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ESTIMATION THE PHYSIOLOGICAL ROLE OF FGF21 IN OBESE WOMEN IN SAMARRA CITY

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ABSTRACT

A global health concern, obesity is associated with higher rates of morbidity and mortality. Diabetes, fatty liver, hypertension, hyperlipidemia, cardiovascular disease, and cancer are among the complex disorders that define it. Chronic energy intake and expenditure imbalances result in excess fat accumulation in adipose tissue, which is the cause of obesity. The aim of this study is to determine the FGF21 levels in obese women and its relationship to obesity and studying the relationship of FGF21 with body mass and its relationship with obesity and adipose tissue. Fortytwo women were used in this study. Women age ranges from 20-35 years and divided into two groups: control group (12 women) BMI less than 24 and obese group (30 women) BMI more than 30. Pregnant women were excluded and also women with liver diseases, ovary cyst syndrome and chronic diseases. All cases are collected from 1st December 2023 to February 2024 from Samarra city and they were in good health, were not presently taking medications, levels of Fibroblast Growth Factor 21 (FGF21) was measured using ELISA techniques, established tools and procedures used, the waist circumference (WC) and body mass index (BMI) were determined. The findings indicated a positive correlation between BMI and WC measures and a substantial ($P<0.01$) elevate in FGF21 levels in the obese group when compared to the group of control. ability to predict neck pain from this addiction. This study offers new therapeutic targets for the prevention and treatment of obesity, which is an epidemic that is still growing. It is evident; therefore, that FGF21 is a very promising targetable system for therapeutic management of the various metabolic issues linked to obesity.

INTRODUCTION

One of the main global health issues of the twenty-first century is obesity, which increases the risk of morbidity and death worldwide. One of the challenging chronic metabolic disorders is obesity. It is likely that obesity has a complex etiology, with pathophysiological, environmental, and genetic variables all serving diverse roles in different people. It is described as an imbalance between chronic positive energy and increase body weight that results in excessive body fat deposits to a level where it affects health, lowering life expectancy and increasing health issues (1).

Over the past three decades, obesity rates have increased dramatically worldwide, becoming a serious health issue most countries in the world. Measures and evaluation data from 188 nations show that about thirty percentage of the world's population, or 2.1 billion individuals, are either

fat or overweight. The percentage (%) of adults who are overweight or obese has risen for both males (from 29% to 37%) and women (from 30% to 38%) (1).

Many different organs produce the peptide hormone known as fibroblast growth factor- 21, which controls energy homeostasis. The demonstrated metabolic benefits of FGF21, such as weight loss and better glycemia, are the basis for the excitement around this relatively new hormone. Because FGF21 can serve as an endocrine, autocrine and paracrine factor and perform a variety of metabolic activities in several target organs, its biology is inherently complex. FGF-21 controls some of elements of glucose metabolism in white adipose tissue (WAT), and it may result in browning in exposed white adipose tissue depots. In experimental pancreatitis, this peptide, which is extensively produced in the pancreas, seems to have an anti-inflammatory function (2). In the muscles of heart, it also has an anti-inflammation effect. FGF-21 is normally not expressed in skeletal muscle, although it is triggered in muscle stressful situations, especially mitochondrial myopathies. For metabolic disorders like diabetes and fatty liver disease, fibroblast growth factor -21 has been suggested as a potential treatment (3).

For metabolic disorders, FGF-21 has been established as a possible treatment. Furthermore, transgenic mice that overexpress FGF21 have longer lifespans, suggesting that FGF21 may be used to support healthy aging. For these reasons, FGF21 is regarded as a pro-longevity hormone. It was recently demonstrated that FGF21 gene therapy directed by visceral fat enhances immunological and metabolic health in mice with insulin-resistant. Over the duration of the seven-month trial, the body weight of the FGF-21 treated animals was consistently and significantly lower than that of control mice. FGF21 therapy enhanced relative lean mass and energy expenditure, decreased adiposity, and raised serum levels of FGF21 by about 100 times (4).

METHODOLOGY

Subject

Forty two women were used in this study, All cases are collected from 1st December 2023 to February 2024 from Samarra city, their ages ranges from 20-35 years and divided into two groups: control group (12 women) BMI less than 24 and obese group (30 women) BMI more than 30. Pregnant women were excluded and also women with liver diseases, ovary cyst syndrome and chronic diseases.

Anthropometric Assessments

Standardized tools and procedures were used to measure waist circumference, height, and weight. Weight (kg)/Height2 (m2) was the formula used to determine BMI. WHO guidelines were followed in defining the BMI cutoff points for overweight and obesity (5).

Measurement of serum FGF- 21

The human's serum was used to measure the FGF21 levels. Each sample's serum levels have been evaluated using an enzyme-linked immune absorbent assay (ELISA) specifically designed for human FGF21. (YL Biont, China).

Statistical analysis

The information was gathered in an Excel document and subjected to statistical analysis. Every result was deemed significant when the p-value < 0.01. The SPSS statistical software was used for all computations, and mean differences were compared using the T-test.

RESULTS AND DISCUSSION

This study indicates that FGF-21 has significant elevated ($p< 0.01$) in obese group in compared with group of control, this results agreed (6,7, 8, 9), with as shown in fig 3.1 and significant elevate ($p< 0.01$) in BMI and CW as an indicate to adiposity in obese group in compared with group of control as shown in fig. 3.2.

The strange stress-induced hormone-like molecule FGF-21 has pleiotropic properties and controls blood sugar and lipid metabolism as well as body energy homeostasis. FGF-21 has garnered attention in recent years due to its potential protective role against metabolic problems linked to obesity (8). When obesity has been identified as a situation of fibroblast growth factor-21 resistance (10), It makes sense to hypothesize that the elevated circulating FGF21 levels are caused in part by the high levels of adiposity that accompany being overweight or obese.

The interplay between adiposity and FGF21 is closely linked to fat content in viscera (11, 12), and the underlying mechanisms have been extensively explored (13). Adipose tissue secretes FGF-21 through a process that focuses on peroxisome proliferator-activated receptor alpha (PPARα). Increased levels of free fatty acids in plasma after lipolysis activate PPARα. Excessive fat accumulation in obese people has been demonstrated to trigger FGF21 synthesis and release through a number of pathways, including activation of the peroxisome proliferator-activated receptor (PPAR) protein family and G-protein-coupled receptor (GPR), and these pathways correlate to FGF21 resistance. This mechanism leads to increased plasma FGF21 in obese individuals (14). The only independent drivers of circulating FGF-21 levels in the current investigation were a body mass index and waist circumference, which were also included in a progressive regression analysis. WC is an indicator for abdominal adiposity, whereas BMI represents total adiposity (13). The paradoxical increasing of FGF21 levels in the blood has also been notify in non-diabetic over-weight and obese humans (15), suggesting that the controversial regulation begins before a sickness actually manifests. Adiposity, or an increase in adipose mass, is partially to blame. Adiposity typically precedes and initiates a number of cardio-metabolic disorders. Since adipose tissue is a known source of FGF21, any alteration to its amount or composition may directly affect the amount of FGF-21 in the blood (6).

Therefore, a compensation mechanism for metabolic abnormalities or tissue resistance to FGF 21 activity may be the cause of the greater, but not statistically significant, total serum FGF-21 levels in peoples with diabetics. Actually, there are two potential explanations for the earlier findings about elevated total serum FGF-21 levels, which could be attributed to a coping strategy attempting to overcome its compromised biological functions- in obese patients: Increased FAP enzymatic cleavage activity and/ or FGF21 receptors dysfunctional activation (9).

Many research investigations have shown that those who are obese have higher serum FGF21 levels, the metabolic syndrome and type 2 diabetes (16,17,7). The expression of KLB, which codes for β-Klotho, was decreased in the adipose tissue of overweight/obese people with or without type 2 diabetes, indicating that obesity in humans is a condition of FGF21 resistance. This could be made up for, though, by enhanced FGFR1c expression or alternative pathways that, based on the unchanged expression of the majority of FGF21 target genes, appear to restore FGF21 signalling. To truly understand the possible function of FGF21 as a myokine, as well as the presence and implications of FGF21 resistance in people, more research is required (18).

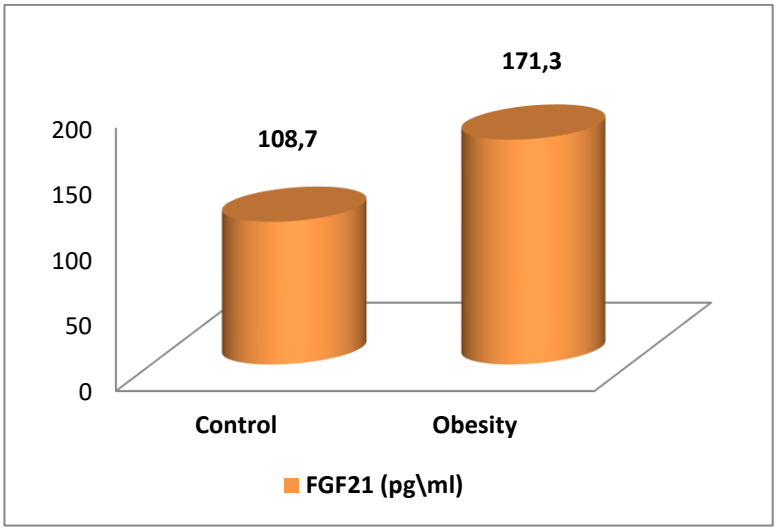

Figure 1. The levels of FGF21 in serum of obese women and control group

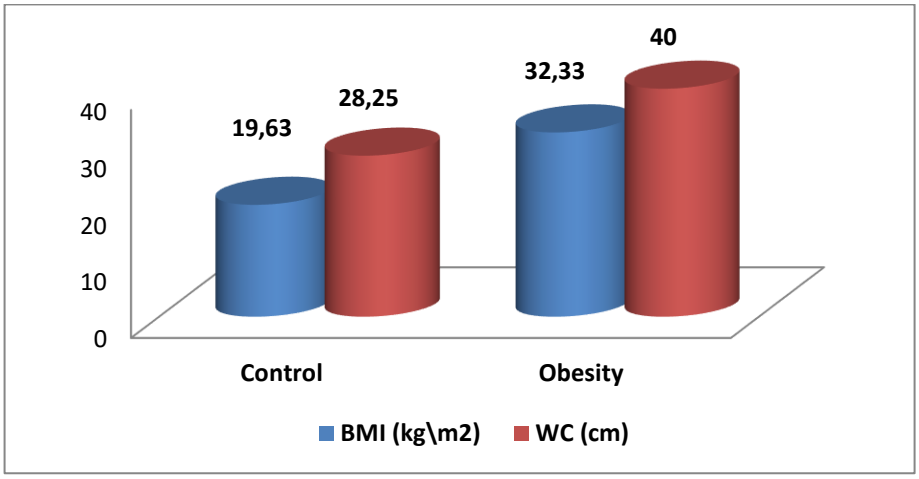

Figure 2. The results of BMI and WC of obese women and control group

CONCLUSION

There is a correlation between body mass and FGF21 in the assessment of adiposity, and FGF21 levels are thought to be a biomarker for obesity. We propose that future research focusing on the physiological processes that are natively regulated by FGF21 will help create and comprehend treatments that target FGF21 signalling and adipokines and their connection to FGF21 are the main topics of future research.

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