

Dietary Survey of Diabetic Patients with Special Reference to Glycemic Index

SAROJ SINHA

Research Scholar

P.G. Department of Home Science, Kolhan University, Chaibasa (Jharkhand) India

ABSTRACT

The 24-hour recall method involves individuals recalling all foods and drinks consumed in the past 24 hours. When applying this method to diabetic patients, attention to glycemic index (GI) is crucial. It is necessary to focus on identifying and quantifying foods with low GI to manage blood sugar levels effectively. Monitor portion sizes and evenly distribute meals throughout the day. The choice of the right foods in the diet is essential for the control of blood sugar levels. This study aims to find out the GI of foods consumed by diabetic patients and find out its association with age and sex. The sample consisted of 100 diabetic patients, 50 male and 50 female, from Jamshedpur. The study evaluated the GI of foods consumed by Diabetic patients and found its association with variables like age and sex.

Key Words : 24-hour recall, Glycemic index, Blood sugar

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder that impairs the body's ability to use glucose fully or partly. Elevated blood glucose levels and changes in the metabolism of fat, protein, and carbohydrates are its defining features. Failure in the production, release, or action of insulin may be the cause of this illness. It is believed that raised levels of postprandial glucose and insulin play a role in the complications linked to diabetes. Microvascular (neuropathy, retinopathy, and nephropathy) and macrovascular (cardiovascular disease) are the complications associated with diabetes (Du *et al.*, 2006).

For the majority of diabetics, controlling blood sugar levels is a lifetime struggle. Factors like diet, exercise, stress, medication, alcohol consumption, and other things that can affect their blood glucose levels. Nutrition is the most significant of these factors because the foods we eat directly affect the levels of blood glucose in our body.

The amount of carbohydrates consumed has been the main focus of conventional dietary recommendations. The total amount of carbohydrates is vital but the quality

of carbohydrates may have an added benefit. This is because not every food work equally in the body. Certain foods have a quick rate of digestion, which can result in a sudden rise or fall in blood glucose levels. Conversely, some foods digest more slowly than others and cause blood glucose levels to rise more gradually. One method for measuring this relation of foods and blood glucose level is Glycaemic Index (GI), developed by Jenkins *et al.* (1981).

The ability of food item to raise the blood sugar is measured in terms of glycaemic index (GI). Foods are ranked according to how rapid their postprandial blood glucose increases. The pancreas overproduces insulin when GI is high. The cells may become insulin resistant and cease to allow insulin to push glucose inside of them after years of glucose and insulin overload. This keeps blood sugar level high, forcing pancreas to make more insulin. Consumption of low GI foods, reduce the rate of glucose absorption and also reduce post prandial insulin level. The prolonged absorption of carbohydrate over a time helps to withdraw glucose from circulation faster and thus lowering blood concentration towards baseline

(Srilakshmi, 2018).

GI allocate scores on a scale of 0 – 100.

GI classifies food in 3 major categories:

Low GI: 55 or less

Medium GI: 56 - 69

High GI: 70 - 100

Objectives :

Based on the importance of glycaemic index of foods for controlling blood sugar level in diabetic patients, this current study has been undertaken to analyse the type of food consumed by diabetic patients.

1. To evaluate the GI of the foods consumed by diabetic patients.
2. To know the frequency of foods consumed by male and female diabetic patients with reference to GI.
3. To know the frequency of foods consumed by diabetic patients between 40 – 60 years of age and above 60 years of age with reference to GI.
4. To find relationship between GI of foods consumed by diabetic patients and their sex.
5. To find relationship between GI of foods consumed by diabetic patients and their age.

METHODOLOGY

– The study was conducted on 100 diabetic patients of which 50 were males and 50 females. Samples were randomly selected from Jamshedpur.

– Primary data was collected by 24-hour dietary recall method.

24 hour recall method:

A 24-hour recall is a dietary assessment tool that consist of a structured interview in which participants are asked to recall all food and drink they have consumed in previous 24 hours.

RESULTS AND DISCUSSION

The Table 1 discloses the food items consumed by diabetic patients and their GI. It shows that patients are consuming high GI cereals like rice, white bread and cornflakes, moderate GI cereals like wheat chapatti, rawa, poha, idli and plain dosa and low GI like daliya. In pulses and legumes group, patients are having low GI items like lentils, green gram dal, toor dal, rajma and black gram. Similarly, in vegetables also patients are having

low GI leafy vegetables, other green vegetables, carrot, radish but they are also taking high GI potato and moderate GI beetroot. Low GI fruits like apple, guava, orange, jamun and moderate GI fruits like papaya, mango and banana are also in the food list of the diabetic patients. Milk and milk products like curd and paneer and flesh foods like egg, fish, chicken, meat and nuts are low GI foods which are also included in the diet of the patients. In low GI salty and sugarfree biscuits and high GI sweet biscuits are taken by patients. Though the surveyed diabetic patients are having low GI foods like pulses, green vegetables, milk and milk products, flesh foods and nuts, but they are also consuming moderate and high GI foods like cereals, potato, sweet biscuits and jaggery. A similar study by Silva *et al.* (2015). Investigated the effects of different types of GI content of food on diabetes control and the results supported the study. This may be hypothesized as high GI foods increase blood glucose level with a spike. The insulin resistant cells do not allow to push glucose inside them. But cells derived energy from glucose. However, due to the unavailability of glucose, there is increased production of free fatty acids mediated by its counter regulatory hormones presuming hypoglycaemia (hunger like condition). Hence creating hunger and urge to have high GI foods. This is also evident from the study by Willett (1998).

The Table 2 depicts that 18% of males are consuming low GI foods, 34% of males are consuming moderate GI foods and high GI foods are taken by 48% of males. Similarly, in females 34% are having low GI foods, 30% moderate GI foods and 36% are taking high GI foods. The frequency of intake of high GI foods is more in males than in females. This may be because of males are having more of cereals and other simple carbohydrates. The data depicted in above table is in line with a previous study by Nisak *et al.* (2009).

Hypothesis I:

Null Hypothesis:

There is no significant relationship between GI of foods consumed by diabetic patients and gender. (P value is 0.178737)

Chi square test was conducted on the data.

Since P value is > 0.05, null hypothesis is accepted at 5% level which shows there is no association between GI of foods consumed by diabetic patients and gender.

The Table 3 reveals that only 9% of patients belonging to age group between 40 – 60 years are

Table 1: Glycaemic Index(GI) of the foods consumed by diabetic patients				
Name of the Food Consumed		Glycaemic Index(GI)		
		Low (55 or less)	Moderate (56 - 69)	High (70 - 100)
Cereals	Rice			72
	Chapatti(wheat)		66	
	Rawa		64	
	Poha		65	
	Daliya	41		
	Bread(white)			100
	Idli		60	
	Dosa(plain)		56	
	Cornflakes			93
Pulses	Lentil	25		
	Green gram dal	29		
	Toor dal	22		
	Rajmah	24		
	Black gram	32		
Vegetables	Leafy vegetables	0 - 15		
	Other vegetables	10 - 40		
	Potato			82
	Carrot	49		
	Radish	15		
	Beetroot		64	
Fruits	Apple	36		
	Guava	20		
	Orange	50		
	Papaya		60	
	Jamun	25		
	Mango		56	
	Banana		56	
Milk and Milk Products	Milk	27		
	Curd	28		
	Paneer	27		
Flesh Foods	Egg	0		
	Fish	0		
	Chicken	0		
	Mutton	0		
Nuts		24 - 54		
Biscuits	Sweet			70
	Salty	48		
	Sugarfree	50		
Jaggery				84

Table 2 : Glycaemic Index(GI) of the foods consumed by male and female diabetic patients							
Sex	Low GI (55 or less)		Moderate GI (56 - 69)		High GI (70 - 100)		P value
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Males	9	18	17	34	24	48	0.178737
Females	17	34	15	30	18	36	

Table 3 : Glycaemic Index(GI) of the foods consumed by diabetic patients belonging to age group 40 – 60 years and above 60 years

Age	Low GI(55 or less)		Moderate GI (56 - 69)		High GI (70 - 100)		P value
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
40 – 60 years (66)	6	9	20	30	40	61	0.000212*
Above 60 years (34)	14	41	11	32	9	27	

Note: * shows the level of significance

consuming low GI foods, 30% of them are having moderate GI foods and 61% of these patients are taking high GI foods. Similarly, in case of patients above 60 years of age, 41%, 32% and 27% are having low GI, moderate GI and high GI foods, respectively. Diabetic patients aged between 40 – 60 years are consuming more of moderate and high GI foods. This may be because of their kinds of jobs that they have to eat outside. A similar study by Wolever *et al.* (2013). supported the present observation shown in the Table 3.

Hypothesis II:

Null Hypothesis:

There is significant relationship between GI of foods consumed by diabetic patients and age. The above P value shows that there is an association between age of diabetic patients and GI of food consumed by them. Since P value is < 0.05 , null hypothesis is rejected at 5% level.

Major Findings:

1. Patients are consuming high GI cereals like rice, white bread and cornflakes.
2. Low GI fruits like apple, guava, orange, jamun and moderate GI fruits like papaya, mango and banana are also in the food list of the diabetic patients.
3. There is no significant relationship between GI of foods consumed by diabetic patients and gender.
4. There is significant relationship between GI of foods consumed by diabetic patients and age.

Conclusion:

Patients with type 2 diabetes have impaired glucose homeostasis, which shows up as hyperglycemia after meals and during fasting. Carbohydrates are the main factor that influence the postprandial glycemic response, so the type and amount of carbohydrates consumed play a significant role in determining the postprandial glucose concentrations. As a result, when accounting for the quantity and kind of carbohydrates ingested, the amount

of soluble fiber and food's GI are also the main causes of postprandial glucose concentrations. It has been observed that low-GI diets lower HbA1c and enhance the glycemic profile overall.

Recommendations:

1. Diabetic patients should avoid eating foods with high Glycemic Index.
2. Consume foods with low glycemic index.
3. Whole grains, legumes, non-starchy vegetables and lean proteins are recommended strongly to stabilize blood sugar levels.
4. Consume fiber rich foods to slow digestion and absorption.
5. Visit doctor regularly and consult professional dietician for personalized advice.

Acknowledgement:

The author is thankful to all the patients for their cooperation. The author is also grateful to seniors, friends and colleagues for their help.

REFERENCES

- Du, H., Van der, A. D.L. and Feskens, E. (2006). Dietary glycaemic index: a review of the physiological mechanisms and observed health impacts. *Acta Cardiol.*, **61**: 383-397.
- Jenkins, D.J., Wolever, T.M., Taylor, R.H. *et al.* (1981). Glycemic index of foods: a physiological basis for carbohydrate exchange. *Am. J. Clin. Nutr.*, **34**:362-366.
- Nisak, M.B., Ruztia, A., Norimah. A., Azmi, K.N. and Fatimah, A. (2009). Acute Effect of Low and High Glycemic Index Meals on Post-prandial Glycemia and Insulin Responses in Patients with Type 2 Diabetes Mellitus. *Malays. J. Med. Health Sci.*, 5-10.
- Srilakshmi, B. (2018). *Nutritional Science*; 6th edition; New Age International (P) Limited, Publishers, New Delhi, 30-34.
- Silva, F.M., Crispin, D. and Azevedo, M.J.A. (2015). High-Glycemic index, Low-Fiber Break Affects the Postprandial Plasma Glucose, Insulin and Ghrelin Responses of

Patients with Type 2 Diabetes in a Randomized Clinical Trial. *J. Nutr.*, **145**: 736-741.

Willett, W.C. (1998). *Nutritional Epidemiology*; Rothman KJ, Greenland S (Eds.), *Modern Epidemiology*. (2nd ed), Lippincott-Raven Publishers, Philadelphia, 623-642.

Wolever, T.M.S., Gibbs, A.L., Chiasson, J.L., Connelly, P.W.,

Josse, R.G., Leiter, L.A., Maheux, P., Rabasa-Lhotet, R., Rodger, N.W. and Ryan, E.A. (2013). Alternating source or amount of dietary carbohydrate has acute and chronic effects on postprandial glucose and triglycerides in type 2 diabetes: Canadian trial of Carbohydrates in Diabetes (CCD). *Nutr. Metab. Cardiovasc. Dis.*, **23**: 227-234.
