

## Original Article

## ASSESSMENT OF FASTING BLOOD GLUCOSE LEVELS AND BODY MASS INDEX OF THE FEMALE STUDENTS OF A PRIVATE MEDICAL COLLEGE

Aqeela Hamad, Shahid Hasan, Hamid Javaid and Sohail Atta Rasool

**Objective:** To determine the fasting blood glucose levels (FBG) and body mass index (BMI) of the female medical students and to find out any possible relationship between these parameters in the study group.

**Material and Methods:** A total of 100 medical students participated in this study. A detailed questionnaire was administered to the subjects about personal habits and family history.

Anthropometric parameters and blood pressure were measured by standard methods after taking written consent. Fasting blood glucose levels were determined. Data was assessed by SPSS.10. Mean Blood sugar fasting levels along with standard deviation were reported. Frequencies of normal, overweight and obese cases were also reported. Analysis included any significant differences in mean FBG levels of the subjects with normal versus obese cases and correlation between BMI and FBG levels was also determined.

**Results:** Mean age of our study population was 19.7. Frequency of impaired BMI was found to be 60%. Mean BSF of the subjects having normal BMI was  $87.9 \pm 4.5$  and those with impaired BMI had BSF  $94.9 \pm 7.4$ . Mean BSF of the subjects with family history and without family history of diabetes mellitus was  $101 \pm 6.1$  and  $90.4 \pm 6.3$  respectively. There was a significant positive correlation observed between BSF levels and BMI.

**Conclusion:** Increased BMI may leads to increased level of BSF due to presence of some degree of insulin resistance. Self monitoring of BSF and weight control measures can prevent early onset of diabetes mellitus irrespective of family history of NIDDM.

**Key words:** Non insulin dependent diabetes mellitus, impaired Body mass index, Fasting blood glucose levels..

### Introduction

Incidence and prevalence of impaired body mass index and obesity has been on the rise in the last few decades, especially young population more effected due to sedentary life style.<sup>2</sup> These conditions lead to the earlier onset of non insulin dependent diabetes mellitus (NIDDM), and may be due to longer duration of obesity and insulin resistant state by late adolescence.<sup>3</sup> Most cross- sectional studies revealed that obesity is the primary amendable risk parameter which causes early onset of NIDDM.<sup>4,5</sup> A recent study conducted on African female subjects revealed positive correlation between blood glucose levels and body mass index (BMI). More studies with different ethnic populations need to be conducted to support these correlations results. Limited studies has been performed in our population therefore this study was performed to find out any possible relationship between BMI and fasting blood glucose levels in young female subjects.

### Material and Methods

A total of 100 female medical students were

registered for the study.

A detailed questionnaire was filled by each student, after taking written consent anthropometric characteristics were recorded; BMI was calculated for each subject using collected data and by applying standard formula<sup>4</sup>.

Capillary blood sample was taken from finger by lancet pricking after aseptic measures. Fasting blood glucose was analyzed after an overnight fast of 12 hours with the help of glucometer. Fasting blood sugar reading were given in mean  $\pm$  SD, frequencies of normal, overweight and obese cases were reported while Pearson's correlation coefficient was used to find correlation between BMI and FBS. The level of significance was  $< 0.05$ .

### Results

Mean age of the participants was 19.7, Mean height was 156.3cm and mean weight was 63.2 Kg, mean BMI was  $25.9 \text{Kg/m}^2$ . Characteristic of the participants on the basis of family history of diabetes are reported in table-1. 34% having normal BMI, 60% had impaired BMI & 6% were found to be obese.

**Table-1:** Gender difference of parameters within Lower socioeconomic group.

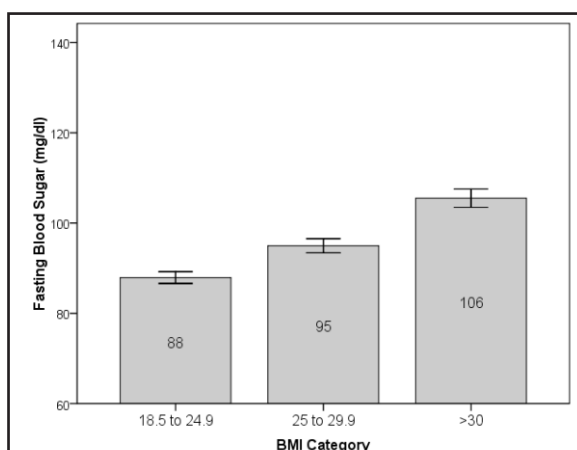
	Family History of Diabetes Mellitus		P-value
	No (n=74)	Yes (n=26)	
Age (Years)	19.6±0.8	19.8±0.7	0.24
Height (cm)	156±4.2	155.3±3.7	0.14
Weight (Kg)	61.5±4.9	68.1±5.3	<0.0001*
BMI (Kg/m <sup>2</sup> )	25.0±1.7	28.3±2.7	<0.0001*
FBS (mg/dl)	90.4±6.3	101.0±6.1	<0.0001*

‡Presented as Mean±SD, \*P significant at <0.05 level, BMI= Body Mass Index; FBS=Fasting Blood Sugar

**Table-2:** Gender difference of parameters within Lower socioeconomic group.

	Comparison of means of FBS‡ by BMI category			P-value
	Normal	Overweight	Obese	
FBS (mg/dl)¶	87.9±4.5	94.9±7.4	105.5±3.0	<0.0001*

‡Presented as Mean±SD, \*P significant at <0.05 level, BMI= Body Mass Index; FBS=Fasting Blood Sugar

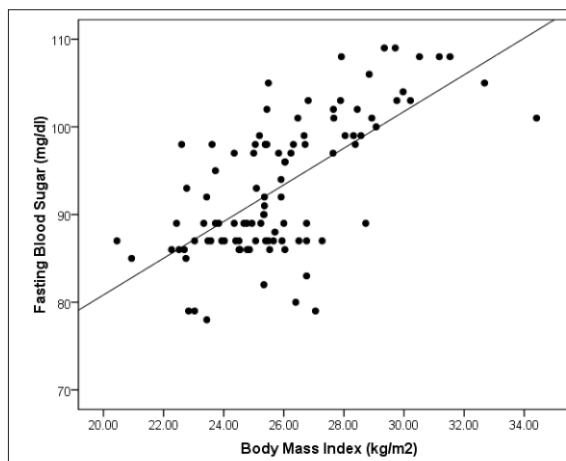


**Figure 1:** Comparison of mean fasting blood sugar by BMI category. Pair-wise comparison between groups is shown by parallel bars. Error bars show 95% confidence interval for mean (95% C.I). \*P significant at <0.05 level.

Obese. The over weight and obese had significantly higher BSF levels as compared to subjects having normal BMI (101.6 Vs 87.9±4, p 0.01) as shown in **table=2**. There was a significant positive correlation found between BSF & BMI p< 0.01 as shown in **fig=2**

### Discussion

In many longitudinal and cross sectional studies the important predisposing risk which leads to NIDDM is impaired BMI & obesity<sup>7,8</sup>. Results of a Swedish prospective study conducted on normoglycemic subjects that were followed up till the development and onset of NIDDM, showed that subjects with



**Figure-2:** Scatter diagram of correlation between BMI and FBS. Pearson's r= 0.66, \*P= <0.0001. \*Correlation is significant at P <0.05.

Highest BMI developed early diabetes as compared with the subjects with normal BMI. Other studies also revealed a positive significant correlation between impaired / high BMI and NIDDM. These studies support the concept of presence of insulin resistance state in obese subjects which leads to hyperglycemia and diabetes. These studies also support the correlation of BMI with the blood glucose levels but not in all cases. Racial and other biological factors may be the factors which also effect the blood glucose concentration and insulin resistance.<sup>9</sup>A Scottish study showed no significant relation of blood glucose levels and BMI. The data interpretation and results of our study indicate that impaired /high BMI is associated with higher fasting

blood glucose levels but the results should be verified by conducting the same study on larger number of population. A recent study analyzed that childhood metabolic parameters may predict the risk for developing NIDDM.<sup>11</sup>

### Conclusion

We conclude that female with impaired BMI are most likely at a high risk of developing early onset

type 2 diabetes mellitus. Health information, public awareness and motivations which encourage changes in the life style along with self monitoring of fasting blood glucose levels required to prevent and prolong the pathogenesis of NIDDM.

*Department of Bio-Chemistry  
University of Health Sciences, Lahore  
[theesculapio@hotmail.com](mailto:theesculapio@hotmail.com)*

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