Dietary Intake Pattern of Diabetic Patients and Non-diabetic Subjects of Dhaka City

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Abstract

The study was conducted among 122 diabetic patients (outdoor patients of BIRDEM) and 50 non-diabetic subjects to study comparable aspects of diabetic and non-diabetic subject with emphasis on their dietary intake. The intake pattern of various food items in terms of number and servings varied considerably between the diabetic patients and the non-diabetic subjects. The dietary history of the subjects was recorded using 24-hour recall method. The p values between diabetic and non-diabetic subjects for calorie and carbohydrate intakes were not significant. On the other hand, protein and fat intakes were significantly different between the two groups. For other food items, 51.0% diabetic subjects took muri and chira in contrast to 28.0% for non-diabetic subjects. For tea, it was 61% and 82% and for sweet products 12% and 14% respectively. Overall it was found that both diabetics and non-diabetics are getting less calorie from their daily food intake. The diabetic people are taking less fat and as a result their total calorie intake was much less than non-diabetics.

Key Words: Diabetic Patients Diet. Non-diabetic Subjects Diet. Food Items.

Introduction

Diabetic mellitus is a clinical syndrome characterized by hyperglycemia due to deficiency or diminished effectiveness of insulin, which may result from many environmental and genetic factors most often the two together. A majority of cases of diabetes mellitus suffer from lack of insulin. A fair percentage of the cases may be due to over production of other hormones, which are antagonistic to insulin-e.g., glucagon hormones of the pituitary, adrenaline and thyroid due to increased production of substances which

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activate insulin e.g. insulinase and insulin antagonists present in plasma[1]. This imbalance leads to abnormalities in carbohydrate, protein and lipid metabolism. The major effect includes characteristic symptoms of ketoacidssis (diabetic coma), progressive change of disease of the capillaries of the kideny and retina damage to the peripheral nerves and excessive atherosclerosis[2].

Therefore, any patient with diabetes mellitus needs help in planning and accepting a daily diet containing the appropriate amounts of carbohydrate, protein and fat, together with adequate amount of vitamins and minerals. Diabetes mellitus has been and will probably continue to be classitied by growth or juvenile onset and maturity or adult onset. The National Diabetes Data group (NDDG)[3] has proposed a new classification without considering age. The two primary types are - insulin dependent, ketosis prone diabetes mellitus and non-insulin dependent, non-ketosis prone diabetes mellitus.

The goals of diabetic diets stated by diabetologists are to bring down the blood glucose level within normal range and constant maintenance of it to prevent hyper or hypoglycemia as well as to prevent or delay diabetic complications; to meet the nutritional needs of the body by developing meal plan based on the diet history and appropriate patient's life style to maintain overall health; to attain and maintain body weight within normal range; to maintain normal growth rate and subsequent weight in children as well as adolescents and to meet adequate nutrition for the increased needs during pregnancy and lactation[4].

The primary objective of the present study was to investigate the food items, servings, calorie received from food eaten by the diabetic patients of BIRDEM and to compare those with that of non-diabetic subjects.

Materials and Methods

From the out patient department of BIRDEM, 122 newly diagnosed Diabetes Mellitus patients were purposively selected between May 1998 to July 1998 after getting their verbal consents. Another 50 non-diabetic persons from different areas of Dhaka city were also included in the study. The age range of these patients/persons was between 25 to 65 years.

A questionnaire was prepared to obtain relevant information on qualitative aspect of food intake pattern as well as quantitative food intake of the respondents through 24 hours dietary recall method. The questionnaire was modified and finalized on the basis of understandability of the subjects in the light of objectives. Afterwards, relevant data were obtained on person to person interview from both groups of respondents.

The questionnaire were cheeked, necessary editing performed and finally entered into PC 486 as well as analysis was carried out by appropriate Statistical tests using SPSS programme.

Thus the present study compared the food intake pattern of diabetic patients of BIRDEM with those of non-diabetic persons of Dhaka city in terms of number of meals, number of servings and quantity of nutrients intake.

A total of 122 diabetic and 50 non-diabetic subjects participated in the study. The salient findings are shown in tabular and figurative forms with interpretation:

Table 1. Distribution (%) of food items on number of meals per day basis

No.of meal	**0**		**< 1**		**1**		**2**		**3**	
Food item	**Diab.**	**Non-Diab.**	**Diab.**	**Non-Diab.**	**Diab.**	**Non-Diab.**	**Diab.**	**Non-Diab.**	**Diab.**	**Non-Diab.**
Rice	0	0	0	0	59.8	6	27	92	13.1	2
Bread	12.3	2	1.6	0	29.4	92	59.8	6	0.8	0
Leafy vegetabls	4.1	0	12.3	34	45.9	30	35.3	36	2.5	0
Vegetables	2.5	0	6.5	8	18	10	62.3	67	10.7	0
Fruits	8.2	14	50	42	41	34.6	0.8	10	0	0
Pulses	3.3	6	12.3	10	31	26	46.7	56	6.6	2
Fish	0.8	4	9	10	38.3	24	48.4	60	3.3	2
Meat	16.4	12	34.4	23	32.8	40	15.5	22	0.8	0
Milk & milk products	38.5	58	18.9	12	40.1	30	2.5	0	0	o
Eggs	19.7	24	41	24	36.8	20	2.5	2	0	0
Vegetable oil	0	0	0.8	0	11.5	0	54.1	64	33.6	36

Table 1 indicates that majority (59.8%) of the diabetic respondents were eating rice once/day, whereas 92% non-diabetic subjects were eating 2 times/day. 59.8% diabetic patients bad taken bread twice daily, whereas 92% non-diabetics took once daily. 45.9% diabetics taken leafy vegetables once/day

whereas 35.3% diabetic took leafy-vegetables twice/day. In case of vegetable 62.3% diabetics had taken twice/day, whereas 67% non-diabetics took twice/day. 41% diabetics had taken fruits once/day, compared to 34.6% non-diabetics. 46.7% diabetics and 56% non-diabetics had taken pulses two times daily. Only 48.4% diabetics but 60% non-diabetics ate fish twice daily and 34.4% diabetics took meat less than 1 time/day, whereas 40% non-diabetics had taken once daily. Many (38.5% diabetics and 58% non-diabetics) subjects did not take any milk or milk products daily.

Table 2. Distribution (%) of food items on number of servings per day basis

No of servings	0		1		2		3		4+	
Food item	Diab.	Non-Diab.	Diab.	Non-Diab.	Diab.	Non-Diab.	Diab.	Non-Diab.	Diab.	Non-Diab.
Rice	0	0	16.4	14.0	68.0	56.0	12.3	22.0	3.3	8.0
Bread	12,3	2,0	5.7	10,0	24,6	44,0	30,3	24,0	27,0	20,0
Leafy vegetable	4.1	0	85.2	96.0	10.7	4.0	0	0	0	0
Vegetable	2.5	0	41.8	56.0	53.3	44.0	1.6	0	0.8	0
Fruits	8.2	14.0	87.7	82.0	4.1	4.0	0	0	0	0
Pulses	3.3	6.0	13.9	34.0	76.2	56.0	5.7	4.0	0.8	0
Fish	0.8	4.0	34.4	54.0	59.0	38.0	5.7	4.0	0	0
Meat	16.4	12.0	7.4	12.0	36.9	38.0	23.0	18.0	16.4	20.0
Milk & milk product	38.5	58.0	60.7	40.0	0.8	2.0	0	0	0	0
Eggs	19.7	26.0	77.0	70.0	3.3	2.0	0	2.0	0	0
Vegetable oil	0.8	0	28.7	2.0	37.7	46.0	27.9	48.0	4.9	4.0

Note : Servings indicate in terms of cup or tablespoon of food item.

Table 2 shows that majority (68.0%) of the diabetic respondents were taking rice 2 servings/day, whereas 56% non-diabetic patients took 2 servings/day. 30.3% diabetic patients had taken bread 3 servings daily, whereas 44% non-diabetics took 2 servings daily. 85.2% diabetics took 1 serving leafy vegetables daily, whereas 96% non-diabetics ate leafy vegetable 1 serving/day. In case of vegetables, 56% non-diabetics had taken 1 serving/day, whereas 53.3% diabetics had taken 2 servings/day. Nearly 88% diabetics had taken fruits 1 serving/day, whereas 82% non-diabetics had also taken 1 serving/day. 76.2% diabetics and 56% non-diabetics had taken pulses 2 servings daily. Only 54%

non-diabetics had taken 1 serving fish/day, whereas 59% non-diabetics took fish daily 2 servings and nearly same percent diabetics and non-diabetics had taken meat daily 2 servings. Majority (58%) of the non-diabetic subjects did not take any milk or milk products, whereas 60.7% diabetics had taken milk and milk products 1 serving/day.

Table 3. Nutrient intake of subjects as per recall method

Variable	Mean ± S. D		P value
	Diabetic	Non-diabetic	
Calorie (kcal)	1117 ± 235	1172 ± 271	0.18
Carbohydrate (g)	117.5 ± 28.4	110.7 ± 30.2	0.16
Protein (g)	60 ± 12	55 ± 19	0.03
Fat (g)	41 ± 15	58 ± 14	0.00

It was found that total calorie and fat intake of diabetic subjects was less than non-diabetic subjects. However, calorie and also carhohydrate intake between the two groups was not significant, but protein and fat intake was highly significant (Table 3). Diabetics obtained more calorie from carbohydrate and protem, but non-diabetics obtained more calorie from fat (Table 4).

Table 4. Percent calorie obtained from nutrients by two categories of subjects

Variable	Nutrient intake		% calorie provided	
	Diabetic	Non-diabetic	Diabetic	Non-diebetic
Carbohydrate	117.5g	110.7g	40	37
Protein	60g	55g	21	19
Fat	41g	58g	15	20

Note: Total calorie intakes of diabetic and non-diabetic subjects were 1117 and 1172 kcal respectively (Table 3).

Most of the diabetic patients took more chira, muri and biscuit compared to non-diabetic respondents, But foods like tea, fry foods, sweet products were taken more by non-diabetic subjects than diabetic subjects (Fig. 1).

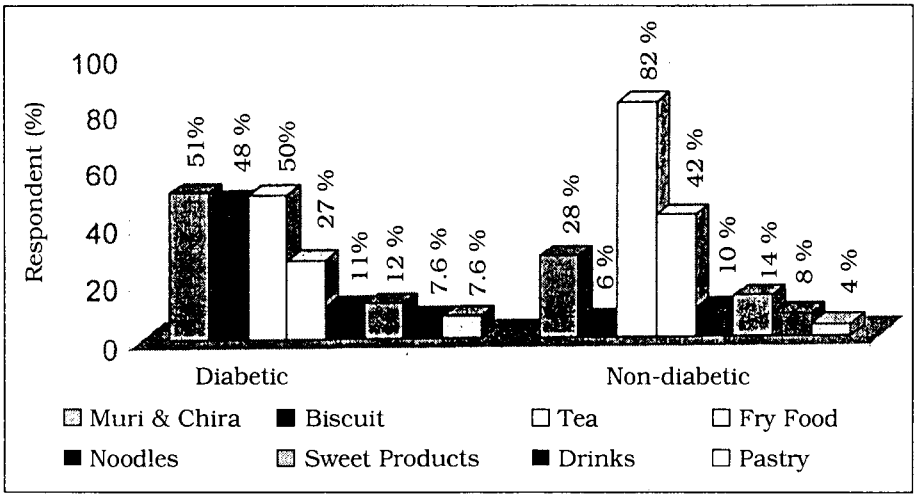

Fig. 1. Distribution of diabetic and non-diabetic respondents according to some minor food items intake.

Discussion

Diabetes mellitus is the most common endocrine disease and one of the major health problems. The chances of becoming diabetic increase with age and increase in body weight. Life expectancy of the diabetes is approximately on third lesser than the general population. The prolonged life span made possible by improved management has revealed new complications for the diabetic patients. The true frequency is difficult to ascertain because of differing standard of diagnosis but probably between 1-2%; if fasting hyperglycemic is the criterion for diagnosis. The disease is characterized by metabolic abnormalities and by long-term complication involving the eyes, kidneys, nerves and blood vessels[5].

In Bangladesh about 2.1% of the total population have been suffering from diabetes mellitus. The majority being non-insulin dependent diabetes mellitus (NIDDM). Among the vast diabetic population only about two percent are getting treatment. Literacy, poverty, lack of communication facilities etc. complicate the disease process[6].

There have been several studies on the diabetic subjects. But only a few works had been done comparing food intake pattern between diabetic and non-

diabetic subjects.The present study was undertaken to compare diabetic and non-diabetic subjects' dietary intake pattern and nutrients received from those foods.

The calorie intakes of subjects as per recall method of the two groups, diabetic and non-diabetic, were 1117 ± 235 and 1172 ± 271 respectively. The calorie and carbohydrate intakes between the two groups were not significant.But protein and fat intakes between these two groups were highly significant. The diabetic subjects were taking some selective foods and tried to avoid so many foods, which reduced their nutrient intake.

Schmidt *et al.*[7] designed a diet history, which was collected by trained interviewers. Mean daily intake of energy, protein, carbohydrate, total fat was calculated from each group at each time period. No statistically significant differences in energy and nutrient intake were observed between the two groups (Diabetics and non-diabetics).

The carbohydrate content of the diet mainly depends on selection of food items. Since 70's recommendations have been made to increase the amount of carbohydrate in diabetic diet without increasing total calorie intake. Types of carbohydrate should be present in the diabetic diet also depends on whether the patient is on IDDM or NIDDM. In Bangladesh, carbohydrate provides about 86% of our daily total calorie intake, which is much higher than the upper limit recommended by WHO and is lacking other nutrients. Diabetics having this type of habit should be encouraged to take other varieties of food keeping the carbohydrate intake within 75% of the total calorie intake and to ensure meeting nutrient needs[8]. In the present study, we found diabetic subjects received only 40% calorie from carbohydrate.

There is no controversy in protein requirement for diabetes. Recent recommendation is 0.8 g per kg of body weight for adult. Protein requirement increases in some conditions. Protein does not rise blood glucose level. Recommendations have been made for protein for diabetes is 12-20% of the total calorie if their kidney function is normal. 21% calorie came from protein of diabetic subject's diet in this study.

The current recommendation of total fat in diabetic diet is less than 30% of total calorie and saturated fat should provide less than 10% of the total calorie. We found only 15% calorie came from diabetic patient's daily fat intake.

It is concluded from the present study that both diabetic and non-diabetic subjects are taking fewer calories, which is due to less carbohydrate and fat intake. Diabetics are getting less fat and as a result total calorie intake was much less then non-diabetics.

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