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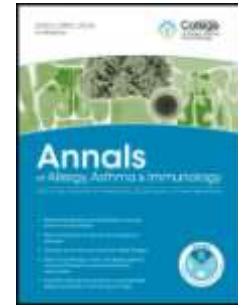
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Integrated Behavioral Health Care for Management of Stress in Allergic Diseases

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Key Messages

- There is an increasing prevalence and severity of allergic disease worldwide.
- A bidirectional relationship has been found between allergic disease and stress, particularly for patients with severe, chronic, and/or multiple allergic diseases; physiological and behavioral pathways contribute to this bidirectional relationship.
- Behavioral health interventions are helpful in addressing stress and non-adherence in patients with allergic disease.
- It is recommended for medical providers to routinely screen for behavioral health and make referrals as indicated or, ideally, incorporate a behavioral health provider into a multidisciplinary patient care team.

- School, workplace, and community-level interventions are also indicated for supporting patients with allergic disease.

Abstract

Objective: The present article will review current findings regarding the management of stress in allergic disease.

Data Sources: The present review article uses articles and books published between 1995 and 2017. Approximately 85% of sources used were published in the last 10 years and 60% were published in the last 5 years. The majority of sources are peer-reviewed articles.

Study Selections: Articles that focused on allergic diseases such as allergic rhinitis, food allergies, urticaria, and allergic asthma were included in the present review. Articles in which it was not clear that the underlying disorder was allergic in nature (for example, non-specified asthma) were not included in the present review. Preference was given to articles published within the past five years.

Results: Patients with allergic diseases, particularly those with chronic and/or co-occurring allergic diseases, often experience stress and, in turn, this experience of stress can exacerbate disease presentation. High rates of treatment non-adherence in patients with allergic disease can also increase disease burden and stress. Research to date supports the benefit of behavioral health interventions for patients with allergic disease. Interventions with multidisciplinary teams, that include behavioral health, as well as interventions at the school, workplace, and community level are recommended.

Conclusion: Medical providers working with patients with allergic disease need to address patient's experience of stress and non-adherence to treatment recommendations. This could be done through routine screening and referrals to behavioral health or, ideally, through incorporation of a behavioral health provider within a multidisciplinary patient team.

Introduction

Worldwide, many individuals and their families are affected by allergic diseases. The present paper will provide a review of recent literature on psychological stress and allergic disease, with a focus on behavioral health interventions for addressing stress in allergic disease.

It is estimated that, globally, 400 million people, or 35-40% of the population, have allergic rhinitis, 200 to 250 million people have food allergies, and 10% of the population has drug allergies.^{1,2} Within the United States, it is estimated that 50 million people are affected by nasal allergies,³ 26 million people have allergic rhinitis, 8.8 million children have skin allergies, and 4.2 million children have food allergies.⁴ Prevalence rates of allergic diseases are increasing,

with greater complexity and severity of disease presentation, particularly in children and young adults.^{1,5}

Psychological stress has known effects on the immune system, including impacting effector and regulatory systems. This can result in increased susceptibility to various infections, latent virus reactivation, and impact on immunoregulatory circuits.⁶ Allergic diseases involve production of allergen specific IgE which affect different bodily systems, such as the respiratory tract for allergic rhinitis and allergic asthma and the skin for atopic dermatitis and urticaria.⁷ The contribution of excessive psychological stress to the clinical expression of allergic disorder is well established. Exposure to stress is associated with a heightened inflammatory profile that, in turn, is associated with increased allergic symptoms.⁷ College students demonstrate elevated sputum eosinophil levels during final exams,⁸ and increased stress in early childhood contributes to development of atopic asthma.^{9,10}

Relationships between Allergic Disease, Stress, and Health

The negative relationship between stress and health is well documented.⁷ The majority of studies on stress in allergic disease are cross-sectional and/or correlational, such that results do not inform causation. Associations have been found between allergic disease, psychological distress, and stress,⁷ with important implications for quality of life and disease management.

Allergic rhinitis is associated with mood changes, anxiety, depression, impairment of cognitive function, and reduced quality of life.¹¹ For example, quality of life ratings in patients with chronic urticaria or atopic dermatitis were found to be comparable to those from older patients with severe ischemic heart disease.¹² Specific focus on pediatric patients with atopic dermatitis has found reduced quality of life, mood changes, irritability, lower self-esteem, and higher levels of behavioral and emotional problems, with problems increasing with disease

severity.^{13,14} Pediatric patients with atopic dermatitis also report more problems with bullying, teasing, and social isolation,¹⁵ which can further contribute to emotional and behavioral problems and the experience of stress. Additionally, research has found that anxiety is common in children with anaphylactic reactions;¹⁶ psychosocial distress is common in individuals with chronic, spontaneous urticaria;¹² emotional instability and anxiety are often seen in patients with allergic rhinitis;¹ increased rates of anxiety and depression are reported by patients with allergic skin disorders;¹⁷ and significant psychological distress is seen in children with food allergies.¹⁸

Individuals commonly have co-occurring allergic diseases and many allergic diseases are chronic in presentation, which can increase disease burden and the experience of stress.⁵ For example, patients with chronic urticaria had lower life satisfaction and used fewer emotion-focused coping strategies than patients with acute urticaria.¹⁹ Perceived stress was associated with comorbidity between urticaria and allergies²⁰ and high levels of food or seasonal allergies were associated with poor self-report health ratings in patients with allergic asthma, with self-report ratings of perceived overall health decreasing over time with increases in levels of seasonal allergies.²¹

Additionally, a relationship has been found between high psychosocial stress and exacerbation of allergic disorders⁷ and psychological stress has an impact on persistent allergic rhinitis, with symptom improvement and increased quality of life when stress is treated and controlled.²²

Impact on Daily Functioning and Associated Stress

Allergic diseases can have a negative impact on school and work performance, which contributes to the experience of stress. It is estimated that, in the United States, 3 million work days and 2 million school days are lost annually due to symptoms of allergic rhinitis.^{11,23,24}

Symptoms of allergic rhinitis are associated with decreased school functioning¹⁸ and work productivity,²⁵ with effects increasing as disease severity increases. Additionally, patients with allergic rhinitis report increased sleep disturbance secondary to allergic symptoms and increased daytime fatigue, which affects school and work performance,¹¹ and contributes to the experience of stress. Children and adults with atopic dermatitis have also reported significant academic and occupational impact, including missing work and school, and avoiding certain occupations that may exacerbate their skin condition.²⁶

Further, allergic diseases, are commonly associated with increased stress within the family system. Reduced parental quality of life and increased psychological distress have been found in parents of children with food allergies^{16,18} and parental sleep disruptions, parent-child conflict,¹⁴ financial stress, marital conflict, increased parenting stress, and reduced parental quality of life have been found in families of children with atopic dermatitis, with problems increasing with disease severity.^{13,27}

Challenges to Adherence

With allergic diseases, such as allergic rhinitis and atopic dermatitis, there is frequent non-adherence to treatment recommendations. This treatment non-adherence contributes to disease severity and associated problems, such as increased stress and reduced quality of life^{13,28} which, in turn, can interfere with the patient's and/or family's capacity to successfully manage his or her allergic disease, further contributing to non-adherence¹³. For example, a child with behavioral problems can present as resistant to skincare tasks, resulting in parental difficulty in completing disease management tasks.^{13,14} Challenges with adherence may be related to concerns about potential side effects, difficulties in administering treatment, lack of access to health care, as well as unintentional factors such as forgetfulness, lack of practice, language and cultural

barriers, and poor physician-patient communication.²⁹ For patients with atopic dermatitis, adherence rates have been found as low as 32% over eight weeks of treatment.³⁰ For children and adults with food allergy, research suggests that many individuals with serious food allergies do not consistently carry their emergency medications,³¹ and may be reluctant to administer epinephrine during anaphylaxis. Researchers examining adults treated in a Canadian emergency department, for example, found that epinephrine was not administered in almost half of moderate-to-severe reactions.³² Additionally, research suggests that some patients, and adolescents in particular, may be non-adherent with food avoidance recommendations.³³ Additionally, stress and psychological factors can interfere with the patient's and/or family's capacity to successfully manage his or her allergic disease¹³

Stress Management Interventions

Overall, as previously discussed, research has indicated that a wide range of allergic diseases are associated with stress, psychological distress, reduced quality of life, impaired sleep, and reduced school and work performance, with these factors likely interacting with and exacerbating each other. The experience of stress, in turn, can exacerbate allergic disease through physiological and/or behavioral pathways. Given the increase in prevalence of allergic diseases and the considerable toll of these diseases, management interventions at the individual, family, school, medical provider, and community levels are recommended, particularly for patients with severe, chronic, and/or co-occurring allergic diseases. Please see Table 1 for descriptions and examples of behavioral health interventions that can be helpful.

Unmet Psychosocial Need

In the treatment of allergic diseases, considerable unmet psychosocial needs have been identified. For example, in one study, 70% of caretakers of children with food allergies who were

surveyed reported that mental health support would be helpful, but only 23% had received mental health services.³⁴ As such, it is recommended for medical providers to routinely screen for mental health issues and provide treatment and/or referrals as indicated.³⁴ Additionally, management of chronic allergic disease requires comprehensive psycho-education regarding allergen avoidance and emergency preparedness across settings.³⁵ Research suggests, however, that many parents and patients receive insufficient information about disease management, or may be overwhelmed by the information that is provided.^{36,37}

Additionally, multiple ecological, social, and logistical factors can serve as barriers to obtaining appropriate behavioral health services for patients with chronic illness.³⁸ Patients and families may lack an understanding of the interaction between stress and disease management, may be concerned about the potential stigma of obtaining mental health services, or lack resources to access care (e.g., insurance, time, and transportation concerns).^{39,40}

Integrated Behavioral Health Care

Incorporation of behavioral health providers, such as licensed psychologists, social workers, or counselors, in the care team can increase ease of access to behavioral health services and research has found that comprehensive, multidisciplinary approaches to treatment that include behavioral health providers are beneficial for patients with allergic disease.^{7,13,14,41} Behavioral health providers can work with physicians to develop comprehensive psycho-educational materials, ensure that education is provided in patient-friendly language, and address coping and emotional challenges as well as safety concerns.⁴²

Educational Interventions

When provided with options, many patients with allergic disease reported a preference for education interventions followed by relaxation interventions.⁴³ Educational interventions for

atopic dermatitis have been associated with improved disease severity and parental quality of life⁴⁴ and a group education program for atopic dermatitis was associated with reduced patient social anxiety, depression, catastrophizing cognitions, scratching behaviors, and improved parental disease management.⁴⁵ Providing hands-on, in vivo teaching can be particularly effective for ensuring understanding and competence¹³ and, for patients with anaphylaxis, educational interventions can also help patients learn to differentiate between anxiety symptoms and anaphylactic symptoms.¹⁶ Similarly, researchers at Boston Children's Hospital demonstrated that parents of children with food allergy who received a comprehensive educational handbook had significantly greater improvement in knowledge and confidence than those who did not receive this educational intervention.¹⁴

Additionally, patients with food allergies experience particular psychological stress due to necessary avoidance of food allergens and concern of accidental exposure to allergens through foods. Research has found that efforts to avoid consumption of certain food products were associated with significantly lower quality of life in mothers and children with food allergies, which is attributed to the time and burden of reading food labels and making decisions about the safety of foods when labels are unclear.¹⁸ Educational resources (e.g., how to read food labels, resources for eating in restaurants or other public establishments) and support to patients with food allergies and their families can be helpful for addressing this stress.

Further, the experience of psychological stress can be alleviated when patients and family members feel that they have the tools to manage allergic disease. For example, prescription of epinephrine auto-injectors was associated with reduced anxiety for children with food allergies, and their mothers, regardless of whether the epinephrine auto-injectors were routinely carried.¹⁸

Given these findings, it is important for medical providers to ensure that patients have appropriate skills, equipment, and education to manage their medical conditions.

Behavioral Health Interventions

In addition to educational interventions, a range of behavioral health interventions have been found to reduce the severity of allergic disease, such as atopic dermatitis, including brief dynamic psychotherapy, cognitive behavioral therapy, and stress management.⁴⁶ As such, it is recommended for medical providers to coordinate care with mental health providers as this can improve quality of life.¹⁹ Some of the useful services behavioral health providers can provide to patients with allergic diseases include helping patients learn to identify emotional and behavioral triggers, addressing sleep hygiene issues, teaching relaxation, coping, and stress management strategies,^{14,41} teaching cognitive restructuring approaches,⁴⁷ addressing social issues,¹⁴ and incorporating biofeedback into treatment.⁷

Research investigators have found that relaxation training is beneficial for children with anaphylactic reactions¹⁶ and, for children with atopic dermatitis, is helpful in reducing severity of atopic dermatitis, symptoms of depression, and psychological distress.⁴⁸ A study providing behavioral health treatment to children with food allergies and their families indicated that all patients reported improvement in regards to emotional, behavioral, and social issues and found the intervention to be helpful.⁴⁹ Additionally, for patients with anxiety and behavioral avoidance secondary to allergic disease, exposure therapy combined with behavioral interventions is helpful for reducing the experience of distress and improving daily functioning.¹⁶ Habit reversal training has also been used successfully to reduce scratching and improve outcomes in individuals with atopic dermatitis.⁵⁰

Combined educational and psychological interventions can also be beneficial. In one study, patients with atopic dermatitis who received education and cognitive behavioral therapy had sustained improvements, through the 1-year post-treatment follow-up, in atopic dermatitis severity, behavioral responses, illness cognitions, and quality of life, and reduced use of histamine agonists and corticosteroids.⁵¹ In another study, when compared to standard medical care, incorporation of relaxation, cognitive behavioral therapy, or combined education/cognitive behavioral therapy into treatment resulted in significantly better outcomes for patients with atopic dermatitis, including improved skin condition, reduced use of topical steroids, and reduced anxiety, depression, and psychological stress.⁵²

Interventions to Improve Adherence

Behavioral health providers who are members of the care team can provide interventions to address patient non-adherence with treatment recommendations. A recent review indicates interventions to improve adherence often include education, reminders, improving the physician-patient relationship, and frequent communication with patients.⁵³ Among pediatric populations, behavioral strategies have also been used successfully to increase children's cooperation with and involvement in skin care routines using games, distraction techniques, and positive reinforcement.^{14,53} Preliminary research suggests that belonging to a patient support group and having a written anaphylaxis management are associated with higher adherence to self-care behaviors among adolescents with food allergy.⁵⁴ Financial incentives and text reminders have also been used to promote the carrying of epinephrine among young adults aged 18-30 with food allergies. Although this intervention significantly improved self-carry rates, those in the intervention group had their epinephrine auto-injectors at only 54% of check-ins, suggesting that additional research in this area is needed.⁵⁵

Family-Focused Interventions

Given the impact of allergic disease on family members, particularly family members of pediatric patients, it is also important for families to receive support^{16,27} and intervention from behavioral health providers.¹⁰ Behavioral health providers can provide parental support, parent and family education, and can help to normalize the experience of emotions such as anxiety.^{13,16,27} Observations of parent-child dyads have indicated that parental competency with child skin care tasks is associated with reduced experience of parental depression and stress, reduced parenting conflict, increased self-efficacy, and increased relationship satisfaction.⁵⁶ Given this, interventions to help parents feel more competent with health management tasks can help to reduce parental stress. In a study focused on providing parental education and teaching of parenting strategies to parents of children with asthma or atopic dermatitis, these interventions resulted in reductions of parent-reported parenting stress.⁵⁷ Additionally, parent and child support groups for children with food allergy that combine psycho-education about illness management with stress and anxiety management and problem solving skills have also been shown to reduce the burden reported by parents of children with food allergies.⁵⁸

School and Workplace Interventions

For pediatric patients, school educators and staff may lack knowledge, comfort, and/or willingness to support a child's needs in school, such that children may not automatically receive needed accommodations or exceptions.¹³ Given the previously discussed toll that allergic diseases can have on school functioning, children with allergic diseases need to have adequate supports and accommodations at school. The Rehabilitation Act of 1973 (Public Law 93-112) guarantees children with chronic illness equal access to education and resources, and Section 504 of this law requires schools to provide appropriate services to children with chronic illness.

School-based 504 Plans are formal, written educational plans that are designed by school-based teams to address a child's unique educational and medical needs. A well-planned health care strategy that includes coordination with school providers and implementation of needed accommodations and services at school is essential; behavioral health providers can be important for bridging this gap.⁵⁹ For children with more severe medical needs (e.g., the child cannot participate in a regular classroom or needs consistent specialized medical attention) or co-morbid learning, cognitive, or emotional/behavioral disorders, educational supports within the special education system through use of an Individual Education Plan (IEP) may be appropriate.⁶⁰ In addition to environmental precautions and ensuring access to medications, 504 Plans and IEPs can include school-based interventions to help children and families monitor treatment effects, promote treatment adherence, facilitate peer acceptance and interactions, combat bullying, and cope with the stress and burden of chronic illness.⁶¹ As adults, individuals with allergic disease may receive accommodations in the workplace via the Americans with Disabilities Act. Reasonable accommodations can include physical modifications to a workspace, flexible scheduling of duties, or provision of assistive technologies.⁶²

Public Health Interventions

Public health interventions, such as public health measures to address food labeling and packaging controls, would also be beneficial.⁶³ Perceived contamination creates stress when eating in restaurants or food service establishments, as a significant number of food reactions occur when eating food from these settings, even when staff are informed of the food allergy in advance.⁶⁴ Results from a survey of restaurants indicated that managers and staff were generally knowledgeable about food allergies and willing to accommodate customer's food allergies, but misconceptions were still reported, such as belief that a person with food allergy can safely

consume a small amount of the allergen.⁶⁴ Comprehensive training of restaurant and food establishment management and staff regarding food allergies and incorporation of plans and procedures to reduce the risk of customer food allergic reactions is needed and public health intervention in this area could also be beneficial.

Conclusion

In summary, recent trends signal increasing prevalence and severity of allergic diseases globally. Research has consistently found associations between allergic diseases and stress, such that patients with allergic diseases often experience stress, psychological distress, and reduced quality of life and, in turn, this experience of stress is associated with exacerbated disease presentation. Co-occurring allergic diseases, chronic disease presentation, and non-adherence to treatment are each associated with increased stress and increased disease burden. Physiologically, the experience of stress can result in a heightened inflammatory profile and, behaviorally, the experience of stress can negatively impact health-promoting behaviors, such as adherence with treatment recommendations.

Medical providers working with patients with allergic disease need to address patient's experience of stress and non-adherence to treatment recommendations. This could be done through routine screening and referrals to behavioral health or, ideally, through incorporation of a behavioral health provider within a multidisciplinary patient team. Research to date supports the benefit of behavioral health interventions and treatment with multidisciplinary teams that include behavioral health for patients with allergic disease.

Interventions

Interventions to address the stress experienced by patients with allergic disease include educational interventions, relaxation training, stress management training, cognitive and/or

behavioral interventions, coping skills training, support groups, biofeedback, sleep interventions, and strategies to addressing treatment non-adherence. Patients with allergic disease also may need workplace or school accommodations provided through The Rehabilitation Act of 1973 or the Americans with Disabilities Act and, as such, patient education, advocacy, and support regarding accessing needed accommodations can also be important for coordination of care.

Finally, community and public health interventions that target food labeling and packing as well as comprehensive training of restaurant and food establishment management and staff regarding food allergies is needed. As such, public advocacy and increased community awareness regarding allergies can also be beneficial.

Importance of Integrated Behavioral Health Care

Given the relationship between stress and allergic disease, and the impact on disease management and quality of life, behavioral health providers constitute an important resource for providers and families.¹³ Research suggests that integrated care programs in which behavioral health services are included in standard medical care can increase the accessibility and acceptability of mental health services for individuals with chronic illness.⁴⁰ Integrated care services can be provided in tertiary medical care centers¹³ or within primary care centers,³⁹ and can establish important clinical services including behavioral health screening, psychoeducation, and stress management interventions.

Limitations of the Current Literature

There is a considerably larger body of research on asthma than there is on non-asthma allergic disease and the majority of studies on asthma do not specify if patients have allergic or non-allergic asthma. This limits the information that is known about allergic versus non-allergic asthma, as well as available information regarding non-asthma allergic disease. Additionally, the

majority of research exploring stress in allergic disease is correlational and/or cross-sectional and the majority of research exploring behavioral health interventions for managing stress consists of uncontrolled open trials. As such, there are increased threats to internal validity within these studies and conclusions cannot be drawn regarding causality.

Future Directions

As the relationship between allergic disease and stress seems well-established, there is now a need for longitudinal studies to provide information regarding possible causal factors that explain this relationship and to specify the components of behavioral health interventions leading to improvements in adherence and stress management. An increased focus on differences between psychological reactions to stress in non-asthma allergic disease in the context of randomized, controlled trials would be further beneficial.

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531 Table 1. Behavioral Health Intervention Descriptions and Examples

Intervention	Description	Example
Behavioral Health Screening and Referrals	This involves identifying patients with behavioral health (mental health or substance use) symptoms and providing referrals for behavioral health evaluation and treatment.	At the doctor's office, a patient completes a questionnaire that indicates symptoms of depression. He is provided with a referral to a behavioral health provider.
Relaxation Training	This training involves teaching activities that individuals can engage in to increase their sense of calmness and reduce negative feelings, such as anxiety, pain, or stress.	A patient learns and uses exercises involving taking deep breaths and tensing and relaxing muscle groups to achieve a state of calm.
Stress Management Training	This training involves teaching coping strategies for managing stress.	A patient becomes more aware of her stress level and utilizes mindfulness techniques when her stress level is rising.
Coping Skills Training	This training involves teaching coping skills for responding to problems.	A child learns to utilize distraction tactics while engaging in skincare tasks that he does not enjoy.
Behavioral Therapy	A therapy that involves identifying and adapting maladaptive behaviors.	A depressed client, who has been spending most of the day in bed, engages in behavioral activation whereby she engages in activities despite feeling depressed.
Cognitive Therapy	A therapy that involves learning to identify and challenge maladaptive, negative, and/or unrealistic thoughts.	A client with a tendency to externalize blame learns to take responsibility for his health and healthcare tasks.
Cognitive-Behavioral Therapy	A therapy that involves learning to understand how one's cognitions, behaviors, and emotions are connected, and strategies for changing maladaptive thoughts and responses	A client thinks it isn't fair she has asthma and replaces this thought with "I don't like it, but everyone has some health problem at some point," and then feels more open to following treatment recommendations for her asthma.
Habit Reversal	A treatment intended to address problematic behaviors by	A patient with problematic scratching behavior is trained to become more

	increasing awareness of the behavior and developing a competing behavioral response.	aware of this behavior and clench his fists instead of scratch.
Exposure Therapy	A therapy that involves exposing a patient to a source of anxiety, often while also utilizing relaxation strategies.	A person with social anxiety who fears talking with others is encouraged to practice talking to others by engaging in brief conversations with peers.

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