



Asthma and Stress: The Double Conundrum

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Asthma is a heterogeneous disease characterized by chronic airway inflammation and defined by a history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and intensity, together with variable expiratory airflow limitation. Patients of bronchial asthma suffer from progressive and persistent decline in lung function throughout life, the degree of decline varying among individuals. Asthma affects 339 million people and leads to an annual mortality of 420,000 worldwide [1]. Asthma is a common disease in society and prevalence is rising.

Stress has long been recognised to be associated with asthma [2]. In fact, before the second half of the 20th century; asthma was predominantly viewed as a psychosomatic disorder in which stress was key factors in its aetiology. Increased awareness in the second half of the 20th century of other triggers of asthma (allergens and air pollution) had shifted the focus away from stress.

Our write up discusses the role of stress in asthma. Psychological factors like stress can modulate asthma symptoms and influence the management of asthma. Stress may include various forms like post-traumatic stress disorder, psychiatric disorders, community violence, stressful life events, partner violence and housing quality, war-related stress, neuroticism and relational problems, perceived safety issues, social depravity and high crime rates, anxiety and attention disorders, psychological distress, maternal anxiety, maternal depression and paternal Post Traumatic Stress Disorder (PTSD) and workplace-related stress [2]. Most of the studies that associated various forms of stress with asthma have been cross sectional in nature.

Many studies, longitudinal in nature have shown that emotional stress, anxiety and PTSD precedes the development of asthma both in children and adults. Huovinen E., et al. did a prospective study of 11,000 adults and found that low life satisfaction and neuroticism was associated with increased asthma prevalence [3]. Hasler G., et al. did a 20 year long prospective community study that showed dose response-type relationships between panic and asthma and bidirectional longitudinal associations between the two conditions [4]. Goodwin., et al. used multiple logistic regression analyses were used to examine the relationship between childhood mental health problems and physical disorders diagnosed by a physician in early adulthood. They found significant link between childhood mental health problems and asthma in early adulthood. Emotional problems and depression symptoms were associated with an increased risk of asthma in early adulthood [6]. A meta analysis of 34 prospective cohort studies by Chida., et al. investigated the influence of psychosocial factors on atopic disorders, including asthma. The meta-analysis revealed a positive association between psychosocial factors and future atopic disorder. Subgroup analysis of healthy and atopic populations showed that psychosocial factors had both an etiological and a prognostic effect on atopic disorders [6].

A number of studies and a growing body of evidence link community violence to the development of asthma. It has been postulated that violence exposure is a psychological and environmental stress that taxes individuals and communities [7-9]. At the individual level, increased stress leads to the dysregulation of the hypothalamic-pituitary-adrenal (HPA) and sympathetic-adrenal-medullary (SAM) axes, disrupting immune and respiratory processes,

and producing an increased risk of inflammatory diseases, such as asthma [10,11].

Some studies showed an inconsistent stress-associated increase in Fe NO in asthmatics and non asthmatics [12-14]. Direct neurogenic mechanisms may underlie at least part of the association between stress and asthma, but these mechanisms have rarely been studied [15]. A less known effect of stress is on the increased synthesis and secretion of nerve growth factor which is a pleiotropic molecule with very heterogeneous effects on immunity, inflammation, and nerve growth. Nerve growth factor is elevated in stress and lowers the threshold for subsequent neuronal responses, and is implicated in the promotion of asthma in a murine model. It can also shift the phenotype of nerves so as to promote synthesis and expression of substance P [16].

Stress of school examinations on otherwise apparently healthy young college students with mild asthma had several effects; it promoted the number of eosinophils in blood and sputum, increased IL-5 generation by sputum cells, decreased the ratio of interferon (IFN)- γ to interleukin (IL)-5, caused a shift in cytokine generation to that of a Th2 character, increased the amount of eosinophil-derived neurotoxin in sputum supernatants, and caused an inverse correlation between sputum eosinophils and FEV1. Thus stress acts as a cofactor to increase eosinophilic airway inflammation [17].

Clinicians should inculcate ways and means in patients to reduce stress. Stress management may include meditation, yoga, exercise, breathing techniques and ways of social engagement. Healthcare providers who care for patients of asthma should actively screen for underlying psychosocial issues and obtain psychiatric or social worker input when appropriate and provide social support when possible.

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