

ASSESSMENT OF VISFATIN IN IRAQI WOMEN WITH TYPE 2 DIABETES MELLITUS

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Abstracts:

Diabetes is stated that affects more than 463 million people worldwide today and type 2 diabetes mellitus (T2DM) represents 90-95% of the total instances. In general, the adipokines are categorized into two groups: proinflammatory adipokines” such as visfatin and leptin that promotes insulin resistance and inflammation and “anti-inflammatory adipokines that have the beneficial effect such as adiponectin. Visfatin is one of these hormones (adipokines) that has pro-inflammatory properties and are present in visceral fat tissue. Assessment of visfatin in Iraqi women with type 2 diabetes mellitus. Study patients were recruited from the Al-Yarmouk Teaching Hospital during the period among the “1st of June 2024 to the 1st of September 2024”. 58 patients “32 males and 26 females”, aged ≥ 30 years were consecutively selected from those who were admitted and diagnosed as DM by specialist. The apparently healthy subjects as a controls group were recruited from those who had no current illness with consideration of age and sex matching with patients. It was shown that serum visfatin had a significant difference among study groups ($p < 0.001$), also the baseline mean level was significantly different between patients and controls ($P < 0.001$) Visfatin level had perfect AUC and high sensitivity and specificity for discrimination between patients and controls. The present study found the values of serum visfatin in patients with DM2 patients are significantly higher compared with controls. Adipokine with an insulin-mimetic action that tends to increase insulin sensitivity and reduces blood glucose level and this clarifies the elevated level of Visfatin in such T2DM.

Keywords: visfatin; Type 2 diabetes; Iraqi women; Insulin resistance; Control blood sugar; Edioquines.

INTRODUCTION

Diabetes is stated that affects more than 463 million people worldwide today and type 2 diabetes mellitus (T2DM) represents 90-95% of the total instances (Kanaley et al., 2022) T2DM is associated with microvascular issues like retinopathy, nephropathy, and neuropathy, in addition to macrovascular problems including myocardial infarction, stroke, and peripheral vascular disease(Haleem et al., 2022) Conditions associated with obesity, including hypertension, elevated cholesterol levels, T2DM, fatty liver disease, heart disease, and certain cancers, resulted in roughly 3.4 million adult fatalities in 2016, as reported by the WHO (kreem & AL-Mohammad, 2017). Adipose tissue was traditionally regarded as a passive reservoir for energy depot. However, nowadays it has been widely accepted in various studies that, adipose tissue plays its metabolic and endocrine (Kim et al., 2019). In general, the adipokines are categorized into two groups: proinflammatory adipokines” such as visfatin and leptin that promotes insulin resistance and inflammation and “anti-inflammatory adipokines that have the beneficial effect such as adiponectin. The imbalance between these two types of adipokines leads to pathogenic response and disorders (Ambroszkiewicz et al., 2018). Visfatin is one of these hormones (adipokines) that has pro-inflammatory properties and are present in visceral fat tissue. Visfatin is a multifaceted protein that plays an important role in regulating a variety of physiological and pathological processes, including obesity, diabetes and cardiovascular disease (Zheng et al., 2019). This hormone is abundantly produced in musculoskeletal system-like muscle, bone, synovium and cartilage but the major visfatin source in the human body is visceral and subcutaneous fat (Franco et al., 2019). Visfatin, an adipocytokine has important role in regulation of glucose and insulin levels in humans. It displays insulin mimetic effects which was thought to be mediated through the phosphorylation of signal transduction proteins in the insulin signaling pathway and through binding to the insulin receptor at a site distinct from that of insulin (Hug & Lodish, 2005). It is reported in studies that visfatin plasma level is involved in pathogenesis of different metabolic disorders and multiple studies have been conducted around this issue. Increasing the plasma level of visfatin was reported in individuals with obesity, GDM (gestational Diabetes Mellitus) and insulin resistance. Some studies also demonstrated that serum visfatin levels were significantly higher in the diabetic

compared with the nondiabetic group and found a significant positive correlation of serum visfatin levels with the obesity indicator BMI and waist circumference, even after adjusting for age, sex, smoking status, blood pressure and lipid profile (Sandeep, 2007). While other studies indicate that blood visfatin concentrations significantly correlate with insulin resistance or type 2 diabetes but not with body fat percentage or body mass index (BMI) (Palin et al., 2008).

MATERIALS AND METHODS

Study patients were recruited from the Al-Yarmouk Teaching Hospital during the period among the “1st of June 2024 to the 1st of September 2024”. 58 patients “32 males and 26 females”, aged ≥ 30 years were consecutively selected from those who were admitted and diagnosed as DM by specialist. The apparently healthy subjects as a controls group were recruited from those who had no current illness with consideration of age and sex matching with patients.

Conflicting Interest: no conflict of interest was declared by the authors

Ethics approval: the scientific committees of the local health care department at al-karkh of Baghdad province the at to allow this research. the goals of were explained for each patient to obtain their approval to involve in it.

Blood analysis: Blood samples were collected from patients and controls. Serum was separated, divided into aliquots, and used for measurement of visfatin. The assays of visfatin depended on use of enzyme linked immune sorbent assay kits that were supplied by My BioSource Company, USA. Serum cholesterol, fasting blood sugar (FBS), triglyceride HDL, LDL and HbA1c were measured by fully automated Cobas c111 analyzer.

Statistical analysis Data were analyzed by the statistical package of SPSS-24. After assuring that the data was normally distributed, data presentation was done by mean, standard error or standard deviation of the mean, and percentage. LSD test was used for the difference between two means. A P-value of “ < 0.05 ” was measured as statistically significant.

RESULTS

The clinical characteristics of study subjects are shown in table 1. The patients and the control subjects had a similar sex distribution (males & females).

Table (1): laboratory investigations of subjects of study

Patients No= 58	Controls No= 30		
	Mean \pm SD	P value	
AGE	57.9828 \pm 10.18511	59.0333 \pm 11.59811	0.056
visfatin	5.1117 \pm 1.72436	3.0550 \pm 0.50256	0.001
HbA1c	9.4293 \pm 2.18206	8.4767 \pm 1.44954	0.001
Glucose	233.1207 \pm 73.94713	183.7000 \pm 34.25578	0.001
Cholesterol	184.5862 \pm 38.88446	164.5667 \pm 29.15912	0.001
T.G	192.8448 \pm 116.34700	145.3333 \pm 52.95498	0.001
HDL	47.2759 \pm 14.51532	41.0667 \pm 12.90799	0.001
LDL	98.7828 \pm 37.87424	101.4400 \pm 47.36984	0.001

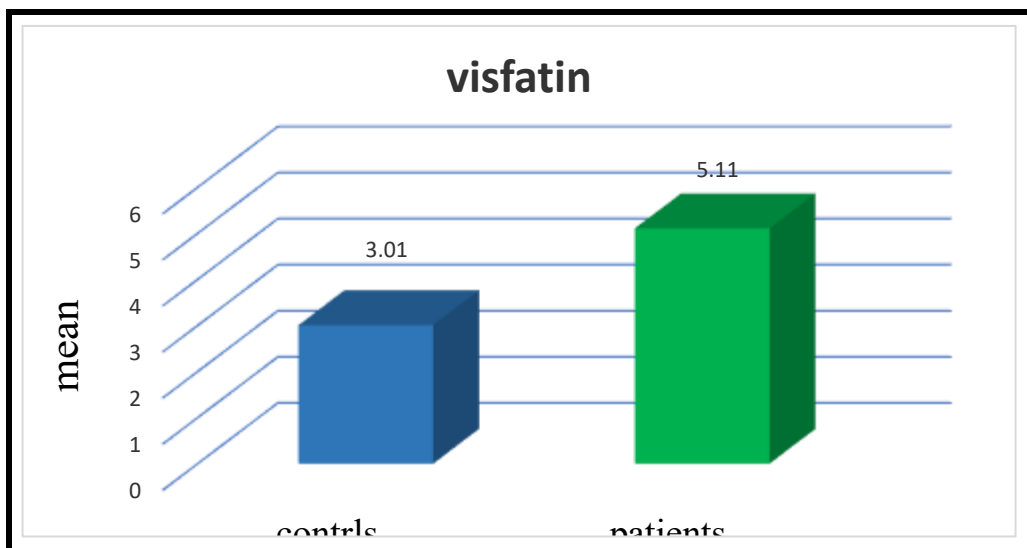


Figure (1): visfatin levels in patients and controls

Table (1): correlations between study biomarkers for patients

		AGE	HbA1c	Glu.	Chole.	T. G	HDL	LDL	visfatin
AGE	r	1	.087	-.015	-.214	-.059	-.159	-.226	-.226
	P value		.517	.913	.107	.660	.234	.088	.088
	N	58	58	58	58	58	58	58	58
HbA1c	r	.087	1	.364**	-.067	.025	-.115	-.213	-.213
	P value	.517		.005	.619	.853	.392	.108	.108
	N	58	58	58	58	58	58	58	58
Glucose	r	-.015	.364**	1	-.181	.070	-.226	.032	.032
	P value	.913	.005		.174	.599	.088	.814	.814
	N	58	58	58	58	58	58	58	58
Cholesterol	r	-.214	-.067	-.181	1	.324*	.848**	.054	.054
	P value	.107	.619	.174		.013	.000	.685	.685
	N	58	58	58	58	58	58	58	58
T. G	r	-.059	.025	.070	.324*	1	-.085	.000	.000
	P value	.660	.853	.599	.013		.525	1.000	1.000
	N	58	58	58	58	58	58	58	58
HDL	r	.035	.065	.036	-.033	-.632**	.038	-.041	-.041
	P value	.795	.625	.790	.807	.000	.776	.761	.761
	N	58	58	58	58	58	58	58	58
LDL	r	-.159	-.115	-.226	.848**	-.085	1	.107	.107
	P value	.234	.392	.088	.000	.525		.424	.424
	N	58	58	58	58	58	58	58	58

visfatin	r	-.226	-.213	.032	.054	.000	.107	1	1
	P value	.088	.108	.814	.685	1.000	.761		
	N	58	58	58	58	58	58	58	58

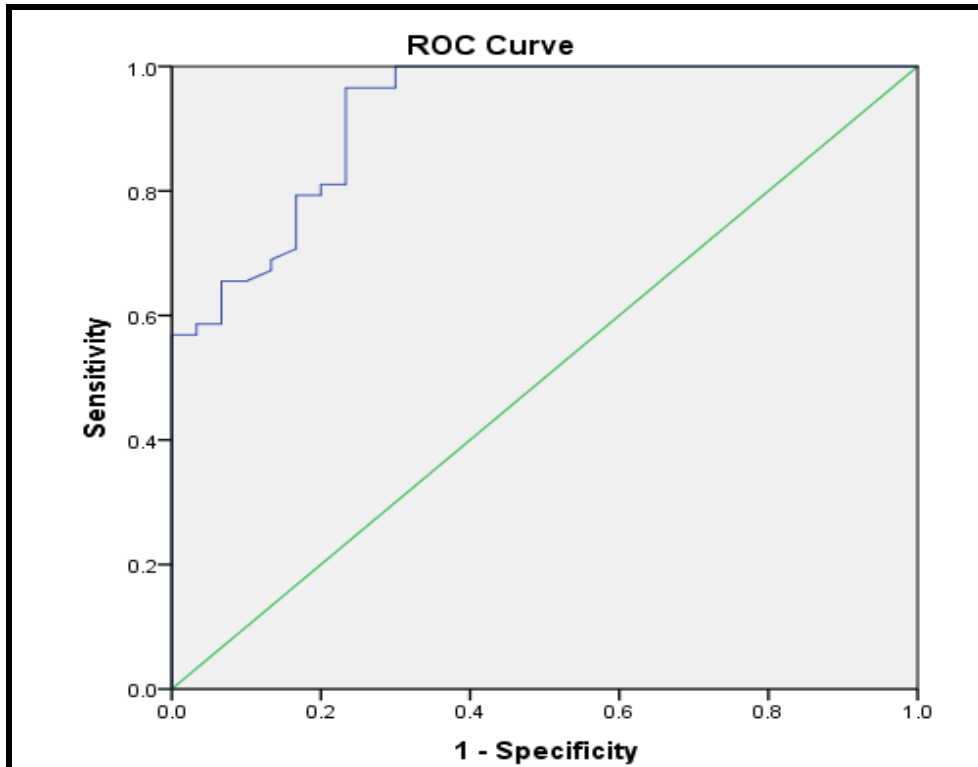


Figure (2): ROC curve analysis of visfatin between patients and controls

Table (3): ROC curve analysis between patients and controls

visfatin			
Area	cutoff	Sensitivity	Specificity
0.924	7.8950	98	100

DISCUSSION

Type 2 diabetes (T2DM) is a metabolic condition associated with obesity and impaired fat tissue storage. Insulin resistance (IR), which is considered to be a relative pancreatic β -cell deficiency with a disturbed balance between abnormal cellular response and insulin actions, is one of the leading causes of T2DM (Polidori et al., 2022). Visfatin is an adipocytokine with some additional properties that are not fully understood yet (Dakroub et al., 2022). The extracellular form of visfatin was shown to be associated with metabolic disorders including obesity and DM. T. Dogru et al. demonstrated that visfatin concentrations increased in patients with DM, but not in patients with impaired carbohydrate tolerance. The authors concluded that visfatin levels did not increase at the early stages of insulin resistance (Lopez-Bermejo et al., 2006).

From the outcome data of this study, there was a significantly increased (mean \pm SD) level of visfatin in diabetic patients than control and this result was agreement with the study of Lopez et. al who found that increased visfatin in patients with type 2 as a result of β cell dysfunction (Dogru et al., 2007). While disagreement with other studies demonstrated that visfatin levels were significantly decreased in diabetic patients compared to control subject (Li et al., 2007). A number of studies have reported higher circulating levels of visfatin in diabetic and obese subjects, while few research shows higher visfatin levels among impaired glucose tolerance subjects (Hajianfar et al., 2012). Increased level of serum visfatin suggests that hyperglycemia and development of type 2 diabetes is delayed through

hypersecretion of adipose tissue derived visfatin as it possesses insulin mimetic effects. Therefore, increased serum visfatin may be a compensatory mechanism or part of pathophysiology of diabetes mellitus. (Kamińska et al., 2015). El-Masallamy et al., (2011) provided several explanations for the increased visfatin levels noted in patients with T2DM. Firstly, increased visfatin levels in diabetic patients may be due to impaired visfatin signaling in target tissues. Secondly, due to the insulin mimetic effects, increased plasma visfatin levels could be a compensatory mechanism in response to hyperglycemia that ameliorates the functional consequences of insulin deficiency or resistance. Thirdly, visfatin-mediated NAD biosynthesis that regulates glucose-stimulated insulin secretion may explain increased levels of visfatin in T2DM patients as a compensatory mechanism for β -cell functioning. Finally, because of the pro-inflammatory properties, these elevated levels could be attributed to the chronic low-grade inflammation present in T2DM. There was non-significant correlation between visfatin and clinical and laboratory parameters including RBS, HbA1c, cholesterol, triglycerides, HDL, LDL. These results were in agreement with the another studies was performed and reported that plasma visfatin was higher in diabetic patients as compared to control group and did not correlate with BMI, glucose and lipid levels and that result indicate hyperglycemia cause increase in plasma visfatin levels^[15] and Kaminska et al., revealed non-significant correlation between visfatin and cholesterol, triglycerides, HDL and LDL (Kamińska et al., 2010). The relationship of visfatin with lipid profile might be a compensatory mechanism for diabetic dyslipidemia, since visfatin up regulates peroxisome proliferators-activated receptor γ activity (Shaker et al., 2011). Sandeep et al., (2007) showed that the visfatin secretion from adipocytes depends on the duration and extent of hyperglycemia^[21]. Accordingly, reported that high visfatin levels were positively related to glycemic control. Therefore, higher glucose and HbA1C levels may contribute to, at least partly, the increased visfatin levels found in type II DM patients (Korner et al., 2007). The conflicting results of visfatin assay may be due, in part, to the types of populations studied, small sample size, and/or variability in the types of assays used to measure serum plasma visfatin. According to the result of this study, the area under receiver operating characteristic curve (ROC) for visfatin was (0.9242) at the cutoff value (7.89ng/ml), the sensitivity and specificity for differentiating Type2 diabetes mellitus from controls (98%) and (100%) respectively that mean the visfatin is very useful in diagnosis of DM type 2.

CONCLUSION

The present study found the values of serum visfatin in patients with DM2 patients are significantly higher compared with controls T2DM is associated with insulin resistance which has many predisposing factors like obesity, sedentary lifestyle and type of food style, visfatin is an adipokine with an insulin-mimetic action that tends to increase insulin sensitivity and reduces blood glucose level and this clarifies the elevated level of Visfatin in such T2DM.

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