PROTEIN IN DIABETIC DIET

B.N. Srivastava, Rashmi Khare

Summary

A study to analyse the protein content in diabetic diet was conducted in Diabetic Clinic, Medical College, Jabalpur. The body mass index was 23.08 ± 3.7 in men and 24.8 ± 4.0 in women. The average nutrient intake per day was deficient in calories and proteins, but high in fat.

The protein intake and age of onset were positively correlated and found to be significant.

The protein intake and glycemic levels were also been positively correlated.

Thus, we conclude that hyperglycemia may be partially controlled by providing adequate protein in diabetic diet, but other nutrients should also be provided in right proportions.

Introduction

Dietary factors could play an important role in causation as well as in the management of 'diabetes'. Recent studies show that protein deficiency may be involved in the pathogenesis of some forms of diabetes[1].

Few studies are available regarding the actual intake of different nutrients and nutritional status of diabetics.

An attempt was made to analyse the dietary habits and nutritional status of diabetics with special reference to protein intake, in patients attending the Diabetic clinic at Medical College Jabalpur.

Material and Methods

500 patients were taken for this study.

For collection of information, a designed format was used. Evaluation of food intake was made by 24 hours recall method. Record of dietary habits of individuals pertaining to vegetarian or non vegetarian, the average daily diet, special likes of particular food and the pattern of consumed diet was made. The cooked portion consumed were recorded and later on raw amount of food equivalent was recalculated. The nutritive values were calculated from ICMR food

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Department of Medicine, Medical College, Jabalpur.

composition tables[2]. Besides dietary information, detailed information relating to various aspects such as past & family history of diseases, personal habits of smoking, tobacco chewing, alcohol drinking, occupation and monthly income were collected by oral questionnaire method.

A person was considered obese when the observed weight was more than 20% or above the standard, weight over weight, when observed weight was more than 10% above and classified as under weight, when observed weight was 20% or more below the standard weight (Life Insurance Corporation of India, India's Mannual's Criteria).

The body mass index (B.M.I.) was calculated as per formula of Schrade and Bhole (1962).

$$BMI = \frac{Weight\ in\ kg}{(Height\ in\ meter)^2}$$

Average value was considered between 20-27. The medical history of patient was recorded by the physician.

Results and Discussion

The age of diabetics fell in the range of 10-80 years. Out of 500 cases, 337 (67.4%) were male and 163 (32.6%) were female, of these, 11.6% cases were IDDM, and 88.4% were NIDDM.

Table I
Age and six incidence

Age in years	0-24	25-34	35-44	45-54	55-64	65-74	75 & above	Total %	%
Male	4	35	83	105	90	15	5	337	67.4
Female	1	25	34	47	36	17	3	163	32.6
Total	5	60	117	152	126	32	8	500	
%	10%	12.0%	23.4%	30.4%	26.2%	6.4%	1.6%	100%	

Anthroprometric Measurements

The mean BMI was 23.08 ± 3.7 for men and 24.8 ± 4.01 for women. Out of 500 cases, 75 (15%) were under weight and 240 (48%) were obese.

Table II
Anthropometric Measurements

Anthr. measurement	Men	Women
Mean height (cm)	163.98 ± 8.29	153.39 ± 5.87
Mean weight (kg)	62.27 ± 12.00	58.53 ± 11.06
Mean BMI	23.08 ± 3.70	24.80 ± 4.01

Food habits

305 (61%) were vegetarian, 195 (37%) were non vegetarian. Seventy percent patients were in the habit of tobacco chewing and only 27% patients indulged in the habit of occasional alcohol drinking and 60% cases were smokers.

Statistical analysis of patients with these habits has shown no effect on the incidence of disease. Frequency of meal per day was 2 times in 69% cases. They were not taking any snacks between these 2 meals, but tea was consumed 5-6 cups per day.

Nutrient Intake

The dietary analysis of the data revealed the following information

Table III
Daily Nutrient intake amongst the diabetics

Nutrient	All subjects	Men	Women
1. Calories (K. calories)	1728.33 ± 366.38	1796.25 ± 384.29	1563.35 ± 263.99
2. Protein (g)	42.26 ± 16.37	44.55 ± 16.03	37.51 ± 16.02
% of cals.	9.8	9.72	9.53
3. CHO(g)	254.02 ± 62.40	261.32 ± 64.82	238.92 ± 54.03
% of cals.	59.05	58.12	60.8
4. Fat (g)	57.01 ± 17.43	58.37 ± 18.09	54.19 ± 15.62
% of cals.	29.8	29.14	31.20

a) The overall intake of calories was low as compared to recommended allowances prescribed by ICMR.
b) The protein intake and the percentage calories from protein was found to be low, as compared to the allowances recommended by WHO study group for Diabetics.[1] Proteins were mainly derived from vegetarian sources.
c) The intake as per cent calories from carbohydrates was high.
d) The fat intake was high.

Sex and Protein Intake

The mean protein intake was 44.55 ± 16.03 gm/d in male and 37.51 ± 16.02 gm/d in females. The overall mean protein intake was 42.26 ± 16.37 gm/d Males consumed greater amount of protein compared to females ($P<0.001$).

Table IV
The different in protein intake versus sex

Sex	protein intake (gm)	Z value and significant
Male (n: 337)	44.55 ± 16.04	Z = 4.60 significant
Female (n: 163)	37.52 ± 16.03	P <0.001

Protein intake versus Age of onset

The mean age of onset of Diabetes Mellitis was 46.45 ± 18.62 yrs. in males and $43.47 \pm$ in females and overall mean age of onset was 45.48 ± 10.47 yrs.

Table V
Protein intake versus Age of onset

	Protein intake (gm/d)	Correlation and significance
Protein intake (gm)	42.26 ± 16.37	r = 0.0855
Age of onset (y)	45.48 ± 10.48	Z - 1.96 P < 0.05

The correlation between the age of onset and protein intake was found to be significant at (P = <0.05).

Protein intake versus Blood sugar level

The role of protein deficiency in the induction of carbohydratic intolerance has been studied by Chandra R. and Bajaj, J. S.[3] Our study also shows close correlation between protein intake and blood sugar level.

Table VI
Protein intake versus Blood sugar level

		SE	Correlation and significance
Protein intake (g/day)	42.26 ± 16.37	0.73	r = -0.0758 Z = 1.696 Significant P < 0.10
PPBS (mg/de)	280.57 ± 58.67	2.62	Z = 3.33 Significant P < 0.01

Protein intake was found to be inversely related to fasting blood glucose.

The correlation between protein intake and Post parandial blood sugar was found to be highly significant. These variables also negatively correlated to each other.

Prescribed Diet and Glycemic Control

In the foregoing, we have put forth the dietetic habits of the patients attending the diabetic clinic. We advised them regarding diet and tried to analyse the effect of diet prescribed on glycemic control

The prescribed diet had the following components:

1. Adequate calories according to requirement of a person.
2. 60-65% of the total calories from carbohydrates.
3. 20-25% of the total calories from fat.
4. 15-20% of the total calories from proteins.

As we found that most diabetics were taking less calories, carbohydrate content was found to be similar to the recommended allowances and needed no change. However, the protein intake was low and fat intake was high.

The WHO[1] recommended high carbohydrates, high fibre diet in which protein constituted 15-20% of the total calories, fat should not be more than 30% of the total calories and carbohydrates should constitute the remaining food energy.

For Indians, Vishwanathan et al.[8] formulated high carbohydrates, high fibre diet consisting of a mixture of cereal, pulses, vegetables and fruits providing adequate calories. The carbohydrates contributing 67% of the total calories, protein 19% of the total calories and remainder being the fat and their results indicate over all improvement in both glycemic and lipemic parameters. Our study has also shown improvement on glycemic control with prescribed diet. We found that increase in protein content lowers the hyperglycemia. Out of 500 cases, 60% have controlled their hyperglycemia and their HBA! C was less than 8 and 40% were poorly controlled and their HBA1C was more than 8. Reason of poor control may be the patient ignorance of the disease and poor compliance.

Table VII
Effect of protein intake content on glycemia

Diabetes	Protein intake	No. of Cases	FBS	PPBS
A. Control (HBA1C <8)	Own diet (low protein)	300	167.32 ± 53.03	250.6 ± 43.3
	Prescribed diet (high protein)	300	90.54 ± 18.4 $Z = 23.7$ Significant $P<0.001$	124.0 ± 27.4 $Z = 42.8$ Significant $P< 0.001$
2. Uncontrolled (HBA1C <8)	Own diet (low protein)	200	210 ± 40.2	312.6 ± 53.6
	Prescribed diet (high protein)	200	$200. 6 \pm 42. 10$ $Z = 2041$ Significant $P<0.05$	300.7 ± 53.4 $Z = 2.31$ Significant $P<0.05$

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