NUTRITIVE VALUE OF CHICKEN PATTY AND FOUR DIFFERENT PIZZAS, AND THEIR GLYCAEMIC INDICES IN NORMAL AND DIABETIC VOLUNTEERS

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ABSTRACT

The study was designed to determine the blood glucose response of six different snakes/meals including chapatti + egg, chicken patty and pizza from three different local bakeries and pizza makers of Faisalabad, Pakistan. The approximate analysis of six different test meals was done for determination of carbohydrates, proteins, fats, ash and fibre contents. A group of 6 normal and 6 diabetic human volunteers were selected and given the test and control meals randomly. The volunteers were fed different meals containing 50g carbohydrates portion, the blood sample of diabetic volunteers were taken finger pricks at 0, 30, 60, 90, 120 and 180 minutes and normal volunteers 0, 15, 30, 45, 60, 90, 120 minutes and glycaemic index were calculated by standard formula. Results obtained in present study have suggested that all four test pizzas and chicken patty have very high glycaemic indices. It is therefore suggested that diabetic patients and high-risk families should not take all the test pizzas and chicken patty in their daily routine.

Key Words: Glycaemic Indices, Nutritive values, chicken patty, pizzas, diabetic patients.

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INTRODUCTION

Diabetes mellitus has become worldwide health problem characterized by chronic hyperglycemia due to relative insulin deficiency, or resistance to insulin or both. It has affected approximately 30 million people worldwide (Parveen, 1995). Recent studies on prevalence of diabetes (NIDDM) in Pakistan have demonstrated that women are more frequently affected with NIDDM than men, while obesity and physical inactivity are the main risk factors of this disease prevalence of NIDDM among men and women is mainly observed in ages ranging from 45 to 54 years. Modern researches have given more emphasis on dietary control of the disease and have recommended increasing the intake of available CHO and fibre in their diet (Shami *et al*., 1998).The nutritional consideration in diabetics is to limit the use of CHO to such foods which have maximum glycaemic effect. To lessen the risk of cardiovascular disease in diabetics and it delay the complication of the diabetes, current dietary guide lines and American and British Diabetic Associations have recommended 50-55% carbohydrates coming from complex sources (Jenkins *et al.,* 1982).

The prevalence of diabetes mellitus in relation to diet and physical work has studied in three selected districts namely Muzaffarabad, Bagh and Poonch of Azad Jammu and Kashmir. The prevalence of the disease is higher in cities than towns and villages. The disease is slightly higher in males than females. The milk and mean consumption of the residents of the area is lower than the recommended amount. The exercise level/physical work status of majority of residents is almost

equal to heavy exercise level. The prevalence of the disease is linked with diet and exercise level/physical work (Danish *et al.,* 2002).

The glycaemic index (GI) has become useful concept because it measures how rapidly the carbohydrates are absorbed and result in blood glucose and insulin elevation. The GI measures the rise in blood sugar levels caused by a measured quantity of a particular food. High GI foods have been rapidly absorbed and cause a large rise in blood sugar levels. Some of the so-called complex carbohydrates, advocated, like potatoes and white bread and low amylase rice, have been absorbed very quickly and give an undesirable metabolic response. The high GI foods generate a demand for insulin (Mathews, 2005).

Pizza has become a popular meal and snack item in several countries. It is generally described as flat type bread product either chemically or yeast leavened, to which flavored. Sauce is applied. This sauce consist primarily of tomato products and cheese, besides ingredients such as chicken meat, onion or pepper added to provide variety. On average sauce comprises of pizza about 45% by weight and remaining 55% is the bread-like curst (Lehmann, 1979).

The present study was planned to determine the blood glucose response and the glycaemic index of chicken patty and four types of pizza in local normal and diabetic human subject because these types of fast foods are becoming popular in our society. Fast foods are high in their fat and carbohydrate contents and cause different diseases e.g. diabetes mellitus and cardiovascular diseases.

MATERIALS AND METHODS

Group of 6 normal and 6 diabetic volunteers were selected randomly from Faisalabad city. The group of 6 normal volunteer of both sexes between the age groups of 20-60 years were randomly selected the same way the diabetic volunteers will be selected.

The blood glucose levels of test subject will be determined by glucometer taking capillary blood in normal volunteer at 0 hour (fasting), 15, 30, 45, 60 and 180 minutes. While in diabetic volunteers the blood glucose was determined at 0 hour (fasting), 30, 60, 90, 120 and 180 minutes because the insulin and glucose responses in blood of normal volunteers are very quicker (Wolever *et al.,* 1991).

Chapatti and egg were prepared at home, four different types of pizzas and chicken patties prepared and marketed by renowned Pizza shops/bakeries of Faisalabad were tested in this study. The approximate analysis of test meals was done for determination of carbohydrates, proteins, fats, ash and fibre contents. Glycaemic indices (G.I.) were calculated by the following formula:

$$\text{G.I.} = \frac{\text{Area under curve for test meals}}{\text{Area under curve for carbohydrate (50g)}} \times 100$$

ANOVA was applied for statistical analysis.

RESULTS AND DISCUSSION

The glycaemic index of four different pizzas and chicken patty were calculated by 50 g chapatti and fried egg as standard, taking its glycaemic index as 100. The proximate analyses of chappati+egg, Pizza Chicken Fagitta, Pizza Veggei, Pizzas of three different sources and Chicken Patty are given in Table 1.

Table 1 Proximate composition of test meals served to test subjects

Substances	Percentage					
	Ash	Moisture	Crude protein	Crude fiber	Crude fat	Carbohyd-rate
Chapatti	2	33.2	8.79	2	1	38.7
Egg fried	1.6	64.8	19	-	19	0.208
Pizza (Chicken Fagitta of pizza of Source A)	2	40.8	17.5	0.5	8.3	19.79
Pizza (Veggie) Source A	1.3	48	13.13	1	8.6	27.5
Pizza (Source B)	2	35	22.103	0.5	14.6	19.69
Pizza (Source C)	4.3	50.2	7.2	0.5	10	22.15
Chicken Patty	2	27	19.3	0.5	23	25.65

Each value is mean of three determinations.

The Mean ± SEM value of glycaemic index of source A Pizza Chicken Fagitta was 95.49±9.0. The Mean ± SEM glycaemic index for Pizza Veggei of the same source was 85.71±11.62. The Mean ± SEM values of glycaemic index for Pizzas of source B and source C were 70.68±8.57 and 88.35±9.52. Similarly, Mean ± SEM value of glycaemic index for chicken patty was 88.35±13.91.

The glycaemic indices of four different pizzas and chicken patty were calculated by taking 50 g chapatti + fried egg as standard and its glycaemic index was taken as 100. Table 2 shows that mean ± SEM glycaemic index of Pizza Chicken Fagitta was 95.49±9.06. Its glycaemic value in diabetic subjects ranged from 128.95-72.09. The Mean ± SEM glycaemic index of Pizza Veggei was 85.71±11.62, while highest and lowest glycaemic indices were 128.95 and 51.35, respectively. The Mean ± SEM glycaemic index of Pizza of Source B and C was 70.68±8.57 and 88.35±9.52 respectively. The highest and lowest glycaemic indices of source B Pizza and source C Pizza were 48.00-100.00 and 37.84-104.00, respectively. The glycaemic index of chicken patty was 88.35±13.91 and highest and lowest value was 48.65 and 148.84, respectively.

Table 2: Increment area under curve (IAUC) for diabetic volunteer with reference to four types of pizzas and chicken patty

Subject	Chapatti + Fried egg	Pizza Chicken Fagitta	Veggei Pizza	Source B Sweets & Pizza	Source C Sweets & Pizza	Chicken Patty
Shahid	750.00	435.00	1440.00	525.00	1170.00	2250.00
Aamir	2040.00	2400.00	1965.00	1845.00	1515.00	2250.00
Rashid	1965.00	2220.00	1725.00	1545.00	1385.00	1755.00
Shamim	3165.00	3195.00	4455.00	1905.00	3195.00	3720.00
G. Batool	1080.00	780.00	1635.00	885.00	990.00	3525.00
Naseem	1425.00	945.00	2370.00	1065.00	1035.00	780.00
Means± SEM	1737.50± 350.53	1662.50± 447.35	2265.00± 457.03	1295.00± 227.38	1548.33± 339.49	2380.00± 450.59

Table 3: Glycaemic Index (GI) for Chapatti + Fried Egg four different Pizzas and Chicken Patty in normal Volunteers

Subject	Chapatti + Fried egg	Pizza Chicken Fagitta	Veggei Pizza	Source B Sweets Pizza	Source C Sweets & Pizza	Chicken Patty
Kishwar	100.00	118.92	51.35	70.27	37.84	48.65
Shazia	100.00	128.95	128.95	68.42	84.21	97.37
Mubashaira	100.00	72.09	90.70	90.70	90.70	148.48
Farrukh	100.00	95.83	87.50	100.00	62.50	68.77
Adeel	100.00	84.00	100.00	50.00	80.00	88.00
Waseem	100.00	84.00	58.00	48.00	104.00	78.00
Means± SEM	100.00± 0.00	95.49± 9.06	85.71± 11.62	70.68± 8.57	88.35± 9.52	88.35± 13.91

It has been suggested that the knowledge of glycaemic responses of food may be useful in rationalizing diabetes diet therapy or in interpreting the results of dietary interventions. To facilitate this, the glycaemic responses of food have been classified using the glycaemic index (GI). To access the glycaemic effect of an entire diet using GI, the GI value of energy food founding the diet must be known. Glycaemic index of each test pizza and Chicken Patty was determined in both normal and diabetic subjects. Many previous studies have indicated that G.I may be used as a tool in planning diet for diabetic (Jenkins *et al.* 1998). However, some studies have also pointed out controversy about the clinical utility of G.I (Coulston *et al.* 1984). But there are some good studied that enables the qualitative and quantitative prediction of blood glucose responses of mixed meals (Chew *et al.*, 1988; Inder-Brown *et al.* 1992). The mean ± SEM glycaemic index of Pizza Chicken Fagitta found to be 95.49±9.06in normal while when compared with Chapatti + Fried of Pizza Veggei was 85.71±11.62 and in diabetics 130.96±16.49.

Glycaemic index of source B and source C was found to be 70.68±8.57 and 88.35±9.52 while in diabetics 74.53±4.24 and 136.98±13.29 glycaemic index of chicken patty was 88.358±13.91 and in diabetic it was 136.98±47.40.

Fat may alter G.I by delaying gastric emptying and tend to flatten postprandial plasma glucose and insulin response. But smaller amounts of have been observed to exert negligible effect on the G.I of foods (Wolever *et al.* 1994); Wolever and Bolognesi, 1996a) as for example in case of Chicken Fagitta Pizza 8.3% fat. Chicken patty had very high amount of fat i.e. 23%. This high amount of fat might have had high amount of fat, i.e. 23%. This high amount of fat might have delayed the gastric emptying and hence glucose and insulin response (Welch *et al.*, 1991). For the diabetic patients, it has already been reported that reducing the blood glucose raising potential of the diet by using low glycaemic index starchy foods. This has

been found to be associated with improved blood glucose and lipid controls in patients with diabetes (Fontvielle *et al.*, 1992; Wolever *et al.* 1992).

The higher amount of protein dramatically reduced the circulating glucose concentration in people with untreated type 2 diabetes as in case of pizza (Source B) which was founded to contain a high amount of protein (22.103 g) as showed lowest glycaemic response. Results obtained in present study have suggested that all four test pizzas and chicken patty have very high glycaemic indices.

CONCLUSION

It is identified that pizzas and chicken prepared by local bakeries contains high amount of glucose concentration as compared to recommended daily allowance. Hence, it is suggested that diabetic patients and high-risk families should be cautious priori taking pizzas and chicken patty in their daily routine.

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