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ORIGINAL ARTICLE

Neuroticism, anxiety, and depression in Egyptian atopic bronchial asthma

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Abstract The association between allergic and psychological disorders had been reported, but whether the key mediating ingredients are predominantly biological, psychological, or mere artifacts remains unknown. We aim to examine the relationship between objectively measured atopic status and anxiety, depression, and neuroticism.

Methods: This randomized case controlled trial was conducted on 50 atopic patients and 50 healthy controls. Atopy was determined by skin prick test and allergy related symptoms. Psychological assessment was done using Beck Depression Inventory (BDI) for the level of depression, the State-Trait Anxiety Inventory (STAI) for anxiety level, while Middle Sex Hospital Questionnaire (MHQ) for measurement of neuroticism. Serum total IgE level was detected in both groups.

Results: 100 individuals were enrolled (50 atopic patients and 50 healthy control subjects) with a mean age (28.24 ± 9.74) and (32.60 ± 8.23) respectively. The mean STAI score for both state and trait anxiety was significantly higher in atopic versus non-atopic ($p = 0.000$) while the mean BDI score was higher in atopic than non-atopic patients but without statistical significance. Also, there was no significant difference in the mean MHQ scores (for hysteria, depression, obsession, somatic anxiety, phobic anxiety and free-floating anxiety) in atopic versus non-atopic groups. There was no correlation between the mean STAI, BDI, and MHQ scores and the mean value of total IgE levels in atopic patients.

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Conclusion: Atopic patients are more likely to have both state and trait anxiety than non-atopic. So, it might be considered in management plan of atopic patients.

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Introduction

Several epidemiological and clinical studies have examined the relationships between various psychosocial factors and allergic diseases, predominantly asthma [1,2]. Some of the studies examined the relationships between allergic diseases and various personality traits, such as neuroticism [3,4], anxiety [5,6], and depression [7]. The co-occurrence of an anxiety or depressive disorder has been shown to be associated with adverse outcomes such as poor symptom control, increased health care utilization, and impaired quality of life (QOL) in adult asthmatic patients.

Nowadays, the studies of their relationship can be viewed from the standpoint of the biopsychosocial model of disease [1–5]. The model postulates that one needs to take into consideration the interaction between biological, psychological, and social factors to be able to understand different disease outcomes, i.e. vulnerability to disease, disease onset, expression of symptoms, disease progression, exacerbation, recovery, survival, and associated quality of life [8].

The majority of studies performed till now have examined the association between psychosocial factors and allergic diseases, and did not attempt to distinguish between asymptomatic atopic constitution and allergy symptoms. Atopy is defined as a personal and/or familial tendency, usually in childhood or adolescence, to become sensitized and produce IgE antibodies in response to ordinary exposures to allergens. Atopy should be documented by objective markers, i.e. IgE antibodies in serum or by a positive skin prick test. A person of the atopic constitution may develop typical allergic symptoms of asthma, rhinoconjunctivitis, or eczema [9].

So we are aiming to investigate the hypothesized association between the atopic status and psychological disorders especially neuroticism depression, and anxiety. Also, whether it differs if the patient had multiple allergen sensitivity, multiple atopic phenotyping or not.

Subjects and methods

After approval by the Medical Research Ethics Committee, Mansoura University, Egypt, 50 atopic patients with ages ranging from 18 to 54 years and 50 healthy non-atopic subjects with age range from 22 to 50 years were enrolled in this study. The atopic patients were further subdivided into bronchial asthma (BA) alone and BA associated with symptoms of other atopic diseases allergic rhinitis, allergic conjunctivitis and atopic dermatitis. All patients' diagnoses were confirmed by chart review and verified by treating physician. Exclusion criteria; if the patients had an apparent cognitive deficit or mental defect or if they had a significant chronic medical conditions that conferred a greater risk for morbidity (e.g. COPD, CHD, ...).

All patients were recruited from consecutive patients to the allergy and immunology unit in the chest department, Mansoura University Hospital from April to September 2013.

A questionnaire including general data and medical history was completed by a physician for each subject. Data about a history of pulmonary, nasal, eye and skin symptoms due to allergy were also collected. All patients were subjected to skin prick testing, and a blood samples were collected for detection of total IgE levels.

Skin prick test

Skin prick testing (SPT) was performed using a standard method [10] with a panel of common local allergens. SPT included testing with positive control solution (10 mg mL⁻¹ of histamine hydrochloride) and negative control solution (buffer solution). Skin reaction (wheal) was evaluated after 15 min. The mean skin reaction (mean wheal diameter) was calculated according to the formula $(D + d)/2$, where D represented the largest longitudinal diameter and d its midpoint orthogonal diameter in mm. For statistical evaluation of the SPT results, the difference between mean skin reaction to each allergen and negative control solution was used as a parameter of SPT reactivity. The results of SPT were considered positive when the mean wheal diameter was larger than the negative control for 3 mm or more in at least one tested allergen.

Psychological assessment

Depression level

Level of depression was evaluated with the Beck Depression Inventory (BDI) [11]. The participants were required to answer 21 questions and each answer was scored on a scale from 0 to 3. The BDI overall score corresponds to the depression levels in a given individual, with higher overall scores indicative of more severe depressive symptoms. The individual is considered free from depression if the overall score is 9 points or less, mildly depressed from 10 to 18, moderately depressed from 19 to 29 and severely depressed if 30 or more.

Levels of trait anxiety and state anxiety

Anxiety level was determined using the State-Trait Anxiety Inventory (STAI), which examines anxiety as a transient state (X-1 questionnaire) and a relatively stable personality trait (X-2 questionnaire) [12]. Each questionnaire consists of a 20-question inventory, with answers scored from 1 to 4. Higher overall scores suggest higher levels of anxiety. The level of anxiety was classified as follows: mild < 30, moderate from 30 to 50, and severe > 50.

Middle Sex Hospital Questionnaire (MHQ)

The MHQ test was designed for providing a measure of neuroticism. It is a 48 item Questionnaire covering six neurotic manifestations (free-floating anxiety, phobic anxiety,

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