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Diabetes & its Complications

Evaluation of Diabetes Mellitus in Diabetic Patients in a Correlation Between Body Mass Index and Blood Sugar

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ABSTRACT

Background: *Body mass index (BMI) criteria are currently the primary focus in obesity treatment recommendations, with different treatment cutoff points based upon the presence or absence of obesity-related comorbid disease.*

Aim: *This project aimed to explore the relationship of body mass index with blood sugar.*

Patients & methods: *Seventy-one adult diabetic patients (36 males+35 females) were subjected to this study. Body mass index was calculated for each patient and random blood sugar was also measured.*

Results: ***T****he highest mean value of BMI was among male & female patients in the age group 60-69 years old, which reached 36.57 & 32.74, respectively while the mean value of random blood sugar in males was among the age group 30-39 years which reached 258.88 mg/dL. But it was 295.0mg/dL among age group >70years in females.*

Conclusion: *It is concluded that obesity is an important risk factor for diabetes and there was a relationship between BMI and increased blood sugar.*

Keyword
Diabetes, BMI, Blood sugar, T2D.

Introduction
Diabetes mellitus (DM) is a clinical metabolic syndrome in which there's an increased blood sugar higher than the normal values. Excess body weight predicts the development of type 2 diabetes (T2D). In people with diabetes, blood sugar levels remain high. This may be because insulin is not being produced at all, is not made at sufficient levels, or is not as effective as it should be. The most common forms of diabetes are type 1 diabetes (5%), which is an autoimmune disorder, and type 2 diabetes (95%), which is associated with obesity [1].

Diabetes Mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia caused due to either deficiency of insulin secretion or insulin resistance. Diabetes Mellitus is one of the most common endocrinal Diseases in the world. Diabetes mellitus is commonly associated with abnormalities of carbohydrate metabolism, lipid metabolism, insulin resistance, etc. [2].

Glycemic control is an important aspect of managing diabetes in order to prevent acute or chronic complications of diabetes mellitus. Many randomized, prospective clinical trials in type 1 and 2 diabetes have clearly shown that achieving glycemic control or reducing hyperglycemia significantly decreases the microvascular complications of diabetes.

Untreated DM can cause severe long-term complications include peripheral vascular disease, neuropathy, nephropathy, foot ulcers, and retinopathy [3,4].

An increase in body fat is generally associated with an increase

in risk of metabolic diseases such as type 2 diabetes mellitus, hypertension and dyslipidaemia [1]. Body mass index (BMI) criteria are currently the primary focus in obesity treatment recommendations, with different treatment cutoff points based upon the presence or absence of obesity-related comorbid disease. In addition, many patients with these metabolic diseases are either overweight or obese. While these simple clinical concepts may be well-accepted among many clinicians and researchers and assumed to be readily accessible in the medical literature, the authors are unaware of any previous reports in which data regarding the important relationship between BMI and metabolic disease are summarized in a comprehensive manner [5,6].

In the previous investigations [7-9], we demonstrated the alterations in lipid profiles in diabetic patients and the correlation between these changes and HbAc1, serum level of Mg in diabetic patients and if there is any correlation between the increase in HbA1c and trace elements and now proposed this study to evaluate the relationship of blood sugar with body mass index in diabetic patients.

Materials and Methods

Patients

Seventy-one adult diabetic patients (36 males+35 females) were subjected to this study. They were examined by consultant physician specializing in internal diseases from 4th of January to 30th of April 2022. Their ages ranged between 18-70 years with a (mean age of 44.36 ± 19.17years).

Complete information includes the age, gender, random blood sugar, body weight and height of both male and female individuals were recorded according the form. Body mass index was calculated for each patient according the formula BMI = (weight in Kg/ Length² in m).

Materials

Five mL of venous blood was collected from subjected individuals by venipuncture, divided into two parts; 4 ml was withdrawn into an anticoagulant-free tube centrifuged (3000xg) for ten minutes for serum separation. The separated serum was pipetted into a clean tube/ and used for estimation of fasting blood glucose (FBG) and random blood glucose (RBG).

Results

In the present study, from total 71 adult diabetic patients 36 of them were male patients and 35 were females (Figure 1).

In the present study, the ages of the patients ranged between 18 and 79 years old. Among the male diabetic patients, the highest percentage of patients was within the age group 30-39 years old, which constituted 9 (12.7%). But in females, it was among age group 20-29 which reached 10 (14.1%).

As shown in tables 1 & 2, according to the distribution of the among the study groups, the highest mean value of BMI was among male & female patients in the age group 60-69 years old, which reached 36.57 & 32.74, respectively. The higher mean value of random blood sugar in males was among age group 30-39 years which reached 258.88 mg/dL. While in females it was among the age group >70 years in females, which reached 295mg/dl.

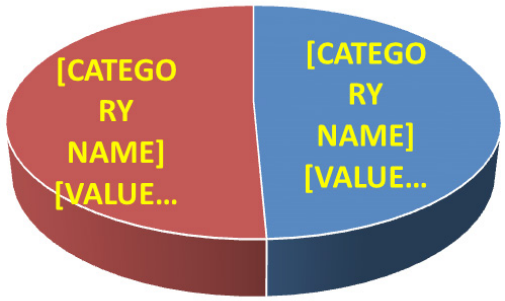


Figure 1: Number & percentage of diabetic patients.

Table 1: Data collected from Female diabetic patients were distributed according to age groups.

Age groups (years)	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	>70
No. of patients / %	10 (14.1%)	7 (9.86%)	5 (7.1%)	2 (2.8%)	6 (8.5%)	5 (7%)
BMI	26.8	28.2	30.4	25.48	32.74	31.52
R.B. S mg/ dL	173.3	211.14	269.4	184.0	232.5	295.0

Table 2: Data collected from male diabetic patients were distributed according to age groups.

Age groups (years)	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	>70
No. of patients / %	7 (9.8%)	9 (12.7%)	4 (5.6%)	3 (4.2%)	7 (9.86%)	6 (8.5%)
BMI	31.85	30.29	33.24	32.78	36.57	32.38
R.B. S mg/ dL	235.7	258.88	226.5	110.0	181.41	216.3

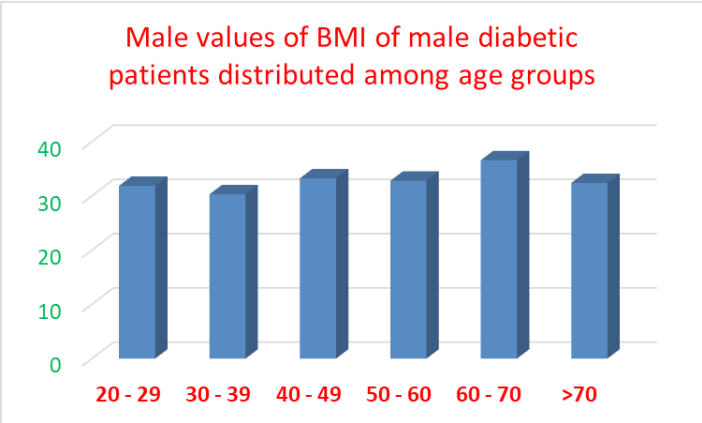


Figure 2

Discussion

Our country has a large population of diabetic patients with a vast geographical distribution and significant variations in the types and

it ranks 9th in the Arab world and 30 in the world with injuries up to 10.2% of the total [7,10]. Our present study reported that there was significant increase in the glycated hemoglobin, FBG and lipid profiles alteration in diabetic patients than in normal individuals. These parameters along with increase in age and poor glycemic control are important factors to be considered when assessing the risk of diabetic complications in the current T2DM in the Kirkuk population in Iraq [7].

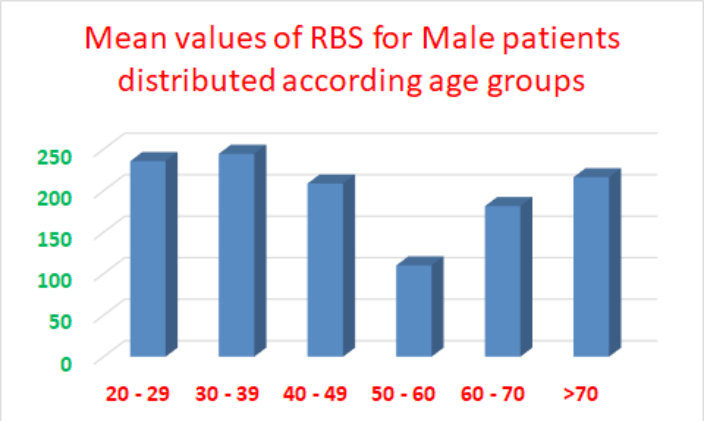
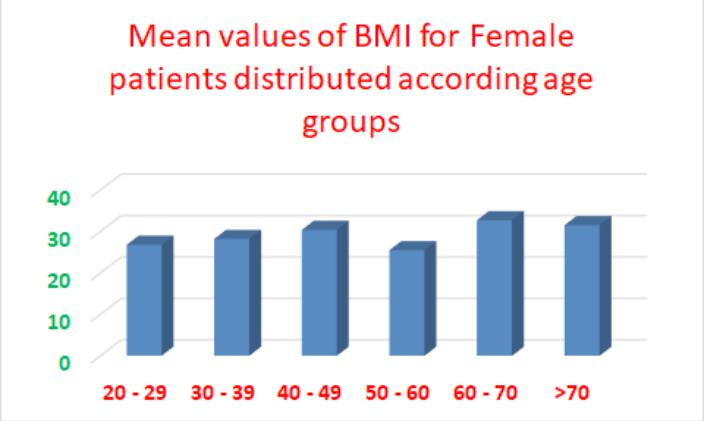


Figure 3



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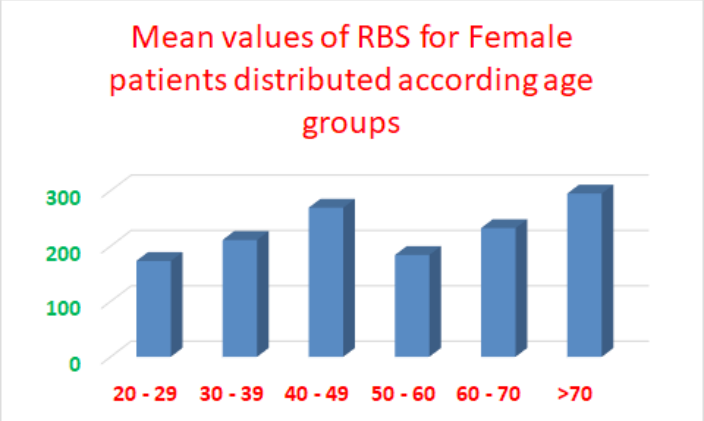

Figure 5

People with sedentary lifestyles Types of Diabetes Type 1: Insulin-dependent diabetes mellitus Type 2: Non-insulin-dependent diabetes mellitus Diabetes mellitus associated with other conditions or syndromes Gestational diabetes mellitus Types of Diabetes Type 1: About 5% to 10% of people with Diabetes. A form of diabetes wherein there is inadequate amounts of insulin are produced by the pancreas, resulting in the need for insulin injections to control the blood glucose. It is also characterized by sudden onset usually before the age of 30 years. Type 2: About 90% to 95% of people with Diabetes. Cause by a decrease in the sensitivity of the cells to insulin and the decrease in the amount of insulin produced. It can be treated with diet, oral hypoglycemic agents and insulin injections. It occurs most frequently in people who are over 30 years of age and obese [11].

Factors including age, gender as well as socio-economic status have been linked to obesity. Age factor was very obvious in this study. We reported that the higher mean value of random blood sugar in males was among age group 30-39 years The transition from living in a rural vs urban area has been associated with increased levels of obesity due to changes in lifestyles [12]. Rural-urban differences in prevalence of obesity in India have been described by others and similar to our study, higher prevalence of obesity has been found in urban areas [11,13]. Higher prevalence of diabetes in urban population as compared to rural population also suggests higher blood glucose concentrations in urban populations.

Excessive accumulation of body fat prevents the secretion of hormones that transport insulin into cells. This leads to type 2 diabetes. If diabetes develops due to obesity, it is necessary to solve the obesity problem first in order to treat it. It was reported that high levels of ectopic adipose tissue, drive the development of T2 [14].

Urgent attention is required toward the prevalence of obesity and prediabetes in children particularly in adolescents from urban areas. Regional differences suggest that strategies to prevent obesity and combat perturbations in blood sugar may have to be different in different regions.

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