

VOLUME 9

ISSUE 2

2023

ISSN 2454 – 3055



**INTERNATIONAL
JOURNAL OF
ZOOLOGICAL
INVESTIGATIONS**

***Forum for Biological and
Environmental Sciences***

Published by Saran Publications, India



International Journal of Zoological Investigations

Contents available at Journals Home Page: www.ijzi.net

Editor-in-Chief: Prof. Ajai Kumar Srivastav

Published by: Saran Publications, Gorakhpur, India



ISSN: 2454-3055

Estimation of the IL-6 and IL-13 levels in Some Obese People in Diyala Governorate, Iraq

Marwa Yahya Mohamed Khairy* and Maha Falih Nazzal

College of Education for Pure Sciences, University of Diyala, Iraq

*Corresponding Author's e-mail: pbiomsc.marwayahya@uodiyala.edu.iq; Maha Falih e-mail: Maha.falih@uodiyala.edu.iq

Received: 4th June, 2023; **Accepted:** 2nd July, 2023; **Published online:** 12th August, 2023

<https://doi.org/10.33745/ijzi.2023.v09i02.034>

Abstract: Obesity is an undesirable humankind physiological case. It is the reason for annoying many people because its symptoms are similar to a disease. It means the accumulation of the excess fats in the body. To some extent it can be a health danger since there is no balance between the eaten and consumed galleries. The recent study aimed to explore the levels of IL-6 and IL-13 in a group of the obese patients whose BMI is 40 kg/m² or more. This was done in comparison with the ideal or health (control) group whose BMI is 25 kg/m². The study sample involved 88 participants distributed into 50 obese persons representing the patients group and 38 healthy persons representing the control group and they have the ideal weight. The patients are diagnosed by doctors specialized in feeding and obesity in Baquba Teaching Hospital, Diyala, Iraq and the study period was from September, 2022 to December, 2022. The study showed that obesity was higher among females than males. The collected sera were separated and it was discovered the above ratios of cytokines ELISA method was employed for measuring the level interleukin IL-6 and IL-13. The recent study showed an increase in the IL-6 level in the obese group (3.81 ± 0.07 pg/ml) in comparison with the control group (2.10 ± 0.08 pg/ml). Also, the results showed an increase in the IL-13 in the obese group (8.40 ± 0.13 pg/ml) in comparison with the control group (5.53 ± 0.12 pg/ml) ($P < 0.05$).

Keywords: Obesity, IL-6, IL-13, ELISA

Citation: Marwa Yahya Mohamed Khairy and Maha Falih Nazzal: Estimation of the IL-6 and IL-13 levels in some obese people in Diyala Governorate, Iraq. Intern. J. Zool. Invest. 9(2): 329-333, 2023.

<https://doi.org/10.33745/ijzi.2023.v09i02.034>



This is an Open Access Article licensed under a Creative Commons License: Attribution 4.0 International (CC-BY). It allows unrestricted use of articles in any medium, reproduction and distribution by providing adequate credit to the author (s) and the source of publication.

Introduction

One of the undesirable mankind physiological cases is obesity. It annoys many people and its symptoms are similar to a disease. Obese individuals face lots of negative personal images in the society and many medical and economical consequences (Lu *et al.*, 2018). Obesity is regarded

as multi-factors. This case is developed by different factors such as genetic, pathological, and environmental, feeding system, and physical activity (Ang *et al.*, 2013).

In the past years, an increasing attention was paid to studying obesity because it has spread

largely and continuously over the world and among different age categories. It was estimated that 0.5 %) of children and 12.0 % of maturing people are suffering from obesity around the entire world (GBD et al., 2017). In 2010, there was more than milliard persons suffering from obesity and nearly 300 million persons or more were classified as obese due to BMI that is 30 kg/m² around all the world (Balistreri *et al.*, 2010). Generally, the people difficulty increases with this disease particularly patients of diabetes, high blood pressure, diseases of heart and blood vessels, and some types of cancer and respiratory diseases (Mitchel *et al.*, 2011).

During past two decades, adipose tissues were described as multifunctional member that plays an important role not only in storing fat/ energy, but also it affects the functions of endocrine and immunity (Falcão-Pires *et al.*, 2012). These tissues work as a main member in the endocrine via releasing a number of biological activating materials known as the secreting factors derived from fat or adipokine that have pro- or anti-inflammatory activities. Also, the irregular production or secreting these adipokines because of a defect in the adipose tissues can cause consequences related to obesity (Ouchi *et al.*, 2011). Throughout the unhealthy weight increasing, the flowing and storing of excess fats in the adipose cells lead to distrusting the function of a normal cell. Consequently, this leads to increase the secretion of inflammatory peptides and this will be an excess secretion in the blood vessels.

Consequently, obesity is defined as a case of systemic inflammation-lower grade. It is characterized with high levels of spread inflammatory particles such as TNF- α , IL-6, and CRP (Huang *et al.*, 2013). IL-6 increase obesity and can be responsible for the high level of acute phase proteins such as CRP in obesity (Fantuzzi, 2005). In addition, the increase of IL-13 is connected with the body increase and central obesity (Schmidt *et al.*, 2015).

Materials and Methods

Study Design and Samples:

This study was conducted from September 2022 to December 2022, in Baquba Teaching Hospital and private clinics. Samples were taken under the supervision of doctors specializing in obesity and nutrition in Diyala Governorate, Iraq. The study included 50 obese patients. The lengths and weights of the study participants were determined for the purpose of calculating Body Mass Index to confirm obesity, the number of males 9 and the number of females 41 with ages ranging from 15-55, and 38 samples of apparently healthy people were collected as a control group, the number of males 25 and the number of females 13. Under sterile conditions, 5 ml of venous blood was withdrawn and transferred to the laboratory, and using a centrifuge, blood samples were separated into serum and kept in sterile tubes by freezing until immunological tests were performed. The ELISA technique was used to measure the level of interleukin-6 and interleukin-13 according to the manufacturer's instructions.

Test principle:

In this test, a group of enzymes were used according to the Immunoassay technique using the Sandwich ELISA test to estimate the levels of IL-6, and IL-8. The microtiter plate was coated with specific IL-6 and IL-13 antibodies, standard solution and samples were added to the wells of the plate, after the incubation process, a biotinylated solution (biotin-labeled antibody) was added to bind the antibodies to both IL-6 and IL-13 to form the immune complex (Antibodies-Antigen-Antibodies). After an incubation period and washing steps, the horseradish peroxidase is added to the wells, all unbound materials (the peroxidase enzyme) are removed by wash solution, then a substrate is added, the color of the solution turns from blue to yellow after the addition of the stop solution and the optical density is measured using an ELISA reader.

Statistical Analysis:

For statistically analyzing the study data, the Statistical Package of Social Science (Version 27) is used for both the mean and standard error of the

Table 1: IL-6 and IL-13 levels in obese people and control sera (pg/ml)

Interleukins	Patient group	Control group	p-value
IL-6	3.81±0.07	2.10±0.08	0.05
IL-13	8.40 ± 0.13	5.53±0.12	

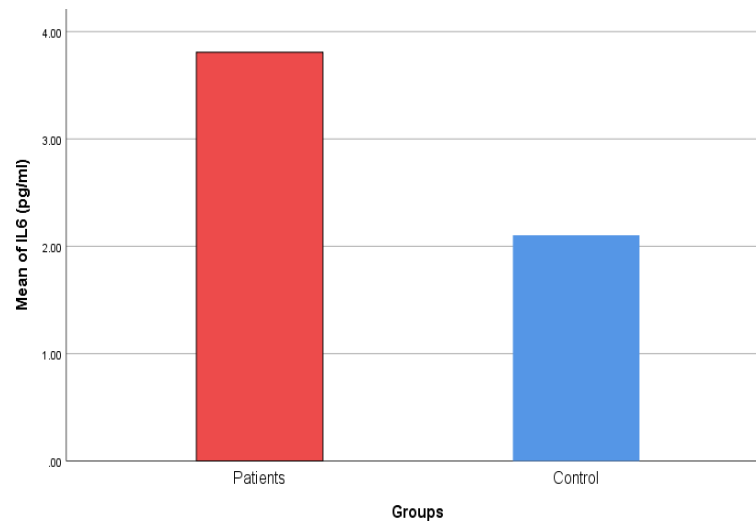


Fig. 1: IL-6 level in obese people and control.

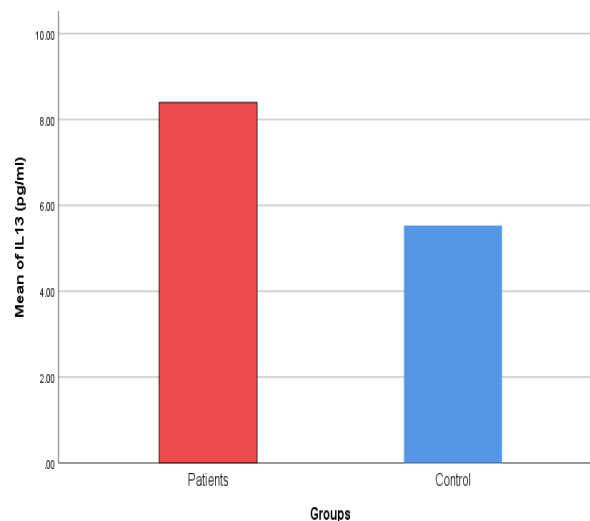


Fig. 2: IL-13 level in obese people and control.

data. Also, t-test is used for assessing probability and the significant probabilities were accepted at or less than 0.05.

Results and Discussion

The results of the current study showed an increase of IL-6 among the obese patients

(3.81±0.07) in comparison with the control (2.10±0.08). Also, the results of the statistic analysis indicated a significant difference (P-value ≤0.05). The study results showed an increase of the IL-13 level among the obese patients (8.40±0.13) in comparison with the control (5.53±0.12). Accordingly, there was a significant

difference (P value ≤ 0.05), as shown in the following Table 1 and Figures 1 and 2.

The results of the current study are in conformity with those of El-Mikkawy *et al.* (2020) that showed an increase in the levels of IL-6 in the obese patients group and there were significant positive correlation between the levels of IL-6 and the Body Mass Index among the individuals suffering from obesity-Grade 3. This high level reflected the severe chronic inflammation developed with high grades of obesity. The results of present study is in agreement with the observations of Ellulu *et al.* (2017) who indicated an increase of IL-6 in the obese individuals. This was because the motivation of increasing the large quantity of feedings in the adipose tissues in secreting the inflammatory mediators such as TNF- α and IL-6. Also it decreased the production of adipokine (anti-inflammatory) since it motivates IL-6 to make and secrete CRP as a risk factor. This is because inflammation is connected with heart and cardiovascular diseases, metabolic syndrome, insulin resistance and diabetes.

In addition, the results of this study derives support from the observations of Casimiro *et al.* (2020) indicating that there was a positive correlation between the obese adipose tissues and the levels of IL-6. There is similarity between the present study and the report of Schmidt *et al.* (2015) who have also observed correlation between the general obesity and central obesity concerning a group of interleukins like IL-12, IL-13, etc., in the individuals who suffered from obesity because of the regulation of pro- and anti-inflammatory cytokines which are related to obesity, insulin resistance, and diabetes disease.

The present study results matched with the results of Nehete *et al.* (2014) showing that there was an increase in the plasma cytokines such as IL-6, IL-13, TNF- α , metabolic hormones such as insulin in the individuals who suffered from an increasing weight and obesity in comparison with those who had healthy weight. The result was related to the fact that obesity is

low-grade chronic inflammation. Martinez-Reyes *et al.* (2018) showed an increase in the levels of IL-13 in the serum of individuals having insulin resistance. Finally, there are a number of studies which showed that the insulin resistance is connected to obesity and low-grade systemic inflammatory.

Conclusion

It can be concluded from the present study that there is an increase in the levels of IL-6 in the sera of patients infected with obesity in comparison with the control and also levels of IL-13 increased in obese patients' sera in comparison to the control.

References

- Ang YN, Wee BS, Poh BK and Ismail MN. (2013) Multifactorial influences of childhood obesity. *Curr Obesity Rep.* 2: 10-22.
- Balistreri CR, Caruso C and Candore G. (2010) The role of adipose tissue and adipokines in obesity-related inflammatory diseases. *Mediators Inflamm.* 2010: 802078.
- Casimiro I, Hanlon EC, White J, De Leon A, Ross R, Moise K, Piron M and Brady MJ. (2020) Reduction of IL-6 gene expression in human adipose tissue after sleeve gastrectomy surgery. *Obesity Sci Practice* 6(2): 215-224.
- Ellulu MS, Patimah I, Khaza'ai H, Rahmat A and Abed Y. (2017) Obesity and inflammation: the linking mechanism and the complications. *Arch Medical Sci.* 13(4): 851-863.
- El-Mikkawy DM, EL-Sadek MA, EL-Badawy MA and Samaha D. (2020) Circulating level of interleukin-6 in relation to body mass indices and lipid profile in Egyptian adults with overweight and obesity. *Egyptian Rheumatol Rehabilitation* 47(1): 1-7.
- Esser N, Legrand-Poels S, Piette J, Scheen AJ and Paquot N. (2014) Inflammation as a link between obesity, metabolic syndrome and type 2 diabetes. *Diabetes Res Clin Practice* 105(2):141-150.
- Falcão-Pires I, Castro-Chaves P, Miranda-Silva D, Lourenco AP and Leite-Moreira AF. (2012) Physiological, pathological and potential therapeutic roles of adipokines. *Drug Discovery Today* 17(15-16): 880-889.
- Fantuzzi G. (2005) Adipose tissue, adipokines, and inflammation. *J Allergy Clin Immunol* 115(5): 911-919.

- GBD. (2015) Obesity Collaborators, 2017. Health effects of overweight and obesity in 195 countries over 25 years. *New England J Med.* 377(1): 13-27.
- Huang CJ, Zourdos MC, Jo E and Ormsbee MJ. (2013) Influence of physical activity and nutrition on obesity-related immune function. *The Scientific World J.* 2013: 752071.
- Lu DY, Che JY, Wu HY, Yarla NS, Xu B, Wu SY, Huang YK, Lu TL and Lu DF. (2018) Obesity, risks and managements. *Metabolomics* 8(1): e156.
- Martínez-Reyes CP, Gómez-Arauz AY, Torres-Castro I, Manjarrez-Reyna AN, Palomera, L, Olivós-García A, Mendoza-Tenorio E, Sánchez-Medina GA, Islas-Andrade S, Melendez-Mier G and Escobedo G. (2018) Serum levels of interleukin-13 increase in subjects with insulin resistance but do not correlate with markers of low-grade systemic inflammation. *J Diabetes Res.* 2018: 7209872.
- Mitchell NS, Catenacci VA, Wyatt HR and Hill JO. (2011) Obesity: overview of an epidemic. *Psychiatric Clinics* 34(4): 717-732.
- Nehete P, Magden ER, Nehete B, Hanley PW and Abee CR. (2014) Obesity related alterations in plasma cytokines and metabolic hormones in chimpanzees. *Int J Inflam.* 2014: 856749.
- Ouchi N, Parker JL, Lugus JJ and Walsh K. (2011) Adipokines in inflammation and metabolic disease. *Nature Rev Immunol.* 11(2): 85-97.
- Schmidt FM, Weschenfelder J, Sander C, Minkwitz J, Thormann J, Chittka T, Mergl R, Kirkby KC, Faßhauer M, Stumvoll M and Holdt LM. (2015) Inflammatory cytokines in general and central obesity and modulating effects of physical activity. *PLoS One* 10(3): e0121971.