The assessment the role leptin, adiponectin levels and body mass index in asthma patients

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Abstract

Asthma is an autoimmune disorder characterized by chronic inflammation within the bronchial tubes of the respiratory system. Many cells and cellular elements contribute to the development of asthma, this causes the return of inflammatory cells that attack the respiratory system and cause wheezing, shortness of breath, chest tightness, coughing, and difficulty sleeping. This study was conducted to evaluate adiponectin and leptin levels and body mass index in asthma patients. The samples consisted of 120 volunteers divided into a patient group of 80 men and women with asthma (40 for each group) and a healthy group of 40 men and women as control groups (20 for each group). They were collected at Al-Zahra Center for Allergy and Asthma / Baghdad / Al-Karkh during the period from December 2022 to April 2023, and their ages ranged between (18 - 76) years after their clinical features were confirmed by a specialist doctor. The current results showed a significant increase in levels of both adiponectin and leptin and in body mass index (BMI) at ($P \leq 0.05$) in the patient group compared to the healthy.

Keywords: - asthma, Leptin, Adiponectin, body mass index.

Introduction:

Asthma is a disease with recurring symptoms of shortness of breath, severe cough, choking, airway obstruction, bronchial hypersensitivity, and inflammation of the respiratory tract. Asthma is one of the most common respiratory diseases in the world, affecting about 300 million people worldwide, and it is expected to increase to 400 million by 2025 [1].

Asthma is an acute inflammation of the bronchi, in which mast cells, eosinophils, neutrophils, T lymphocytes, macrophages, and epithelial cells have a role in the development of bronchiolitis. [2]. Excess body weight is a major cause of asthma development, especially in young people. Many comprehensive studies have confirmed a strong relationship between obesity and asthma, which leads people with obesity to develop severe asthma that cannot be well controlled, and to show relatively high resistance to treatment. [3].

Leptin, one of the hormones derived from adipocytes, has a size of 16 kilograms and has a role in regulating the metabolism process and playing a role in the immune system. [4]. Leptin has a significant impact on body weight by affecting appetite and on metabolism. [5]. Leptin levels are higher in people with high body weights compared to people with low body weights, which indicates that obesity may be resistant to leptin. [6]. Excess body weight is closely related to the risk of developing asthma [7]. Leptin contributes to stimulating inflammation in the body, which leads to the risk of developing and developing asthma [8]. Respiratory sensitivity is related to increased leptin secretion. [9]. The lung contains leptin receptors [10]. Many studies have been conducted to evaluate leptin levels in asthma, and the results have shown that leptin may be related to the risk of developing and developing asthma. [11].

Adiponectin is a type of protein produced from white adipose tissue in the body. This protein consists of a chain of amino acids containing a total of 224 amino acids [12]. In 1995, adiponectin was announced, and the gene that encodes this protein is located on chromosome 3q27. [13]. Adiponectin is one of the most abundant proteins in the blood, its normal level is between 5 and 30 microliters per milliliter. It is produced by fat tissue in the body. [14]. Studies in mice have found that adiponectin may have an effect on the development of asthma [15]. This relationship has not been well confirmed in humans yet. Research suggests that adiponectin may prevent the development of asthma in humans [16]. Studies have shown an association between adiponectin levels in the blood and the risk of asthma [17].

Body mass index (BMI) is a measure currently used to define the characteristics of human height and weight in adults and classify them into different groups. It also represents an indicator of an individual's obesity, which is a factor in causing human health problems. [18]. Obesity is associated with the risk of developing allergic diseases. [19]. Considering the possibility that obesity may increase the inflammatory state in the body, [20]. Previous reviews have analyzed the relationship between allergic diseases and body mass index (BMI) at specific time points, or in relation to the speed of fat growth. [21].

The aim of study:

Evaluating the effect of asthma on weight and obesity, as asthma is considered one of the chronic diseases that may affect a person’s weight directly or indirectly.

Materials and Methods:

5 ml of blood was obtained from healthy controls and asthma patients using medical syringes, and the blood analysis then was transferred to a gel tube to separate the serum. The Taube gel samples are placed in the centrifuge for 30 minutes at 4000 rpm, after which the blood serum is withdrawn and placed inside a Plain Tube and stored at a temperature of (-20 degrees Celsius) until the time of examination. Samples were collected at Al-Zahra Center for Allergy and Asthma / Baghdad / Karkh. The study started from December 2021 to April 2022 on the ages of the study population ranged between (18 - 76) years. The total subjects were 120 individuals, 80 Of men and women with asthma (40 for each group) and 40 Of healthy men and women as control groups (20 for each group).

The patients' condition was confirmed through the doctor's diagnosis and tests that support the diagnosis, such as lung function testing. Patients were interviewed directly using a questionnaire that included name, gender, age, family history, body mass index, and medication intake. Leptin and adiponectin were estimated using the company's sandwich method (ELISA) https://www.cloud-clone.com kits [22]. Statistical analysis was done by using SPSS and a comparison was made between various groups, which were evaluated by t-test. The level of statistical significance was calculated at ($P \leq 0.05$)

Results:

Results showed an increase in adiponectin and leptin levels at a level ($P \geq 0.05$) in asthma patients compared to healthy controls, as shown in Table (1) and Figures 1 and 2.

Parameters	mean ± S.D male Asthma	mean ± S.D male healthy	P- value	mean ± S.D female Asthma	mean ± S.D female healthy	p- value
leptin (ng/m)	(3.00±0.30)	(1.84±0.34)	0.0001**	(3.40±0.80)	(1.60±0.63)	0.0001**
Adiponectin(ng/m)	(6.43±1.14)	(1.60±0.48)	0.0001**	(6.04±0.84)	(1.24±0.18)	0.0001**

Table (1) shows the levels of both adiponectin and leptin levels, (pg/ml) In (Patients with asthma compared to Healthy).

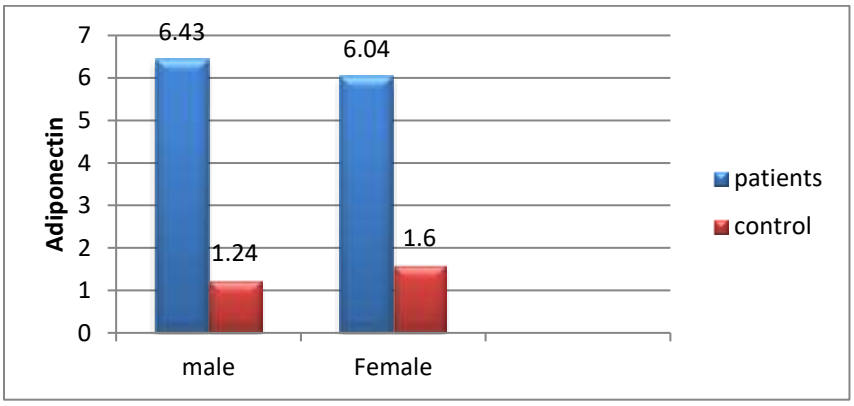

Fig 1: showing the increase in adiponectin levels (pg/ml) In Patients with asthma compared to healthy.

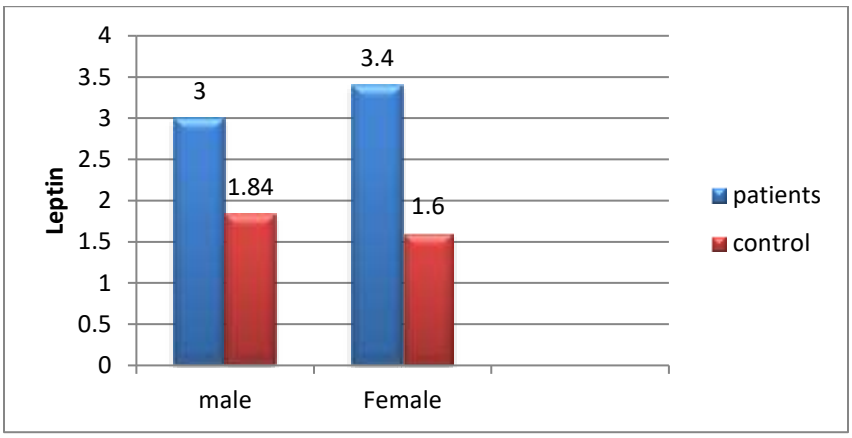

Fig 2: showing the increase in leptin levels (pg/ml) In Patients with asthma compared to healthy.

The Body mass index (BMI):

In the current study the results of the body mass index were found to be higher at the level ($P \geq 0.05$) in asthma patients compared to healthy people, as shown in Table (2) and Figure (3).

parameters	mean ± S.D male Asthma	mean ± S.D male healthy	P- value	mean ± S.D female Asthma	mean ± S.D female healthy	P- value
BMI	(29.27±0.885)	(25.63 ±0.402)	0.0001**	(28.04 ± 1.96)	(24.09± 0.06)	0.0001**

Table (1) shows the levels of body mass index levels (pg/ml) in patients and control groups.

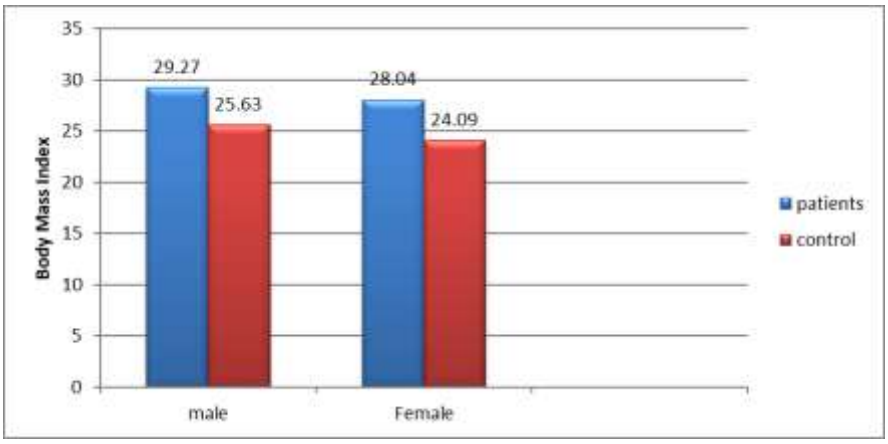

Figure 3: There is a difference in the levels of body mass index (pg/ml) of patients with asthma compared to healthy people.

Discussion

The level of leptin increased significantly ($P \geq 0.05$) In asthma patients compared to healthy people. And this result agrees with. Szczepankiewicz et al [23]. and also agree with Kilic, H et al [24]. The hormone leptin is higher in obese women with asthma compared to thin women. This is due to the formation of large masses of fat cells, as the concentration of leptin increases in obese people compared to thin people. [25]. Levels of the hormone leptin in the blood increase after eating, and also increase in cases of inflammation and infection. [26].

Changes in leptin levels may be linked to exacerbation of clinical asthma, and this is related to the severity of inflammation in the lungs. [27]. The level of leptin increased significantly ($P \geq 0.05$) In asthma patients compared to healthy people. And this result agrees with. Osman et al [28].

This study is in solidarity with previous research that found an increase in adiponectin levels in asthma patients compared to individuals without asthma. [29]. Studies suggest that the protein adiponectin may have an impact in the development of obesity-related bronchial asthma. Obesity is an inflammatory disease and a risk factor for lung disease, and sufferers have high levels of adiponectin in the blood. Studies have shown that increased levels of adiponectin can increase respiratory inflammation and vascular changes in the lung, and can worsen asthma symptoms. It is believed that adiponectin has a role in regulating inflammation in acute lung

diseases, and helps reduce inflammation, stress, and oxidation in the lung. Therefore, adiponectin is a potential therapeutic target for obesity-associated bronchial asthma. [30].

It was also noted from the results of this study that there was a significant difference in the Body mass index (BMI). between patients with asthma of both sexes and healthy people ($P \leq 0.05$). Thus, suffering from asthma leads to increased body mass and weight gain. Previous studies have confirmed that weight gain and increased body mass, or even imposed weight loss, are significantly and significantly linked to increased disease severity and infections, as well as increased non-response to treatment [31].

Conclusion

The results of the current study indicated a positive correlation between increased leptin and adiponectin levels and obesity in asthma patients.

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