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Blood sugar level in obese and non-obese.

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Abstract

Introduction and Aim: Obesity has become a leading global public health problem. It is one of the underlying causes of non-communicable chronic diseases like insulin resistance type-II diabetes, stroke and certain cancers. Obesity has become one of the leading causes of morbidity and mortality in both developed and developing countries. The present study was aimed to compare blood glucose levels in obese and non-obese and to show that obese are more prone to developing type-II diabetes mellitus.

Materials and Methods: 50 obese subjects with age matched and 50 non-obese subjects were chosen. Their venous blood samples were collected after 12 hrs. of fasting and analyzed for FBS using glucose oxidase and peroxidase method.

Results: Result of the present study showed that obese have high blood glucose levels compared to non-obese.

Conclusion: Thereby proving that obese people are prone to develop Type-II diabetes mellitus. This is due to changes in body metabolism because of change in body fat distribution in obese people.

Keywords: FBS, Obesity, Glucose

Introduction

Obesity is defined as a condition, in which there is abnormal and excessive accumulation of fat in the adipose tissue, to the extent that health may be impaired.[1] Obese individuals not only differ in the amount of excess fat that they store but also in the regional distribution of that fat within the body. The accumulation of fat in the abdominal region has been described as the type of obesity that had the greatest risk for the health of the individuals.[2] Obesity has become a leading public health problem in India and across the world. Obesity is one of the underlying causes of non-communicable chronic diseases. It has become one of the leading causes of morbidity and mortality in both developed and developing countries.[3] Prevalence of obesity has increased tremendously in Indians subsequent to the wave of industrialization and modernization. Obesity is defined as having a body mass index (BMI) of greater than 30 kg/m^2. Healthy weight is defined as a BMI between 19 and 25 kg/m^2. Overweight is defined as a BMI between 25 and 30 kg/m^2.[4] Obesity is strongly

linked to non-communicable disorders like cardiovascular diseases, insulin resistance, type-2 diabetes mellitus, strokes and certain cancers.[5] Obesity is strongly linked to type-2 diabetes mellitus through promotion of insulin resistance. Insulin which is secreted from beta cells of islets of Langerhans from pancreas act through specific cell receptor of insulin sensitive cells which results in enhanced glucose uptake into the cell. Insulin being an anabolic hormone results in energy conservation and thereby signaling the body to produce fat. As BMI increases, insulin resistance also increases which results in increased blood glucose levels in the body**.** Elevated blood glucose indicates that the increasing risk of developing Type-II diabetes mellitus. Adipose tissue accumulation with with triglyceride and free fatty acids, especially visceral and ectopiv (intramuscular and hepatic), induces a spectrum of metabolic and hormonal changes, which progressively impair insulin signaling**.** These changes manifest as increased insulin resistance in adipose tissue, liver, skeletal muscle and vascular endothelium which may lead to glucose intolerance.[6]

The aim of the study is to compare blood glucose levels in obese and non-obese adults and to focus on the frequency of type-II diabetes mellitus in these two gatherings in Kathua district.

Aims and Objectives of study: To compare the serum glucose level in obese and non-obese adults.

Materials and Methods

The study was conducted on100 subjects of age (18-60 years), among those 50 subjects were obese and 50 non-obese inclusive of both male and female. Verbal consent was obtained from patients or their attendants. Two groups were made, in Group-I obese 50 subjects (male-25 and female-25) and Group-II non-obese 50 subjects (male-25 and female-25).

Inclusion Criteria

1. Obesity BMI > 30 kg/m2
2. Non-obesity BMI = 20-24.9 kg/m2
3. Age Group 18-60 yrs.

Exclusion Criteria

1. Endocrine disorders like thyroid disorders and diabetes mellitus
2. Hypertensive
3. Subjects with any metabolic disorder
4. Smokers and alcoholic

Data Collection Procedure

The following parameters were measured for all the study subjects i.e., anthropometric and blood glucose level.

Height and weight were measured by measuring tape and weighing machine and they were expressed in cm and kg respectively.

The Body Mass Index was calculated based on a person height and weight by using “Quetelets Index”.

[BMI = Weight (Kg) / Height (m^2)]

Laboratory Investigations

Blood samples were collected from the antecubital vein, in the early morning, after a minimum of 12 hrs. of fasting period.

Biochemical analysis of serum glucose level was measured by Enzymatic Glucose Oxidase and Peroxidase (GOD-POD) method.

Statistical Analysis

Results

In the Group-I and Group-II subjects height, weight, body mass index and fasting blood sugar were measured. The statistically analyzed data was suitably arranged in

tables. All these characteristics were compared between Group-I and Group-II.

Table 1: Distribution of different parameters of subjects studied

Parameters	N	Minimum	Maximum	Mean	Std. Deviation
Obese					
Age (yrs)	50	26.00	61.00	43.6400	9.87216
Weight (kg)	50	70.00	153.00	90.1200	13.28439
Height (cm)	50	143.00	178.00	159.4400	6.94926
BMI (kg/m^2)	50	30.40	55.03	35.4267	4.12454
BSF (mg/dl)	50	90.00	205.00	119.8600	18.93815
Non-obese					
Age (yrs)	50	21.00	62.00	42.6200	10.13358
Weight (kg)	50	46.00	80.00	58.2800	7.08848
Height (cm)	50	147.00	191.00	158.7400	9.06397
BMI (kg/m^2)	50	20.58	25.00	23.1422	1.03270
BSF (mg/dl)	50	78.00	106.00	98.8800	44.92971

Table 2: Comparison of different parameters between obese and non-obese subjects studied

	Subjects	N	Mean	Std. Deviation	Significance	
					t- test	p- value
Age (yrs)	Obese	50	43.6400	9.87216	0.510	0.611
	Non-Obese	50	42.6200	10.13358		
Weight (kg)	Obese	50	90.1200	13.28439	14.952	<0.001
	Non-Obese	50	58.2800	7.08848		
Height (cm)	Obese	50	159.4400	6.94926	0.433	0.666
	Non-Obese	50	158.7400	9.06397		
BMI (kg/m^2)	Obese	50	35.4267	4.12454	20.430	<0.001
	Non-Obese	50	23.1422	1.03270		

Table 3: Comparison of glucose level between obese and non-obese subjects studied

		N	Mean	Std. Deviation	Significance	
					t- test	p- value
BSF (mg/dl)	Obese	50	119.8600	18.93815	9.346	<0.001
	Non-Obese	50	92.8800	7.61749		

Table 4: Comparison of different parameters between males and females of obese subjects studied

Group Statistics						
	Obese-Subjects	N	Mean	Std. Deviation	Significance	
					t- test	p- value
Age (yrs)	Males	25	43.7200	9.65453	0.057	0.955
	Females	25	43.5600	10.28381		
Weight (kg)	Males	25	82.1600	7.13956	-5.268	<0.001
	Females	25	98.0800	13.31641		
Height (cm)	Males	25	154.4000	3.12250	-7.457	<0.001
	Females	25	164.4800	5.99389		
BMI (kg/m^2)	Males	25	34.5293	3.19047	-1.561	0.125
	Females	25	36.3240	4.78288		
BSF (mg/dl)	Males	25	116.5600	14.49736	-1.239	0.221
	Females	25	123.1600	22.34704		

Table 5: Comparison of different parameters between males and females of non-obese subjects studied

Group Statistics						
	Non-Obese Subjects	N	Mean	Std. Deviation	Significance	
					t- test	p- value
Age (yrs)	Males	25	45.2400	9.92169	1.875	0.067
	Females	25	40.0000	9.84463		
Weight (kg)	Males	25	55.1600	3.91237	-3.439	0.001
	Females	25	61.4000	8.18535		
Height (cm)	Males	25	154.6400	2.44745	-3.559	0.001
	Females	25	162.8400	11.25715		
BMI (kg/m^2)	Males	25	23.1860	1.04058	0.297	0.768
	Females	25	23.0984	1.04430		
BSF (mg/dl)	Males	25	105.0800	63.12020	0.975	0.334
	Females	25	92.6800	7.56483		

Discussion

The current study was carried out to evaluate the blood glucose levels in obese and non-obese individuals and also to show that obese individuals are more prone to higher blood glucose levels.

According to Table 2, the significant p-value ($p< 0.001$) was drawn for the considered parameters like weight, BMI and height ($p=0.666$) in group I (obese) compared with Group II (non-obese). Baksha et al. (2004) reported that the obesity is related to increase in parameters such as weight and BMI. Further it was supported by Ismail

ozkaya et al. (2014) who stated that significant increase in parameters resulted in obesity. The results drawn from the present study correlated with the reports suggested by Baksha et al. and ozkaya et al. Thus, the degree of increase in parameters like weight and BMI will directly influence the change in blood glucose level.

According to Table 3, the fasting blood glucose shows significant change (<0.001) in obese when compared with non-obese. Fava et al., (2015) conducted a study on the association of BMI with known CHD risk factors. The results of present study correlate with the earlier study done by Fava, which resulted in attention towards increased FBG levels may be due to ectopic accumulation of lipids in the muscles, liver and β-pancreatic cells, leading to insulin resistance.

Conclusion

In the present study, significant levels in weight and BMI were seen in obese people (Abdominal obesity was more closely related to metabolic dysfunctions connected with cardiovascular disease than was general obesity). Thus, changes in body fat distribution result in changes in body metabolisms which in turn cause the changes in blood glucose levels. An increased significant level of blood glucose may lead to various risk factors like diabetes, cancer cardiovascular disease. Thus, the obesity is positively correlated with blood glucose levels. Diagnosis of obesity and the evaluation of the present study parameters will be highly useful to the clinicians to institute remedial measures at an early stage. Policies and programs can be formulated that focus on population-level intervention with regard to obesity prevention, such as those that promote public awareness about obesity and its causes, effects, complications and management.

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