

## IL-1 BETA AND IL-6 CYTOKINES PROFILE IN OBESE AND OVER WEIGHT WOMEN IN HILLA CITY-IRAQ

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### ABSTRACT

The occurrence of obesity has augmented fast through new year. Our previous study showed obesity was related with diseases and or infections recorded, adipose tissue mediates immune system. Present study aim is evaluation some immune aspect related with IL-1- Beta as pro-inflammatory cytokine and IL-6 cytokine as both pro and anti-inflammatory cytokine) production in obese versus normal weight women. Enzyme-linked immune sorbent assay (ELISA) used for detecting and quantifying cytokines. Results shows that the concentration of the IL-1Beta as pro inflammatory cytokine stood greater in obese and overweight women ( $186.2 \pm 58.54$ ,  $n=17$ ) than in normal weight women (control group ( $20.41 \pm 9.387$ ,  $n=3$ ), ( $F=220.4$ ,  $P < 0.05$ ) while here stayed not any substantial variances in IL-6 concentrations between test group ( $198.5 \pm 34.93$ ,  $n=15$ ) in compare with control group ( $212.6 \pm 122.9$ ,  $n=3$ ), ( $F=2.475$ ,  $P=0.240$ ). In conclusion, our result improved that obesity responsible in elevation level of pro-inflammatory cytokine IL-1 Beta and interleukin 6 play important role as both anti and proinflammatory cytokine.

**Key words:** Obesity, IL-1Beta, IL-6, pro inflammatory cytokines.

### INTRODUCTION

The occurrence of obesity has amplified fast through recent years. Obesity affect immune system. [Marti *et al.*, 2001]. Cells of Immune system and adipocytes show resemblances trendy configuration and role in the creation of several inflammatory intermediaries. [Marti *et al.*, 2001, Nave *et al.*, 2011]. Adipose tissue facilitates immune system and adipose tissue relations by the excretion of adipokines, such as, leptin [Nave *et al.*, 2011]. The variation of macrophages takes by exposed toward exist precious through the existence of fatness [Marti *et al.*, 2001, Nave *et al.*, 2011]. Adipose tissue altering happens in obesity, considered through adipocyte hypertrophy then enlarged penetration of macrophages which furthermore change to phenotype of a proinflammatory. IL-1 $\beta$  a main cytokine created mainly in macrophages, is occupied trendy the progress of obesity-related insulin conflict [Chen, 2015].

Our previous study showed obesity was related with diseases and or infection recorded, in height pressure of blood, diabetes type 2, cancer, including breast cancer, breathing disorders, including sleep apnea, infertility, non-alcoholic fatty liver disease, osteoarthritis, cellulitis and skin condition, gallbladder, gallstone, headache, teeth problems, hair fall, skin blackness, varicose veins, recurrent urinary tract infection, Atopic Dermatitis) Eczema, susceptibility to influenza infection, tuberculosis, stomach ulcer (*Helicobacter pylori*), pneumonia [Al-Mahdi *et al.*, 2016].

Adipocytokines representative mostly soluble hormones created typically but not wholly by adipo-

cytes have been exposed to have specific parts through immune responses. Leptin and adiponectin are the greatest profusely produced adipocytokines through distinct imports on immune responses and metabolism. Leptin has been related with chiefly pro inflammatory traits and the capability to encourage the making of 'classical' pro inflammatory cytokines for example IL12, TNF- $\alpha$  and IL1, all ensuing into a Th1-ruled pro-inflammatory immune response [Gainsford *et al.*, 1996]. Obesity exists clear in a ceremonial of prolonged standard inflammation named inflammation of metabolic in which the cells of immune, specially monocytes stay triggered penetrate the increasing adipose tissue then convert distinguished as occupant adipose tissue macrophages. ATMs remain categorized through the appearance of M1 or proinflammatory markers (MCP-1, TNF- $\alpha$ , IL-6, CD11) [Michaud *et al.*, 2013]. Interleukin IL-6 is a significant cytokine is concealed in adipocytes, macrophages then further causes containing emaciated muscle, endothelial cells [Febbraio *et al.*, 2002, Sundararaj *et al.*, 2009]. It exists a general manager mass organization and metabolism of lipid [Shoelson *et al.*, 2006., Mohamed-Ali *et al.*, 1997]. It remains too related through fatness then resistance of insulin; nevertheless, it is uncertain whether it shows a risky [Eder *et al.*, 2009, Senn *et al.*, 2002] or a protecting part [Mauer *et al.*, 2014., Pedersen *et al.*, 2007]. Our present study aim is an evaluation the concentration of together IL-1 Beta then IL-6 in both obese and normal weight women in Hilla city in middle of Iraq.

## Materials and Methods

**Assessment of obesity:** Body mass index (BMI) is a modest index of weight for height that is used to categorize weighty and obesity in grownups. It is distinct as individual's weight in kilograms allocated by the square of his height in meters (kg/m<sup>2</sup>) [WHO, 1997].

$$\text{BMI} = \left[ \frac{\text{Weight in Kg}}{(\text{Height in meter})^2} = \frac{\text{Kg}}{(\text{m})^2} \right]$$

- . a BMI more than or equivalent to 25 is overweight
- . a BMI more than or equivalent to 30 is obesity (table-1).

BMI delivers the greatest beneficial public level ration of obesity and weighty as it is the similar for together sexes and for wholly ages of adults. But, it must be reflected a rough guide since it might not agree to the similar grade of obesity in diverse persons.

**Blood Sampling:** Samples collection for present work was performed from Merjan Hospital during 2016. Blood were collected from obese and overweight women as well as from normal weight

women using sterile disposable syringes. Each taster minus anticoagulant for parting of sera to study ELIZA cytokines, cytokine IL-1 beta, IL-6 grit stayed executed as in creation orders.

**Cytokine Score:** The cytokine reactions existed valued as immune enzyme color responses in relationships of picograms per milliliters.

**Biometric Analysis:** Statistical analysis and graphing was accompanied with Graph Pad Prism software (Graph Pad Software, Inc, La Jolla, CA).

## RESULTS

Results shows that the concentration of the pro inflammatory cytokine IL-1B was greater in obese and overweight women (186.2 ± 58.54, n=17) than in normal weight women (control group (20.41 ± 9.387, n=3), (F=220.4, P < 0.05) and results are presented in table-1 & fig. 1, while there stayed no significant variances in concentrations of IL-6 among test group (198.5±34.93, n=15) in comparison with control group (212.6 ± 122.9, n=3), (F=2.475, P=0.240) table-1, fig. 2.

**Table 1: Cytokine profile in overweight and obese women versus normal weight women**

Test group	Cytokine concentration (pg/ml)	
overweight and obese women	IL-1 Beta	IL-6
Sample-1	16.38	100.42
Sample-2	57	417.60
Sample-3	43.6	463.77
Sample-4	186	308.85
Sample-5	952	289.07
Sample-6	58.7	148.76
Sample-7	49.5	127
Sample-8	53	103
Sample-9	161	15.46
Sample-10	83	325
Sample-11	205	108
Sample-12	108	269
Sample-13	195	103
Sample-14	118	99
Sample-15	153	100
Sample-16	631	383.7
Sample-17	113	457.6
Normal weight (control group)		
Sample-1	1.645	73.34
Sample-2	29.36	107
Sample-3	30.23	47.92

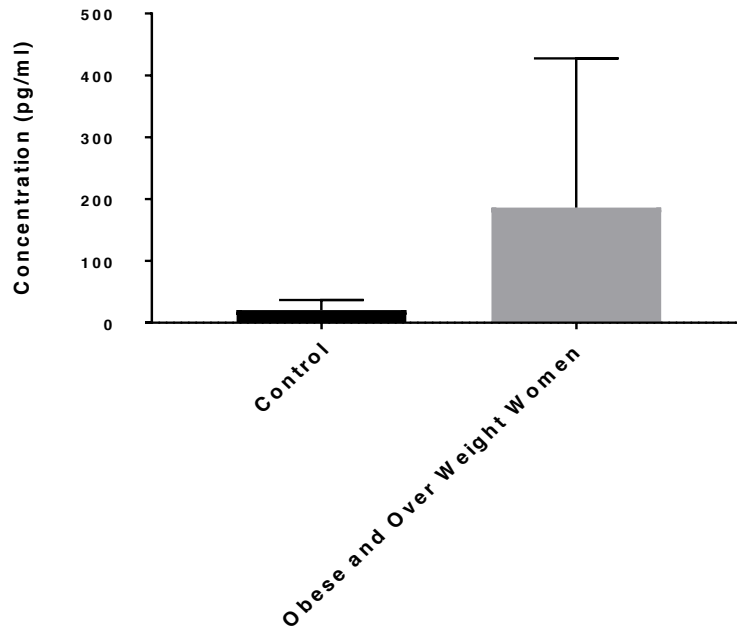


Fig 1: IL-1 Beta concentration in obese and overweight women versus normal weight women (control group), bar represent as standard deviation.

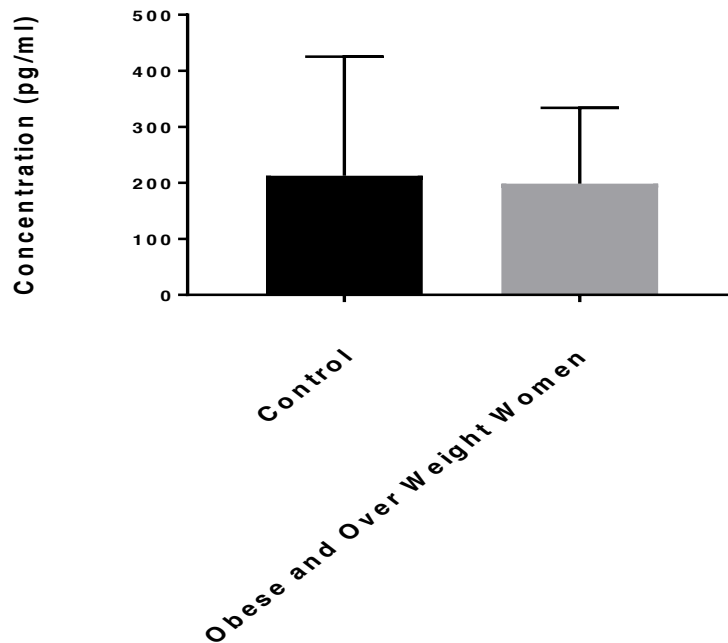


Fig 2: IL-6 concentration in obese and overweight women versus normal weight women (control group), bar represent as standard deviation.

**DISCUSSTION**

Through the progress of obesity, there is increase of macrophages and additional immune cells in adipose tissue [Shoelson *et al.*, 2007]. Adipose tissue, usually conceptualized as inert storage for trigl-

lycerides and energy has been connected to the creation of numerous hormones, pro-inflammatory cytokines and chemokines. Documentation of the main causes that intermedate the harmful influence of macrophages on adipocytes is acute for

evolving actual therapeutic aims. IL-1 $\beta$  has been occupied as a basic manager in the conversion of obesity-related inflammation into insulin resistance in rodent types [Ehses *et al.*, 2009, Jager *et al.*, 2007].

Our results shows that the concentration of the pro inflammatory cytokine IL-1 Beta was higher in obese and overweight women ( $186.2 \pm 58.54$ ,  $n=17$ ) than in normal weight women (control group ( $20.41 \pm 9.387$ ,  $n=3$ ), ( $F=220.4$ ,  $P < 0.05$ ), this results were similar with other papers which also shows that the proinflammatory cytokine IL-1B was higher in obese people than in control group [Aygun *et al.*, 2005], however our results shows ten obese samples with very high IL-1B and higher than the values recorded by others, may be those patients suffer from other diseases such as type 2 diabetic patients[Mojtaba *et al.*, 2011].

Interleukin-1 $\beta$ , a main cytokine of proinflammatory made mostly via macrophages, monocytes, is triggered over caspase-1 via the NLRP3 inflammasome difficult [Agostini *et al.*,2004]. Modern educations propose IL-1 $\beta$  as a supposed contestant in the progress in type 2 diabetes and insulin resistance [Tack *et al.*, 2012]. A promotion in flowing planes of IL-1 $\beta$  composed through IL-6 has stayed exposed toward rise the danger of diabetes kind 2 [Spranger *et al.*, 2003]. IL-1 $\beta$  reserve decreases tissue inflammation then hyperglycemia in diabetic rats and overweight mice [Ehses *et al.*, 2009]. Also, IL-1 $\beta$  might establish mediator of cell-cell in meta inflammation, as IL-1 $\beta$  manufactured in TNF $\alpha$ -inspired adipocytes of mouse consumes stayed exposed to prompt confrontation of insulin in cell of liver [Nov *et al.*, 2010].

Cytokines family of IL-1 require designated to be eminent in adults weighty. A family contains amongst others, IL-1 receptor antagonist, IL-18 and IL-1. Together proinflammatory cytokines, IL-1 then IL18, are higher in adult fatness and part a like sign transduction way [Osborn *et al.*, 2008].

Obesity is identified danger reason in the progress ofSpartan asthma. Modern documents reported that the inflammation connected with obesity, possibly intermediated through the cytokine IL6, shows a part in initiating lowly role of lung and amplified danger for evolving asthma exacerbations [Peters *et al.*, 2016].

IL-6 is too created by adipocytes then is assumed to be a cause why obese persons need greater planes of endogenous CRP [Bastard *et al.*, 1999]. mRNA appearance trainings display that adipocytes container synthesis together tumor necrosis factor alpha and several interleukins, particularly IL-1beta also IL-6 [Coppack, 2001]. While there were no significant variances in IL-6 deliberations

among test group ( $198.5 \pm 34.93$ ,  $n=15$ ) in compare with control group ( $212.6 \pm 122.9$ ,  $n=3$ ), ( $F=2.475$ ,  $P=0.240$ )

Adipose tissue is an essential basis of partying IL-6 then the increasing adipose tissue in obesity might pay great plains of IL-6 in the exchange. It existed distinctly described in two diverse readings of plasma [Kern *et al.*, 2001] and adipose tissue [Bastard *et al.*, 2000] planes of IL-6 connected improved than TNF- $\alpha$  through obesity and insulin resistance.

By way of an anti-inflammatory cytokine, IL-6 was stated to obstruct the things of proinflammatory TNF- $\alpha$  [Pedersen *et al.*, 2001], support M2 macrophage polarity, and progress resistance of insulin [Mauer *et al.*,2014]. General the part of IL-6 in insulin sympathy and glucose homeostasis ruins divisive [Jansson *et al.*, 2007] and we risk that the obesity-related alarms in IL-6 and its receptor expected require various things in diverse tissues and organs.

Resent documents provision a ideal in which human obesity clues toward the high appearance of IL-6R, IL-6 in the adipose tissue, with improved tissue expression of TNF- $\alpha$ , IP-10, MCP-1and penetration by CD11b, CD163 and macrophages as the primary types of meta-inflammation [Sardar *et al.*, 2015].

In conclusion, our result improved that obesity responsible in elevation level of pro-inflammatory cytokine IL-1 Beta and interleukin 6 play important role as both anti and proinflammatory cytokine.

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