.9 ± 6.4 (*p* = 0.0001). When the number of offending foods was examined by duration of symptoms, the most significant difference between the groups was in the number of foods re-

ported to have first caused symptoms during adulthood (Table VI).

The groups also differed in the types of offending foods reported in the medical history to cause most prominent symptoms. The food most frequently ranked first by patients in group A was peanut followed by shrimp, fish, and mixed nuts. The food most frequently ranked first by patients in group B was milk followed by white sugar, egg, smoked/cured meat, and yeast.

When those foods reported by each patient to be most troublesome were categorized by biologic food family, a significantly larger proportion of patients in group B than in group A rated foods belonging to the dairy and grasses families as most troublesome, 60.9% versus 9.1% ($p = 0.009$) and 52.2% versus 9.1% ($p = 0.0051$), respectively. Patients in group A were more than twice as likely to rate foods belonging to the crustacean and legume families as most troublesome than were patients in group B, 31.8% versus 13.0% and 40.9% versus 17.4%.

Medications

A larger proportion of patients in group B than in group A reported adverse reactions to medications, 43.5% versus 31.8%, respectively. Compared to patients in group A, patients in group B were twice as likely to report adverse reactions to penicillin, almost three times as likely to report adverse reactions to aspirin, and nearly twice as likely to report reactions to drugs other than penicillin and aspirin.

DISCUSSION

Clinical findings in the present study indicate that patients referred to allergists for suspected adverse reactions to foods represent two distinctly different groups. The first group comprises patients in whom the bulk of evidence supports IgE-dependent, immediate hypersensitivity, food-allergic reactions; the second group includes patients in whom symptomatology and offending foods are incompatible with classic IgE-mediated food allergy and in whom food challenges are negative.

Less than one half of potential subjects participated in the study. Reasons for not participating were chiefly lack of time on the part of the patient or interfering medical conditions. Comparison of nonparticipants and participants with respect to gender and major complaints indicated that nonparticipants were mainly female and that approximately one half reported symptoms suggestive of food hypersensitivity with the other half reporting more subjective symptoms. We are therefore confident that patients in the study are representative of the patient population observed at the three allergy clinics involved.

Only three of the 22 patients in group A underwent double-blind challenges. Adverse reactions in the remaining 19 patients were severe with positive food skin tests and symptoms highly suggestive of immediate anaphylactic hypersensitivity. Food challenges are dangerous and therefore inappropriate in patients with a history of anaphylactic or severe reactions.³ However, it is possible that some patients in group A may not have reacted on food challenge. Atkins et al.² reported that a proportion of patients with suspected immediate food hypersensitivity failed to react on challenge.

Demographic characteristics of the two study groups were generally consistent with findings reported by other investigators.^{2,4} Studies focusing on patients with suspected adverse reactions to foods have often included a preponderance of female subjects.¹⁻⁴ This finding may reflect the greater availability or increased willingness of women to make repeat visits to allergy clinics. The preponderance of female subjects among those with atypical food reactions in the present study (91.3%) corroborates a previous article that patients with complaints unresponsive to conventional medical intervention are often women.¹³

In the present study, foods causing most prominent symptoms in group A represented with few exceptions those foods considered to be the most commonly allergenic, namely, peanuts, soybeans, tree nuts, fish, shrimp and other crustaceans, and mollusks.^{14,15} In contrast, most patients in group B reported that their most prominent symptoms were elicited by foods such as sugar and beef that are not commonly considered to be allergenic or by foods such as milk and other dairy products that are more commonly allergenic among the pediatric than adult population. The frequency with which patients in group B reported dairy products and grains to be most troublesome might suggest undiagnosed lactose intolerance or coeliac disease. Although symptoms attributed to milk and wheat did include gastrointestinal reactions suggestive of these disorders, symptoms also commonly included a variety of nonspecific, atypical symptoms.

It is possible that patients in group B may have been influenced by accounts in the popular news media suggesting that commonly eaten foods often cause adverse reactions.¹⁶ Patients in group B were more likely to rely on lay sources for information related to adverse food reactions and to have consulted a nontraditional health practitioner.¹⁷ The emergence of alternative medicine and medical subcultures, such as clinical ecology and holistic and orthomolecular medicine, has introduced and popularized unconventional and sometimes unfounded dietary modifications and nutritional therapies in the treatment and/or prevention of disease.⁸ During the course of the study, a

yeast-free diet to counteract a *Candida*-induced "immunodeficiency" was receiving media publicity despite lack of evidence supporting the theory.^{18, 19} This finding may explain in part the frequency with which yeast was reported to cause adverse reactions in group B patients. It is important that clinicians assess patients carefully for such dietary practices, since overly restrictive or unnecessary dietary manipulation may have important nutritional and social implications.

One group A patient who skin tested negative to soy was confirmed to have migraine induced by soy flour on double-blind food challenge. Although it has been suggested that allergy may be involved in migraine,^{20, 21} this theory remains controversial. To date there is little evidence that IgE-mediated allergy plays a role in most patients.^{22, 23} The larger proportion of group A subjects who skin tested positive for inhalants is in agreement with other studies in the literature.^{24, 25}

Given the lack of evidence for classic IgE-mediated allergy in group B patients, it is questionable as to whether food-allergic disease actually was present in other family members as reported by patients. It would appear, however, that food-related complaints were more common and long-standing in these families. This may reflect the ability of children to imitate a parent's illness, symptoms, or overconcern about health.²⁶

The speed of onset and potentially serious nature of immediate-onset, IgE-mediated, adverse food reactions generally makes patients cautious in their eating habits. As would be expected, most subjects in group A reported reactions occurring on a sporadic basis but that, when they did occur, they often required medical treatment. In contrast, more than half of subjects in group B reported symptoms that were to some degree incapacitating and that occurred on a daily to weekly basis, reflecting the chronic and pervasive nature of their food-related complaints.

Self-reported, drug-induced reactions were more common among patients in group B. Conceivably, subjects in group B could be more reactive to pharmacologic agents. Alternatively, some of these individuals may be presenting signs of falling into the medical subculture, clinical ecology, in which patients are diagnosed as "allergic" to or "hypersensitive" to both unusual and common substances in the environment.²⁷

Subjects in group B reported a variety of atypical, subjective food-related complaints. Other investigators studying patients with supposed but unconfirmable food hypersensitivity have reported similar symptoms.^{4, 8} In the study conducted by Pearson,⁸ psychologic and behavioral symptoms were reported by all

subjects whose food-related complaints could not be confirmed, whereas no subjects with confirmed adverse food reactions reported such symptoms.

Psychologic dysfunction among patients in group B may have played a role in present findings.²⁸ Other investigators have reported evidence of psychopathology among patients with unconfirmed "food allergy"⁵ and patients with 20th-century disease ("total allergy syndrome").^{29, 30} The question as to whether adverse food reactions were responsible for the psychologic or behavioral disturbances in group B or whether the reactions were purely psychogenic remains unresolved. The possibility that other immunologic or nonimmunologic mechanisms may be involved cannot be dismissed on the basis of the usual challenge of relatively short duration. It remains possible that larger quantities of food or longer periods of ingestion are necessary to provoke responses in these patients. The potential role of food and psychologic factors in nonspecific food-related complaints requires additional assessment.

At the present time, double-blind challenges are the most objective means of evaluating patients with symptomatology atypical of food hypersensitivity and negative skin test responses to relevant foods and can effectively eliminate IgE-mediated food hypersensitivity as a diagnosis. The negative double-blind challenge may help to convince such patients that they are not sensitive to the suspect food and therefore may afford clinical and social benefits.

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