



CLINICAL RESEARCH

Stress Profile of Clients Referred for Investigation of Food Allergy

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Abstract

Purpose: To determine whether client referrals to a clinic that specializes in the assessment and treatment of food intolerance might benefit from psychological interventions for management of stress, in addition to dietary manipulation.

Design: A correlational design was employed, with stress status compared to published normative data.

Materials and Methods: Stress status was assessed in 47 consecutive new patients in the Allergy Nutrition Clinic, referred for management of putative adverse reactions to foods. Stress was measured with the Derogatis Stress Profile (DSP®). The scorer was blind to patient identity and clinical presentation. The DSP is a well-validated instrument that yields a Total Stress Score, and three "Domain Scores", comprised of emotional responses, environmental events and personality mediators. Further subscales are embedded within the Domain scales.

Results: The results showed no elevation on any of the stress variables measured by the DSP in the subjects relative to the normative sample. A number of subjects actually scored significantly below normal on personality factors related to psychological disturbances (for example, time pressure, driven behaviour, low relaxation potential). None of the subjects showed elevations on indices of anxiety, depression or hostility. A subgroup of clients with predominantly irritable bowel syndrome (IBS)-like symptoms engaged in fewer relaxing activities compared to clients without gastrointestinal (GI) symptoms. The individuals with IBS symptoms of gradual onset scored highest for overall stress on the DSP.

Conclusions: It is concluded that only a small subgroup of individuals with IBS-like symptoms referred to the Allergy Nutrition Clinic might benefit from psychological intervention for stress management in addition to dietary management. The low DSP scores in those with symptoms in other organ systems, suspected to be because of adverse reactions to foods, indicate that the psychological factors measured by the DSP are not contributing significantly to their presenting morbidity.

Keywords: food intolerance, gastrointestinal symptoms and stress, irritable bowel syndrome, food allergy clinic, Derogatis Stress Profile (DSP®), management of adverse reactions to foods, food sensitivity and stress.

INTRODUCTION

The increased public awareness of the association between diet and health has enhanced the idea that "allergy" to foods, food additives, beverages, and even water causes a wide range

of distressing acute physical and psychological problems as well as chronic, disabling diseases [1]. When a person is suffering from symptoms that have defied medical diagnosis, but which nevertheless compromise their quality of life, it is perfectly understandable that the search for a cause would encompass areas not commonly considered pathological. Almost every symptom experienced by humans has been blamed on food ingestion. Fatigue, depression, anxiety, irritability, mental fogginess, memory problems, insomnia, attention deficit disorder with hyperactivity, migraine headaches, seizures, tachycardia and palpitations, irritable bowel syndrome (IBS), Crohn's disease, musculoskeletal pain, rheumatoid arthritis, blurry vision, Raynaud's phenomenon, as well as asthma, rhinitis, eczema, urticaria, angioedema (the traditional "allergic diseases") [2] have been cited as resulting from ingestion of one or more foods [3]. However, when the suspect food is given in a disguised form, and compared to a placebo (double-blind placebo-controlled food challenge, surprisingly few foods actually trigger the reported symptoms [4, 5].

Effective identification and management of food sensitivity is complicated by the lack of reliable laboratory tests that can identify the specific foods responsible for a person's adverse reactions [6, 7]. The diversity of reaction mechanisms that mediate the symptoms, and individual idiosyncrasies in the expression of the reaction by overt clinical signs, make identification of the culprit foods extremely difficult in practice [8, 9]. This has resulted in many practitioners dismissing the whole field of "food allergy" as exaggerated, or even fictitious. The general perception of "food allergy", even among some of the most enlightened practitioners, seems to be as a subjective, somatic or functional illness with the negative connotations that these appellations so habitually carry [10]. A number of studies have shown differences between patients reporting food-related illnesses and controls in terms of greater histories of depression and anxiety disorders [11, 12], somatization [13] and stress-related conditions [3].

Individuals referred to the Allergy Nutrition Research Program and Clinic (ANC) at Vancouver Hospital and Health Sciences Centre for management of food-related conditions often present with many of the symptoms cited above. This population is referred to the ANC after all other causes of their symptoms have been ruled out by appropriate medical tests. In an attempt to develop a possible screening tool to expedite implementation of appropriate management protocols, a psychological profile of those attending the ANC was sought. The Derogatis Stress Profile (DSP®) [14] is a theoretically derived instrument, which assesses three dimensions: stressful events, personality characteristics and emotional responses [15]. We hypothesized that attendees at a food allergy clinic would demonstrate elevated stress scores. If this occurred, adding psychological treatment to the dietary strategies used in the clinic should improve the beneficial outcome of the program.

METHODS

Forty-seven consecutive new referrals to the Allergy Nutrition Clinic were administered the DSP [15], which is a 77-item self-report measure predicated on the theory that stress is comprised of environmental events, personality mediators and emotional responses. In the DSP there are 11 subscales which assess these three "domains" of stress:

Environmental Domains include subscales assessing illness-promoting behaviour, and domestic and vocational stressors

Personality Domains include the subscales: time pressure, driven behaviour, attitudinal posture (achievement ethic), engaging in few activities that are potentially relaxing, and role definition (self-representation, e.g. highly responsible, serious, lonely)

Emotional Domain subscales include: hostility, anxiety, and depression.

A Total Stress Score was also computed.

TABLE 1. Site of all reported symptoms and symptoms of primary concern

	Site of all symptoms		Site of symptoms of greatest concern	
	<i>N</i> = 47	% of subjects	<i>N</i> = 47	% of subjects
Organ system				
Gastrointestinal tract	29	63	28	60
Musculoskeletal	9	19	2	4
CNS/ANS	24	51	5	11
Respiratory tract	27	62	5	11
Skin	21	45	7	15

The DSP has been demonstrated to possess good retest reliability and internal consistency [15]. It has been used in a number of studies including evaluation of patients with cardiac disorders [16], temporomandibular joint pain [17] and migraine headaches [18].

Subjects

Forty-seven consecutive new clients attending an initial assessment at the Allergy Nutrition Clinic completed the DSP. Clients also completed intake questionnaires assessing presenting symptom complaints, demographic information, current and past treatments and their outcomes, data relating to illness onset and course, and familial patterns of allergy.

There were 38 females and 9 males, with a mean age of 42 years (range 19–67; SD = 12). Twenty subjects were married, 20 were single, 2 were separated, and 5 declined to respond to the question of marital status. The subjects were relatively well educated with 14/47 having complete 16 or more years of education. The mean years of education was 14.5 (SD = 2) with a range of 9 to 18 years.

RESULTS

Data were first checked for normality. All DSP related variables were normally distributed.

Several subjects failed to complete all aspects of the DSP questionnaire. A pairwise deletion of subjects from analyses was employed to maximize the resulting number of subjects per analysis.

Symptoms

Presenting symptoms were divided into 4 main system areas:

GI tract (e.g. diarrhoea, cramping pain, and other IBS-like symptoms)

Central and autonomic nervous system (e.g. dizziness, “brain fog”)

Upper respiratory tract (ear, nose, throat) (e.g. rhinitis, sore or “scratchy” throat, earache)

Musculoskeletal (e.g. joint pain, muscle pain)

Primary symptoms had a mean age of onset of 28 years (SD = 15) with a range from infancy to 65 years. About 19% of the sample had a pre-adolescent onset and 10% developed their primary symptoms in adolescence. About 60% experienced the onset in the third to fifth decade, and 6% first experienced symptoms after age 50 years. Four percent of subjects were unable to report the age of onset. The mean duration of symptoms was 13.5 years (SD = 13), the median at 10 years, and a range from 1 to 54 years.

TABLE 2. T scores of primary, domain and total DSP® scores of entire sample (N = 47)

Variable	Mean	SD	Range
Personality Domain			
Attitude (achievement ethic)	39.33	11.67	19–69
Driven	47.73	10.14	27–78
Time pressured	41.76	8.77	22–62
Low relaxation potential	43.57	10.66	17–67
Stress-inducing role definition	49.51	8.59	33–71
Overall Personality Domain score	39.39	9.09	23–63
Environment Domain			
Health	47.38	9.97	28–79
Domestic satisfaction	47.55	7.69	34–65
Vocational satisfaction	44.70	9.86	19–61
Overall Environment Domain score	44.02	8.80	20–60
Emotion Domain			
Anxiety	48.71	10.79	27–79
Hostility	47.22	9.92	30–81
Depression	52.42	8.67	35–71
Overall Emotion Domain score	49.27	10.27	28–81
Total Stress Score	41.48	10.42	20–73

DSP Results: Whole Sample

The results of the DSP for the whole sample are summarized in Table 2. All means reflect T scores, a standardized statistic with a mean of 50 and SD of 10.

Relative to the normative sample there was no elevation on any of the stress variables measured by the DSP. Of particular interest is the finding that most of the personality subscale values are considerably below the norms for the general population, and the composite Personality Domain mean is almost one standard deviation below average. Neither the environmental variables nor the emotional response measures were above average. The Total Stress Score was also slightly low (about the 18th percentile).

In the whole sample, duration of illness showed positive significant correlations to all 3 DSP domains:

Emotion Domain Total Score $r = 0.37; p = 0.01$

Environment Domain Total Score $r = 0.32; p = 0.04$

Personality Domain Total Score $r = 0.36; p = 0.02$

Considering the DSP dimensions, duration of illness was significantly correlated with:

Depression $r = 0.31; p = 0.04$

Anxiety $r = 0.32; p = 0.03$

Illness-inducing behaviour $r = 0.26; p = 0.00$

Domestic dissatisfaction $r = 0.28; p = 0.06$

Role definition $r = 0.37; p = 0.01$

Age and gender were not significantly related to any DSP scores.

Type of onset: 43% of subjects reported gradual onset of symptoms; 30% reported rapid onset; 27% were unable to recall details of symptom onset. The type of onset was significantly related to a number of factors. Individuals with gradual onset of symptoms scored significantly higher than those with a rapid onset on measures of total stress ($p = 0.000$), Environmental Domain stressors ($p = 0.01$) and in the Personality Domain ($p = 0.01$). However, those with gradual onset of symptoms did not endorse more emotional

symptoms overall ($p = 0.20$). Individuals with gradual onset of symptoms endorsed significantly greater domestic dissatisfaction ($p = 0.008$), depression ($p = 0.04$), failure to engage in health-promoting activities ($p = 0.02$), and stress-inducing role definition ($p = 0.003$). They also showed trends to higher anxiety ($p = 0.06$) and hostility ($p = 0.09$) than individuals with rapid symptom onset. Conditions of onset (gradual or rapid), duration of illness and age at onset (earlier rather than later) all correlated above $p = 0.55$.

Age at onset of symptoms showed correlations similar to duration of symptoms since age of onset correlated highly with duration ($r = 0.55$; $p = 0.003$).

Marital status was unrelated to DSP scores in the Personality and Emotional Domains, but there was a trend for married individuals to show higher scores on the Environmental Domain ($F = 3.95$; $1,35$; $p < 0.06$). Within the Environmental Domain married individuals engaged in more behaviours associated with poorer health outcomes than unmarried individuals ($F = 3.97$; $1,39$; $p = 0.05$). Marital status was unrelated to vocational dissatisfaction, but those who were married reported significantly more stress associated with relationships with partners and family ($F = 9.12$; $1,38$; $p < 0.005$).

Comparison of Subjects with GI (IBS-like) Symptoms and Those Without

Twenty-nine individuals reported GI tract symptoms. It has frequently been suspected that IBS is associated with increased stress [19]. Therefore, we were interested in comparing the stress profiles of those people who reported IBS-like symptoms, and suspected that they were a result of "food allergy", to subjects who did not report GI symptoms (Table 3). The two groups did not differ in mean age, age at onset of symptoms, duration of illness, years of education, or marital status.

Subjects with GI tract symptoms scored significantly lower on the achievement ethic scale, and engaged in significantly fewer activities with a high potential to be relaxing than non-GI tract symptom reporters. Since the type of onset of symptoms (rapid or gradual) showed a number of relationships to stress scores in the whole sample, we separated those with IBS-like symptoms into gradual and rapid onset groups. Individuals with GI tract symptoms of gradual onset showed significantly higher Total Stress Scores ($p = 0.03$), poorer domestic satisfaction ($p = 0.02$), increased depression ($p = 0.053$), poorer health-oriented behaviour ($p = 0.054$), and trends to higher role definition and Total Environment Domain scores than those with GI tract symptoms of rapid onset.

DISCUSSION

A random sample of 47 clients referred to the ANC for management of illnesses suspected to be due to adverse reactions to foods fell well within or below the normative range on most indices of the DSP. This finding appears to indicate that clients referred to the ANC do not demonstrate a "high stress profile", but, on the other hand, it does not confirm that in the absence of stress-related pathology adverse reactions to foods are a cause of the illnesses reported by our clients. However, it is possible that in considering an "external cause" (i.e. food) of their symptoms, and having taken steps to address the cause, a perception of increased control over the illness is experienced, with a resulting decrease in stress. In addition, the fact that their physician has referred them to a clinic specializing in the management of food intolerances may be perceived as validation that their symptoms have an organic/physiological basis rather than being due to psychological causes. This fact may reduce the feeling of frustration, with its associated stress, that often arises as a result of absence of objective evidence that an individual's symptoms are due to an external cause, such as food intolerance, and not neurosis.

Rix *et al.* [2] demonstrated that psychiatric problems (e.g. neuroses and hyperventilation syndrome) were very common in adults, referred to an allergy clinic, whose food allergies

TABLE 3. T scores of primary, domain and total DSP® scores: a comparison of gastrointestinal (GI) tract and non-GI tract symptom reporters

Variable	With GI tract symptoms N = 27		Without GI tract symptoms N = 17		t	p
	Mean	SD	Mean	SD		
Personality Domain						
Attitude (achievement ethic)	36.70	11.38	43.71	11.46	1.98	0.05
Driven	45.92	9.15	50.35	11.51	1.40	0.17
Time pressured	43.30	9.09	39.12	8.06	1.55	0.13
Low relaxation potential	46.77	8.37	38.17	12.00	2.57	0.008
Stress-inducing role definition	48.74	7.94	50.24	9.70	0.56	0.58
Total Personality Domain	39.23	8.19	39.29	9.79	0.02	0.98
Environment Domain						
Health	49.86	10.34	43.12	8.28	2.30	0.03
Domestic dissatisfaction	47.38	7.22	47.59	8.75	0.08	0.93
Vocational dissatisfaction	44.61	8.58	44.06	11.56	0.17	0.87
Total Environment Domain	45.36	8.16	41.69	9.60	1.28	0.21
Emotion Domain						
Anxiety	49.93	10.31	47.00	11.87	0.86	0.39
Hostility	47.37	8.68	47.18	12.13	0.06	0.95
Depression	52.48	9.32	52.00	7.97	0.18	0.86
Total Emotion Domain	49.93	10.04	48.24	11.14	0.52	0.61
Total Stress Score	41.92	10.22	40.53	11.18	0.41	0.68

were unconfirmed. The authors noted that their subjects tended to be suggestible, held an extreme and firm belief in food allergy and experienced less anxiety than psychiatric outpatient controls [2]. This prompted the speculation that some patients translated anxiety into somatic symptoms, whereas others developed hyperventilation syndrome (panic attacks). Both Rix *et al.* [2] and Lessof *et al.* [20] found low levels of psychiatric disturbance in those with confirmed food allergies.

In contrast, Pevcler *et al.* [21] assessed 273 adults by postal questionnaire and found that unconfirmed cases of food intolerance were not associated with mood disturbance or social impairment. They noted that subjects who attributed their physical symptoms to food sensitivity suffered less psychological impairment than those attributing their symptoms to stress, stomach, or bowel disorder. Of those attributing symptoms to food, the probable proportion of psychiatric "cases" (defined as a cut-off point on a psychopathology rating scale) was only 9%. The average for the entire sample on the psychopathology rating scale was comparable to the general population. The use of postal questionnaires rather than consecutive referrals is a weakness of this study. Nevertheless, the authors concluded that the low level of psychiatric disturbance in their general population sample suggests that greater psychopathology increases the probability of attending at a specialty clinic. Therefore, they argued that reports of increased psychiatric disturbance in clinic attendees is an artefact of referral bias.

Because of the general perception that IBS is strongly associated with stress [19], we were particularly interested in comparing individuals with GI tract symptoms with those who reported symptoms in the skin or respiratory tract. There were no differences between the two groups in overall stress scores, or in any of the major stress domains (i.e. personality, environment, emotions). There were no differences on the subscales comprising the Emotion Domain. Significant differences between the two groups were recorded in

specific subscales of the Environment and Personality Domains. Subjects with GI tract symptoms tended to engage in fewer relaxing activities, had lower achievement ethic scores, exhibited a greater concern for health, but engaged in fewer health-promoting activities than those without GI tract symptoms.

Individuals with GI tract symptoms of rapid onset and shorter duration were more likely to report frequent exercise, do not take sleeping pills, believe that physical health is extremely important and to claim to be in good physical shape compared to those with gradual onset and longer duration of symptoms. Perhaps this reflects early stage of illness coping strategies compared to those who have had to live with a distressed GI tract for many years.

Factors that May Have Influenced the Results

A number of factors may have influenced the results of this survey:

1. The lack of a control group makes it difficult to state confidently that the subjects were actually below the study norm since the norms may have changed over the past decade. Since we did not know *a priori* whether the subjects in the study were dealing with somatic manifestations of stress, or stress resulting from chronic illness, or stress caused by the frustration of dealing with a chronic illness lacking validation or explanation, we chose to compare our subjects with a "normal population" without chronic illness since the DSP is measured against such a population.
2. The validity of the measurement tool within the cultural context of the source of data. Our data were collected from a Canadian cohort rather than from a population from the USA, which formed the DSP's normative sample.
3. The design of the DSP appears to have been influenced by earlier research on the risks of coronary disease (i.e. "Type A personality"). The Personality Factors of the DSP may not be relevant for psychological dysfunction in the type of population that present to an Allergy Clinic.
4. The absence of a validity scale within the DSP. If members of this population are denying their psychological disturbances we might expect them to present themselves in a favourable light, and accordingly score lower on the DSP. This would be consistent with the notion that their symptoms represent a form of somatization. Improving the assessment protocols by incorporating a measurement tool that is sensitive to both deliberate and subconscious attempts to deny the presence of psychological disturbance would be important for this type of population.

CONCLUSIONS

Individuals referred for assessment and treatment of putative food allergy did not tend to show elevated levels of stress. They fell well within the normative range, and even scored significantly below normal on Total Stress Scores and on the Personality Domain factors (e.g. time pressure, driven behaviour, relaxation activities). Neither the whole sample nor the subgroup with IBS-like symptoms showed increased scores on the personality traits associated with the Type A personality. Mean scores for emotional distress and environmental stressors were in the middle of the normal range.

The failure to find higher scores in the full sample may be the result of individuals attributing their symptoms to a cause that is under their control (food), and then having taken steps to exert control (e.g. referral to a food allergy assessment and management clinic). This increased self-efficacy might explain the difference observed between those with GI tract symptoms of gradual onset and long duration and those whose symptoms were of shorter duration and more acute onset. It is reasonable to expect that individuals in the former group would feel that few factors surrounding their illness were

under their own control. Their experience had shown that their symptoms persisted in spite of many attempts to alleviate the problem.

This preliminary study suggests that those with putative food intolerances do not appear to be presenting with symptoms that are essentially psychiatric. Whether or not subsequent diagnostic measures confirm the presence of food intolerances, attributing their symptoms to food may increase coping efforts such as lifestyle modifications that extend beyond dietary manipulation. Ultimately, these efforts might produce lower scores on stress measures.

In conclusion, our findings validate an approach that first addresses the possible food-related aspects of their symptoms.

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