Effect of Satiety over Blood Glucose levels: A Prospective Study

Sabitha K¹, Rajkumar², B Venugopal³, Rafi⁴

ABSTRACT

Aim: Fasting blood glucose reflects pancreatic islet β-cell function and stands for secretory function of basic insulin and measurement of fasting blood sugar (FBS) is used to diagnose diabetes as it has low positive results. But high levels of postprandial blood sugar (PPBS) alone is the risk factor for mortality in cardiovascular diseases (CVD). The present study aims to know the differences in the post prandial blood sample given after having breakfast and after having lunch.

Materials and Methods: 125 samples are collected from normal healthy individuals working in Chalmeda Anada Rao Institute of Medical Sciences (CAIMS) hospital. The samples are collected in fasting, postprandial after breakfast and postprandial after lunch and is analysed for blood glucose levels in semi auto analyzer by kinetic method.

Results and Conclusion: The mean and SD values of postprandial sample after having breakfast and after lunch are 100±5.93, p<0.01 (significant). The Post prandial sample collected after having lunch is more appropriate as it gives satiety to stomach and insulin secretion will be according to the contents than postprandial collected after breakfast.

Keywords: Postprandial blood glucose, insulin, satiety
The blood sugar is estimated by Nicholas 5010 semi auto analyzer by Glucose-Oxidase Peroxidase (GOD-POD) method.

**STATISTICAL ANALYSIS**

The statistical analysis is done by using paired t test.

**RESULT**

In the present study the Mean ± SD values of PPBS after having breakfast are 97.95±16.88 and after having lunch are 93.45±15.36. The mean ±SD values after comparison is 100 ± 5.93 with p<0.01 (significant).

<table>
<thead>
<tr>
<th>PPBS Breakfast</th>
<th>PPBS After Lunch</th>
<th>(PPBS Breakfast) Vs (PPBS After Lunch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>97.95±16.88</td>
<td>93.45±15.36</td>
</tr>
<tr>
<td>P value</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In normal healthy individual, an acute increase of glycemia is capable of electrophysiological changes, which is evident with prolonged QT curve \[^{8,9,10}\]. The increase in post prandial blood glucose is an important factor in the development of atherosclerosis \[^{11}\]. The post prandial hyperglycemia (PPH), increases LDL oxidation, reduces the carotid – intima meida thickness thus leading to atherosclerosis and coronary Heart Diseases (CHD) \[^{12,13,14}\]. In diabetics, PPH causes an increased production of plasma IL \[^{6,18}\] & tumor necrosis factor – α (TNF α), overproduces thrombin, decreases flow mediated vasodilation \[^{15,16,17}\]. The PPH and post hypertrigly ceredemia causes endothelial dysfunction which is mediated by oxidative stress also. Thus, PPH amplifies the atherogenic lipid profile and is a true risk factor for CHD \[^{18,19,20,21}\]. The post prandial blood glucose levels are affected by many factors like first phase insulin secretion, glucagon secretion, muscle tissue, liver tissue and fat tissue sensitivity to insulin, blood sugar levels before a meal, food and time to have meals, digestion function and absorption functions \[^{22}\].

In a study by Matthew Riddle et al\[^{23}\] they specifically mentioned about the timings of glucose measurements irrespective of diabetic or suspected diabetics or taking anti hyperglycemic drugs or not. The timings of glucose measurement influences especially basal hyperglycemia or post prandial hyper glycemia. In this present study we found that post prandial blood glucose levels given after taking breakfast is slightly towards higher side than the post prandial sample given after lunch however, all the values are within normal limits (except 5).

Similarly, in Paris a study is conducted to assess risk factors in a large male population, they concluded that 2 hour post load insulin level was a major independent predictor of coronary heart disease death, whereas impaired glucose tolerance was not \[^{24}\]. Protein and fat content of food has minimal effects in raising blood glucose \[^{25}\].

The relationship between insulin, blood glucose levels and satiety are unclear. There are findings which states that any effects on insulin and glucose were related to the lunch meal but not the preceding meals i.e., breakfast \[^{26}\]. There are reports which states no relationship between insulin, blood glucose levels and satiety \[^{27}\] and also there are studies which concludes a significant inverse relationships between satiety and glucose and insulin responses \[^{28,29}\].

**CONCLUSION**

The present study has revealed the importance of collection of blood sample for assessment of blood glucose levels and has indicated that a post prandial sample taken after lunch (satiety) rather than after taking breakfast will be more significant and better indicator of blood glucose levels.

This study emphasizes the importance of post prandial sample to be drawn after having a meal which gives satiety and the sample to be given exactly after 2 hours of time, and then the blood sugar measurement will be according to the levels of insulin secretion.

**CONFLICT OF INTEREST**

The authors declared no conflict of interest.

**FUNDING:** None

**REFERENCES**

Effect of Satiety over Blood Glucose levels: A Prospective Study


