DIFFERENT GLYCEMIC INDEX LEVELS IN HUMAN BEINGS BLOOD DUE TO VARIATION OF FOOD IN LAHORE, PAKISTAN (A CASE STUDY)

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ABSTRACT: *The purpose of this study was to examine glyceride index and find out its level in different food items such as baked potato, white rice, brown rice, banana, apple, and grapes. Over the decade's researches have been done to find out the low glycemic index benefits. Many of the old studies have proved lower level GI diets beneficial as it has good effect in controlling the blood glucose level in diabetic patients.*

Subjects were served with a fixed amount of food every 2hr. The study was done in an outpatient setting. Correlational analysis between incremental area under the curve of given food and glucose was drawn. It was observed that glucose was believed to be good for reference pod. Within multiple meal pods, GI level was found to reduce with the mixed food, before or after rice intake.

It is concluded that actual GI is high as compare to reference GI. A total of 12 single mixed meal Pakistanis most popular foods were studied for their GI values. In rice, potato, table sugar, has a high glycemic index where peanut, orange juice, dried dates, apple, and banana has low glycemic index values.

INTRODUCTION

Carbohydrates are broken down in the body via food changing into glucose, which is the main fuel source for the survival of cells. Glucose reaches the cells via the bloodstream. Once the food enters the stomach, glucose enters the bloodstream either slowly, moderately, or fastly. This all is dependent on carbohydrate type and the food source. Glycemic index (GI) is basically a way of measurement that how fast this all occurs and how blood glucose level is affected by food. High index level foods raise blood sugar more rapidly than foods having lower glycemic index levels. Glycemic index is nearly utile in high carbohydrate foods (grains, bread, pasta, sweets), foods broken down straight into glucose and rapidly get into the bloodstream. Nutrients like fats and proteins hold low glycemic index levels as they are converted of amino acids and fatty acids (respectively) into glucose before they can raise the level of blood glucose [1]

Jenkins, 1981 brought into the glycemic index (GI) by comparing the postprandial blood glucose incremental area under the curve (IAUC) of different carbohydrate foods. Once glycemic index was introduced, many other studies came in front and published an International Glycemic Index table. Within the literature published, most of the work was in Western cultures which from the reference mostly used white bread and/or glucose food source. Whereas Asian population, had white rice consumption as a staple food as this food is readily available and is more palatable. Measurement of glycemic index in the laboratory is such that blood glucose level produced by a particular food is compared to a standard amount of pure glucose [2.]

Since many types of research have been conducted on GI of foods to solve the health problems and make people clear of their diet. The principal objective of this study was also to check the GI of different foods. Subjects were served with a fixed amount of food every 2 hr. The final results were checked on a photometer machine. The rationale of this study is to investigate the effect of selected foods on the subject blood glucose level and check which food should be used by the healthy person and diabetic patients.

Sample

To check GI, a total of 12 different foods were selected and given to the subjects in a fixed amount. The 12 different foods were divided into three groups. In the first group, the selected food like apple, white bread, dried dates, and orange juice were selected food. In the second group white rice, pancake, grapes, and jelly beans. In the third group ice cream, chocolate, peanut, and brown rice, and in the fourth group banana, corn flakes, table sugar, and potato were selected food. The 200 subjects were selected for this purpose. The first blood sample was taken in fastening condition and the rest blood samples were collected after taking selected food with a time gap of two hours.

MATERIALS

Centrifuge machine, photometer machine (filter # 546nm), and disposable syringes (1 per sample), cotton roll, test tubes (1 per sample), 10ul plasma/serum (per sample), 1ml glucose reagent (per sample), Glucose was taken as the reference food.

Methodology

To determine a food's GI rating, measured portions of the food containing 10 - 50 grams of carbohydrate were fed to volunteers after an overnight fast. Mixed all the tubes well and leave them at 37^{o}C temperature for 10 mins. At last final readings were taken and presented in graphical form.

In the laboratory, a manual method was used for measuring of blood glucose level

1. Took three test tubes and was labeled as a standard tube, distilled water tube, and plasma tube for an accurate result.
2. Took sugar reagent of 1ml in all test tubes
   - Added 10ul standard in one tube named as a standard tube.
   - Added 10ul distilled water in the second tube named as the distilled water tube.
   - Added10ul plasma/serum in the third tube named as plasma tube.
3. Mixed all the tubes well and leave them at 37^{o}C temperature for 10 minutes. At last final readings were taken and presented in graphical form.

RESULTS

The study was to probe the feasibility of using glucose as a reference food in the study of the glycemic index (GI) and the GI values of different foods like a baked potato, white rice, brown rice, banana, apple, grapes. Subjects were served a fixed amount of food every 2 hr. The work was done in an outpatient setting. The data were analyzed by the correlation between incremental area under the curve (IAUC) of given food and glucose was drawn, it was observed that glucose is good for reference food. All the tables represent glycemic index values.

The fifty young healthy volunteers age 22-30 years old were selected for collection of blood samples. The first table represents the table glycemic index values of apple, bread, dried dates, and orange juice. Each food sample is GI of fifty persons. Table I shows GI vary from food to food.

Table I show the GI level of apple, bread, dried dates and orange juice.

Food	GI
Apple	130
Bread	140
Dried dates	110
Orange juice	120

Table ll show the GI level of white rice, grapes, pancake and jelly bean.

Food	GI
White rice	110
Grapes	130
Pancake	100
Jelly bean	90

Table ll: Shows the GI values of white rice, grapes, pancake and jelly bean. The blood samples were collected where the table shows the GI values vary from food to food. The first blood sample was taken at fasting condition. After every 2hr subject was given selected foods i.e. white rice, grapes, pancake, and jelly beans, and blood samples were collected. The table shows the GI values of different foods.

Table III: The first blood sample was taken at fasting condition. After every 2hr subject (A) was given selected foods i.e. ice cream, chocolate, peanut, and brown rice, and blood samples were collected. The above graph shows the GI vary from food to food.

Table lll show the GI level of icecream, choclate, peanut and brown rice.

Food	GI
Icecream	140
choclate	100
Peanut	100
Brown rice	130

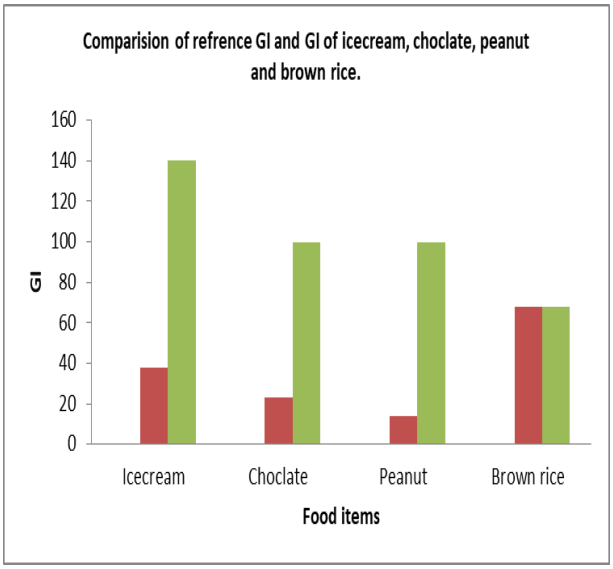
Table IV: The glycemic index with time.

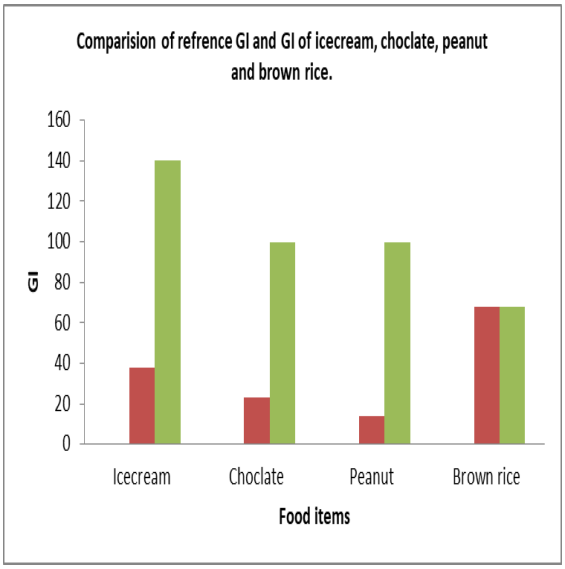
In this graph, the first blood sample was taken at fasting condition. After every 2hr subject (A) was given selected foods i.e. banana, corn flakes, table sugar, and baked potato, and blood samples were collected. The above graph shows that GI varies from food to food.

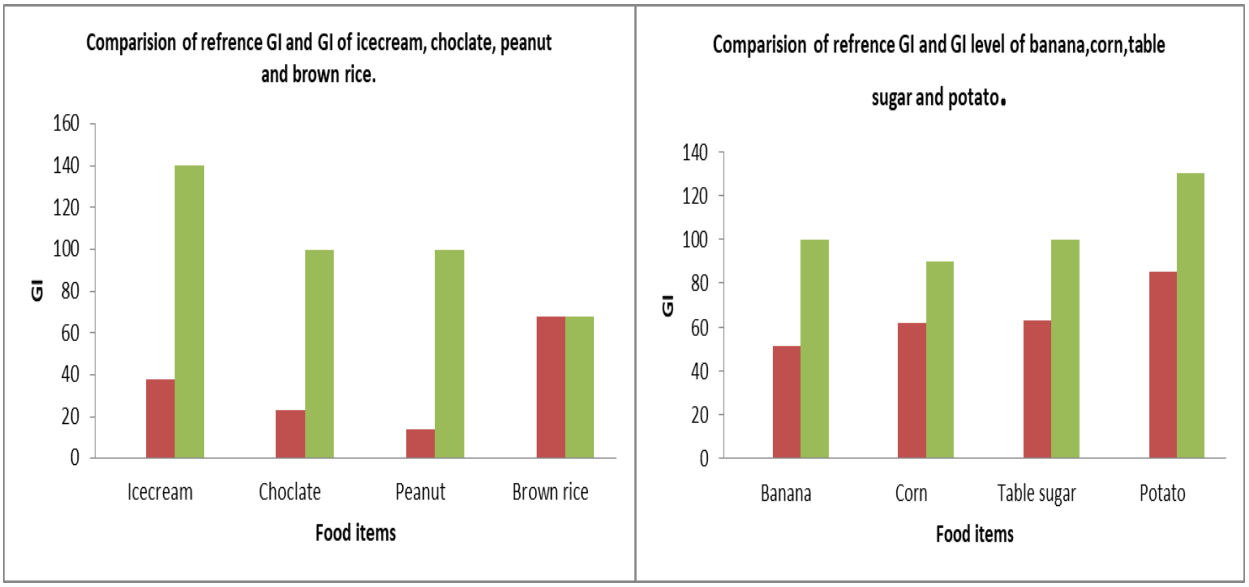
Table IV show the GI level of banana, corn, table sugar and potato.

Food	GI
Banana	100
Corn	90
Table sugar	100
Potato	130

Comparison of graphical representation of reference GI and GI of food items.







DISCUSSION

Carbohydrates are broken down from food and convert into glucose, a type of sugar. Glucose, the main fuel for cells, reaches the cells via the bloodstream. Once the food intake takes place it enters the bloodstream either slowly, quickly, or moderately. This all is dependent on the type of carbohydrate food. Glycemic index is basically a way of measurement that how fast food is broken down and affects blood glucose levels. Foods with higher index values raise blood sugar more rapidly than foods with lower glycemic index values do. In older researches, white bread and glucose were primary reference foods for glycemic index. A study proved that GI was found to be higher in white-bread as compared to GI values of the glucose-based item and so GI of white-bread was lined up to GI based on glucose. Rather than glucose, white bread was served as a reference food as it was thought to be more palatable plus secretion of glucose correlated improved than glucose [3].

In the previous studies, the basic food of Japanese, white rice studied as a reference food. Along with the International GI method of determination, single and mixed white rice meals, refined products of rice, beans, and dairy products were also equated for their incremental area under blood glucose curves and the glycemic index of every product was measured based on white rice. Analysis proved that glucose and white rice IAUC had a higher correlation and, thus, were found to be useful as the reference food. Furthermore, it was found that GI based on white rice was increased as compared to GI based on glucose and so GI based on white rice could be a lineup to glucose-based GI. In finding out the mixed meal foods GI such as beans, dairy products, and vinegar had low GI effect consuming with rice [4].

For decades, attempts were made to explore the benefits of lower GI diets. All verified that he lower GI foods were found to be better for controlling the blood glucose level in diabetic patients. Furthermore, carbohydrate mixed food can reduce postprandial glucose response and can be helpful for preventive measures and clinical health. The results of of the present study have been found to be coincident with the finding of the others in the literature using GI as a diet study tool. In conclusion, for determining GI of foods, glucose can be used as the reference food.

In this study, glucose was used as a reference food to examine glycemic index (GI) and the GI levels of different foods like a baked potato, white rice, brown rice, banana, apple, grapes. Subjects were served with a fixed amount of food every 2 hr. The work was done in an outpatient setting. The data were analyzed by correlation within the incremental area under the curve (IAUC) of given food and glucose was drawn, it was observed that glucose was found to be good to be used as a reference food. According to my results white rice, baked potato, table sugar, etc. has a high glycemic index while foods that showed intermediate glycemic index were peanut, orange juice, dates dried, apple and banana, corn flakes, pancake showed low glycemic index. Some foods showed variation from the old work of the scientists because the glycemic effect of foods depends on a number of factors such as food eaten alone or with other foods, type of starch, individual's health, and time period. A baked potato has a high glycemic index and peanut has a low glycemic index. So for a healthy life, we should have a balanced diet and for diabetic patients low glycemic index-based food is beneficial.

CONCLUSION

According to results, white rice, baked potato, table sugar, etc. has a high glycemic index while foods that showed intermediate glycemic index were peanut, orange juice, dates dried, apple and banana, corn flakes, pancake showed low glycemic index. Some foods showed variation from the old work of the scientists because the glycemic effect of foods depends on a number of factors such as food eaten alone or with other foods, type of starch, individual's health, and time period. A baked potato has a high glycemic index and peanut has a low glycemic index. So for a healthy life, we should have a balanced diet and for diabetic patients low glycemic index-based food is beneficial.

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