Egypt. J. Chem. **Vol. 64,** No. 11 pp. 6515 - 6522 (2021)

Egyptian Journal of Chemistry

http://ejchem.journals.ekb.eg/

Study the Association of β-Salusin with some Anthropometric Measurements in Iraqi Type II Diabetics Women

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Abstract

Diabetes mellitus is a heterogeneous metabolic condition defined by insulin secretion: hyperglycemia deficiency, or impt residues of amino acids. β-Sal promotes reproduction, vascular smooth movement of muscle cells (VSMC), vascular brosis, and development of VSMC foam cells. The present study is aimed to evalution the relation of β-salusin (β-Sal) with some anthropometric measurements (AMs) and other parameter in Iraqi type2 diabetics (T2DM) women. This study included 60 T2DM women, were collected from the area Al-Fallujah and Al-Ramadi in al-Anbar governorate, and collection of 24 healthy women as a control, patients and healthy were have the same age. The period was from August 2019 to October 2019. Results showed concentration of β-sal is high in the patients withT2DM, itgives an important indication that the immune response in diabetics is high. The analysis also disclosed that the level of β-sal can give an impression on the disease is progressing. In addition to this research, it promotes the use of W / H and W / T to determine the risk of developing T2DM in women as they offer a clear and accurate method of assessment.

***Keywords*:** Type 2 Diabetes Mellitus, β-salusin, BMI, Hip circumference;

1. Introduction

Diabetes mellitus) DM) is a heterogeneous metabolic syndrome distinguish by chronic High blood sugar due to failure of insulin production, or impaired action of insulin or both. Complications of hyperglycemia is correlated with fairly common long term myocardial infarction affecting the skin, kidneys and nerves and an raised danger of cardiovascular vascular disease(CDV) [1].

T2DM patients with prolonged high blood glucose levels often demonstrate microvascular complications including neuropathy, nephropathy and retinopathy, which are the most common causes of blindness, nontraumatic amputations and renal insufficiency disease [2].

The reaction of the immune system to hyperglycemia and the presence of inflammatory mediators released by adipose tissue and dendritic cells in fat cells give rise to an inflammatory response. Such low and persistent activation weakens the beta-cells of the pancreas and leads to inadequate insulin synthesis leading to hyperglycemia.

Hyperglycemia to diabetes is thought to cause immune response dysfunction that does not regulate the spread of invading pathogens in diabetic subjects. The increased prevalence of T2DM would increase infectious disease incidence and the associated comorbidities [3].

Salusin-β is an endogenous bioactive peptide with 20 amino acid residues it stimulates the proliferation, migration of vascular smooth muscle cells, and foam cell formation, salusin-β blockade ameliorates endothelial inflammation to improve pulmonary arterial hypertension [4],

β-Sal facilitates proliferation, vascular smooth muscle cells (VSMC) vascular disease and VSMC cell growth [5]. β-Sal serves as a possible proatherogenic factor by facilitating the development of foam cells in the macrophage [6], β-Sal is positively correlated with coronary artery injury or stenosis [7], Salusin-β is also closely related to autonomic nervous system. Although once considered as a potent endogenous parasympathomimetic peptide, recent studies have elucidated that circulating levels of salusin-β are correlated with sympathetic action [8].

The β-Sal level is high in T2DM patients, and it found β- Sal inhibition alleviates diabetic oxidative stress, inflammation and cardiac dysfunction [9]. In addition, β-Sal has recently been reported as leading to a high glucose-induced proliferation inhibition [10].

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Receive Date: 29 May 2021, Accept Date: 05 June 2021
DOI: 10.21608/ejchem.2021.78221.3830

Anthropometrics (AMs) are a series of standardized muscle tissue , bone, and adipose measurements utilized to estimate the composition of the body. The key anthropometry components are height, weight, Body mass index (BMI), circumference of body (waist, hip and thoracic), and thickness of the skin. These measurements are important because they represent diagnostic criteria for obesity, which significantly increases the risk of hypertension conditions such as cardiovascular disease (CVD), DM [11]. Obesity is an unfavorable consequence of changes in lifestyle and behavioral patterns. It is also associated with many chronic diseases including diabetes, hyperlipidemia, cardiovascular disease and osteoarthritis [12].

Many studies have shown the association of waist circumference, waist hip ratio and body mass index with type 2 diabetes mellitus. Waist circumference and waist hip ratio have been used as measures of central obesity and body mass index has been used as a measure of general obesity [13]. Recently, waist-to-height ratio (WHtR) was suggested as a simpler indicator of abdominal obesity that has greater practical advantages than BMI and WC [14].

The aim of this study was to evalution the relationship between β-Sal concentrations with certain AMs in Iraqi type 2 diabetics women which will explain to us the relationship between the immune system and its relationship to some AMs.

2. Experimental

2.1 Materials and Methods

The previous study included 60 T2DM women from state Al-Fallujah and Al-Ramadi in al-Anbar governorate, and 24 healthy as a control. Gender and age-group safe people from the same cities were enrolled as control group. The period was from August 2019 to October 2019. Furthermore, the history of the treatment, modifications, and lifestyle, were considered. Diabetic patients were on insulin and tablet therapy. The recruited patients all met the following requirements for inclusion:35 years < Years < 65. Waist circumference (WC), circumference of the hip (HC), circumference of the thoracic (TC) and circumference of the nick (NC), in cm. A body mass index (BMI) was calculated using an anthropometric scale(m^2) divided by body weight (kg) with an acceptable standardization of 500 g and 1 cm. A venous blood (6-7 ml) was collected after 12hours fasting. The specimens were centrifuged at a rate of 4000 xg at 18-25 °C and 20 minutes.

Serum β-sal concentration were determined by an enzyme-associated immune sorbent assay (ELISA). San Diego, USA), and FSG determined by colorimetric enzyme method.

Ethical clearance was received from Anbar University's Ethics Committee and Medical Research Committee.

All participants gave an informed consent to their written agreement.

2.2 Statistics

Statistical review of our observations was done by Graph Pad Prism version 7.04 and SPSS program version 24. The mean data± standard deviation was presented (SD) used to make impact of difference Factors in Parameters of Analysis. In all analyses, statistical significance was considered attained for p-value < 0.05. The statistical importance of the differences among the subjects with and without T2DM was verified with t test, bivariate associations were tested via a Pearson correlation investigates with two-tailed, while the precision of the investigation was measured via Zone under the ROC curve (AUC).

3. Results

Results showed a mean age (years) of T2DM women and control were 52.22 and 44.85 respectively. A mean of β-Sal concentration is 199.6 pg/ml, it is significantly increased compared with control 144.2 pg/ml. Also serum level of FSG had high levels in T2DM women, it is 189 mg/dl than in control 91.27 mg/dl. In addition, results indicated high (cm) significant differences p<0.0001. HC, WC, TC and NC in cm unit showed no major differences (p>0.05). W/T and W/H result showed no significant variations between T2DM women and control (p>0.05).

While W/H have significance differences between these two groups with p-value (0.0016). SBP (mmHg) and rate of pulse (ROP) was higher in T2DM women than in control with high significant differences p-values were 0.0001 and 0.0008 respectively, while DBP (mmHg) showed non-significant differences between T2DM women and control groups (p>0.05). The mean of BMI (kg/m2) for T2DM women was (30.02± 6.043), but the mean of BMI for control was recorded (25.91± 1.198), and this was considered as a significant difference (p=0.0057) as shown in **Table 1 (figures 1 and 2).**

Table 1 Baseline Clinical and Laboratory Characterises

Parameters	T2DM women			Control			P-value
	Mean	SD.	SE.	Mean.	SD.	SE.	
Age (Years)	52.22	6.682	0.8626	44.85	6.195	1.215	<0.0001
FSG (mg/dL)	189	46.26	5.972	91.27	8.107	1.59	<0.0001
β-Sal (pg / Ml)	199.6	81.01	10.46	144.2	36.4	7.43	0.0019
Weight (Kg)	75.38	16.9	2.182	74.69	14.51	2.846	0.8565
Height (cm)	159.7	10.42	1.345	162	7.34	1.44	0.3154
H.C (cm)	110.6	16.43	2.121	113	9.126	1.79	0.4901
W.C (cm)	113.3	13.02	1.681	108.3	7.817	1.533	0.0741
T.C (cm)	110.6	10.97	1.416	109.5	7.981	1.565	0.6463
N.C (cm)	48.55	3.925	0.5067	48.27	4.566	0.8954	0.7727
BMI (kg/m²)	30.02	6.043	0.7801	25.91	5.869	1.198	0.0057

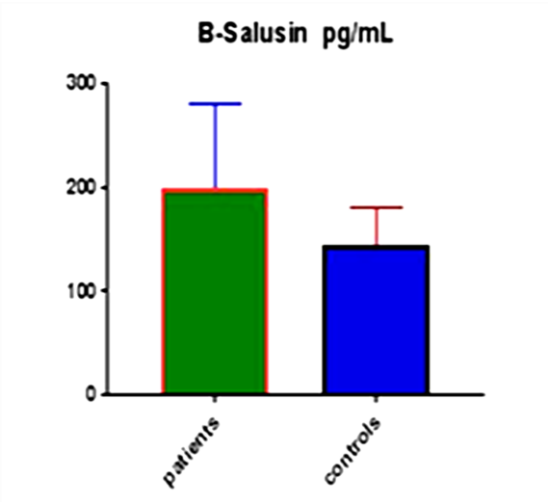

Fig. 1: Mean ± SD for FSG in control and T2DM women

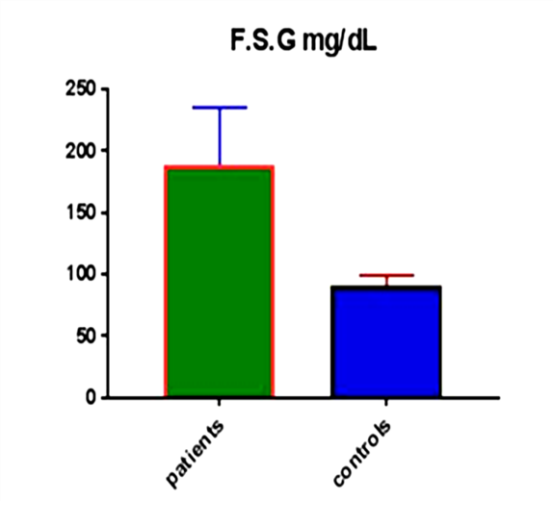

Fig. 2: Mean ± SD for β-Salusin in control and T2DM women

Results of correlation coefficients showed no correlation for FSG with β-Sal, coefficients (r) test was made of FSG showed no correlation with β-Sal with r= -0.037 and p-value 0.819. Also Age + BMI showed non-correlation (r=0.018, p-value 0.819 and r=0.044, p-value 0.785 respectively). β-Sal correlation with weight, HC, WC, TC, NC, W/H, W/T, W/N was non significance with P value > 0.05 and r less than 0.3. This study result show moderate correlation with height in T2DM. The following group values (Table 2 and Figures 3) are shown in (r=0.327, with p-values= 0.037).

Table 3 (Figures 4 - 9) provided comparisons of the areas and confidence intervals (CI) for the parameters and plots analyzed arising from receiver operator characteristic(ROS) curve investigation. Set in table 3 on the areas and CI values SBP and age has the highest kind of prejudice . Amongst such Individuality T2DM signs with area under curve (AUC) 0.8135 (95% CI 0.724 to 0.903; SE 0.04563; p<0.0001) for SBP; **(figure.4)** and for age with AUC 0.792 (95% CI 0.684 to 0.899; SE 0.05467; p<0.0001, Price is considered excellent for AUC here.β-sal appears to be the good predictor for T2DM disease with AUC 0.7465 (95% CI 0.6347 to 0.8584; SE 0.05707; p= 0.0004); **(figure.5).** In second place came W/H, W/T, ROP and BMI with AUC values 0.7688 (95% CI 0.6567 to 0.8808; SE 0.05717; p=0.0001), 0.6809 (95% CI 0.5562 to 0.8057; SE 0.06365; p=0.0099), 0.7222 (95% CI 0.6074 to 0.8371; SE 0.05859; p=0.0015) and 0.6885 (95% CI 0.5763 to 0.8008; SE 0.05729; p=0.0072); (**figures 6 - 9)**, respectively for these parameters. Based on the ROC zones, whereas TC, NC, WC, HC, W / N, height, and weight tend to be the non-marker for T2DM women; less than 0.6 in area.

Table 2: Correlations of β-Salusin with Other Studied Variables

B-salusin	r	p-value
FSG mg/dl)	-0.037	0.819
Age (Years)	0.018	0.9137
Weight (Kg)	0.161	0.3157
Height (cm)	0.327	0.037
HC (cm)	0.127	0.4297
WC (cm)	0.221	0.166
TC (cm)	0.286	0.0701
NC (cm)	0.01	0.897
W/H	0.054	0.737
W/T	-0.040	0.802
W/N	0.229	0.150
BMI (Kg/m^2)	0.044	0.785

Table 3: Diagnostic Criteria of the ROC Curves for Tested Variables in women with T2DM.

Parameters	AUC	Std. Error	95% Confidence interval	P-value
β-salusin pg/mL	0.7465	0.05707	0.6347 to 0.8584	0.0004
FSG (mg/dL)	1	0	1 to 1	<0.0001
Age (Years)	0.792	0.05467	0.6848 to 0.8991	<0.0001
Weight (Kg)	0.5147	0.06472	0.3879 to 0.6416	0.8288
Height (cm)	0.5532	0.06679	0.4223 to 0.6841	0.4351
H. C (cm)	0.5962	0.06065	0.4773 to 0.715	0.1584
W. C (cm)	0.6112	0.06	0.4936 to 0.7288	0.1028
T. C (cm)	0.5006	0.06421	0.3748 to 0.6265	0.9925
N. C (cm)	0.5019	0.06969	0.3653 to 0.6385	0.9775
W/H	0.7688	0.05717	0.6567 to 0.8808	0.0001
W/T	0.6809	0.06365	0.5562 to 0.8057	0.0099
W/N	0.5958	0.06817	0.4622 to 0.7294	0.1718
SBP (mmHg)	0.8135	0.04563	0.7241 to 0.903	<0.0001
DBP (mmHg)	0.6385	0.06308	0.5149 to 0.7622	0.0482
ROP (1/min)	0.7222	0.05859	0.6074 to 0.8371	0.0015
BMI (Kg/m^2)	0.6885	0.05729	0.5763 to 0.8008	0.0072

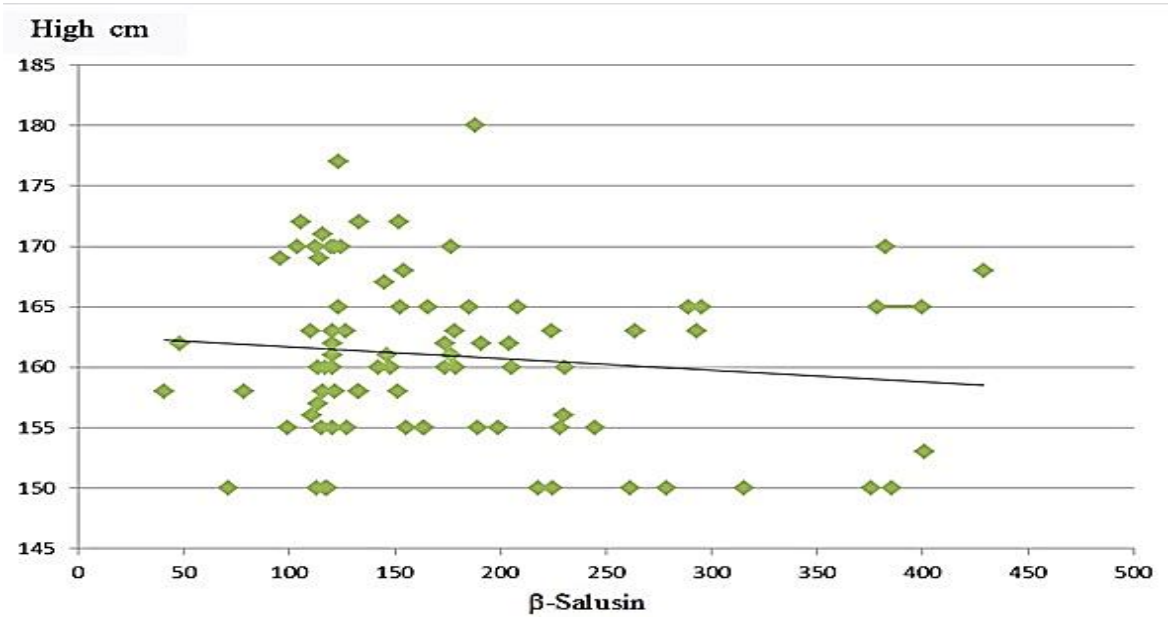

Fig. 3: Association of β-salusin with Height

3.2 Results

The pathophysiological mechanisms for vascular lesions in diabetes mellitus (DM) are complex, which plays a crucial turn in endothelial dysfunction. The endothelial therapeutic target should provide critical places for the handling of vascular DM diseases. Recent we found the sal-β contributed to high apoptosis of the endothelial cells triggered by glucose. Evidently improved silencing of endothelium-dependent vaso relaxation, inflammatory response nitrative stress and oxidative stress, in DM aorta [15]. Main hazard factors for T2D are very known - Including unalterable lifestyle factors such as diabetes age , sex and people background, the most noticeable hazard factors are in an deleterious diet, including morbidly obese / obesity , physical inactivity, smoking and an eating disorder [16].

General obesity and central obesity (WC, W / H, W / T) were assessed using anthropometric measurements. BMI is identified in several studies as a predictor for recognizing diabetes-prone people. Additional parameters anthropometric are therefore known for measuring excess visceral fat.

The abdominal adipose tissue is also measured with WC and W / H [17]. **Ford et al** also identified WC As a higher metabolic syndrome predictor, diabetes, cardiovascular disease and death from all causes than BM I [18].

WHR demonstrated this is also capacity Predicting diabetes such as BMI and WC, found in the Vazquez et al meta-analysis [19].

Since no of these anthropometric parameters are better measurement for forecasting futurity FSG (although we use FSG as a baseline), our data indicated. Considering limitations (or risk of complications or hazard ratios) as a method to assess hazard factors and a much more thorough picture of the relevance of anthropometric variables to [20].

The serum salusin-β levels for subjects with T2DM are higher that safe controls[21]. A report showed this inhibition of sal-β relieves inflammation oxidative stress, and cardiac dysfunction in DM patients [10].

In addition, it has recently been found that sal-β. The suppression of reproduction, angiogenesis and migration in endothelial cells was highly glucose-induced. The molecular link between endothelial injury associated with sal-β and T2DM has still not been thoroughly clarified. We investigated therefore the potential roles of sal-β in T2DM endothelial dysfunction and the underlying molecular mechanism [10].

A study showed that the findings indicate that in response to T2DM, sal-β knockdown exerted protective effects on endothelial dysfunction[22]

Past studies have also shown that main sal-β participate to sympathetic activity, arginine hypertension and vasopressin release [23] Sal-β stimulates the development of vascular fibrosis and vascular smooth muscle cells (VSMCs) [24].

Other studies showed that Sal-β knockdown in diabetic rats does not amplify hyperglycemia and insulin resistance, diabetic rats displayed significantly higher rates of rapid blood glucose than those in controller rats non influenced by it [9].

In a study the serum Sal-β degree in the diabetes category has a higher height association, probably because of higher prevalence of obesity and the relationship with height in patients [25].

Our study agree with this study that showed the β-salusin results obtained in the studies performed within the framework of this research were comparable to previous study findings, while the serum β-salusin level values obtained from T2DM patients are higher than control groups and the difference is important. For subjects with T2DM the serum salusin-β levels are higher than healthy controls [21].

These data are consistent with the previous studies that, the salusin-β serum level in the diabetes community was higher than in the control community, likely due to increased BMI and higher obesity in patients [25].

3. Conclusion

This research showed concentration of β-Sal is high in the women withT2DM. This rise gives an important indication that the immune response in diabetics is high, and complications can occur if the rate of β-Sal remains high. The study also revealed that the β-Sal level can offer a progressive impression on the disease.

In addition to this research, it promotes the use of W / H and W / T to determine the risk of developing T2DM in women as they offer a clear and accurate method of assessment.

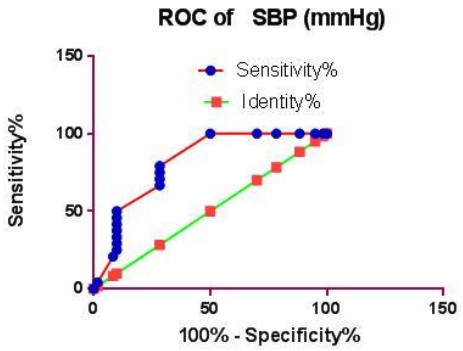

Fig. 4: ROC curve displaying AUC of SBP inT2DM Women

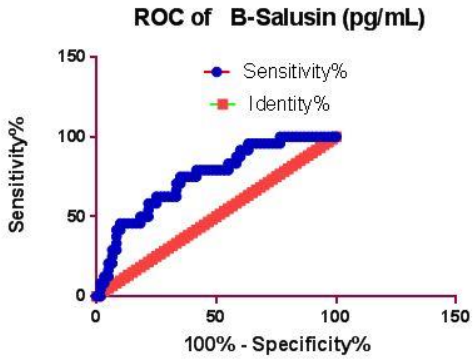

Fig. 5: ROC curve displaying AUC of β-salusin in T2DM Women

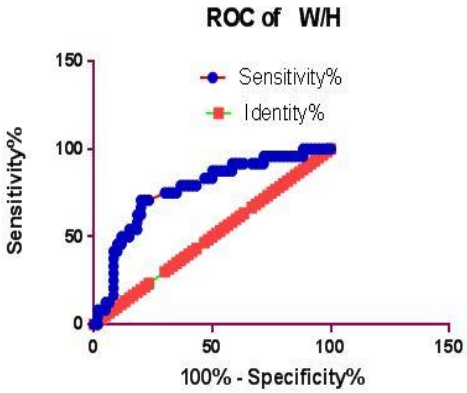

Fig. 6: ROC curve displaying AUC of W/H in T2DM Women

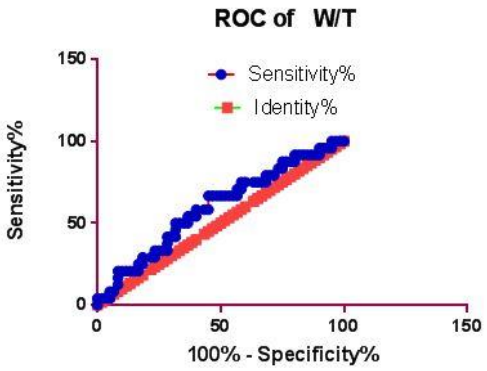

Fig. 7: ROC curve displaying AUC of W/T in T2DM Women

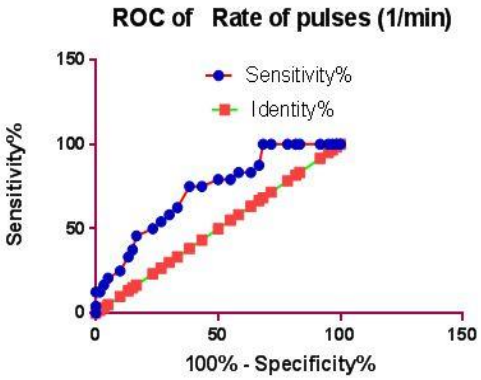

Fig. 8: ROC curve displaying AUC of ROP in T2DM Women

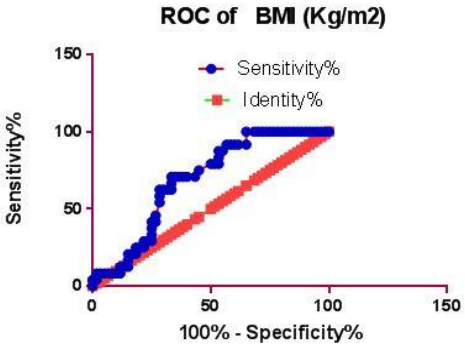

Fig. 9: ROC curve displaying AUC of BMI in T2DM Women

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