

FATS AND OILS IN THE DIETS OF INDIAN DIABETICS (NORTH INDIA)

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The content and type of fat being used in the diet has drawn considerable attention, especially in relation to various metabolic diseases. Fats from animal sources are rich in saturated fatty acids and their increased consumption has been related to increased serum lipids and atherogenesis. Diabetics have an increased susceptibility to the disorders of the vascular system and it is related to the presence of increased lipids in their circulation. A reduction in the dietary fats can lower the serum lipids and thus effectively lower the risk of atherogenesis.

Fatty acids are classified as saturated or unsaturated, depending upon the presence or absence of double bonds.

Saturated fatty acids (lauric and myristic acids, palmitic and stearic acids) in the saturated fats such as butter, cream and ghee are short chain fatty acids and are generally solid at room temperature. These are mainly of animal origin.

Unsaturated fatty acids in safflower, soya bean, corn or Til oils are long chain fatty acids and are generally liquid at room temperature. They are mainly of vegetable origin.

Cholesterol : Foods of animal origin especially mutton, pork, glandular organs and egg yolk are rich in cholesterol.

Triglycerides refer to neutral fats or triacylglycerides.

It is thus increased levels of cholesterol or triglycerides in the blood that give rise to atheroma.

The present study was conducted with the following objectives—

1. To study the pattern of fat consumption in the diets of diabetics as regards total calories.
2. To assess nature of fat consumption, extent of saturated/polyunsaturated fats in the diets of diabetics.
3. To inter-relate dietary fat consumption with clinical profile, serum lipids and vascular disease in diabetics.

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Material And Methods

During 1984, 150 adult ambulatory diabetic patients of both sexes were randomly selected from the Diabetic clinic of AIIMS. - A special proforma was designed with 25 item questions. 24-hour recall method was followed for the assessment of the diet pattern. This normally involved on the average 30 minutes of interview with each patient. Nutritive value was calculated from ICMR series number 42 ; standardized fatty acid composition from Indian Standards Institute (ISI) was used for the assessment:

The following parameters were recorded :

1. Age.
2. Sex.
3. Height.
4. Weight.
5. Body Mass Index
6. Physical Activity.
7. Duration of diabetes.
8. Approximate family income.
9. Type of treatment being followed.
10. Clinical presence of vascular disease.
 - (i) Macrovascular-CAD, CVD, PVD.
 - (ii) Microvascular-Retinopathy/nephropathy.
11. Blood Chemistry :
 - (i) Blood glucose-Fasting
-Post-prandial.
 - (ii) Serum Cholesterol (Fasting)
 - (iii) Serum Triglycerides (Fasting)
- Electrocardiogram/urine analysis/fundoscopy and serum creatinine level were also performed in each case.
- 12 Dietary pattern-total calories, total fat, saturated fats, polyunsaturated fats, i.e. ` oleic acid and linoleic acid, diet cholesterol and fibre were assessed.

Results

Table I

Clinical profile of 150 patients as analysed in this study

Sex	Mean age (Yrs)	Mean Weight (kg)	Mean Height (M)	Mean BMI	Duration of diabetes Mean Yr.	Treatment Diet % Oral	Diet+ %	Diet + Insulin %
Male	70	80	50	63	1.63	23.7	7.7	20 61 19

Table 2

Biochemical Profile

<i>Blood Glucose</i>					
Mean fasting mg	Mean post-prandial mg	Mean serum cholesterol mg %	Mean serum triglycerides mg%	Macro-vascular disease % of total	Microvascular disease (% of total)
147	219	223	166	24	46

Table 3

Analysis of Diet Pattern

Total calories/ 24 hours	Fat (g)	Saturated fat (g)	Unsaturated fat (g)		Cholesterol mg% Mean
			Oleic acid g/day	Linoleic acid g/day	
Mean-1600 Range-1100-2040	Mean-60 33-37% as total calories	36	13.1	4.5	184

Based on income, diet habit, caloric intake and diet compliance, the patients were divided into 4 different groups.

Group A : Income < Rs. 500/ month
> Rs. 500/ month

Group B : Vegetarian/Non-vegetarian.

Group C : Calories < 1500/ day
Calories > 1500/ day

Group D : Compliance to diet therapy.

Non-compliance to diet therapy.

Analysis of the data of these 4 groups with regard to serum lipids, vascular disease and glycaemic control is presented in Table 4.

Those consuming more than 1500 cal/day, non-vegetarian and non-compliant to diet have higher serum cholesterol and triglyceride values.

Again, those consuming more than 1500 cal/day, non-vegetarian, non-compliant group have a higher percentage of macrovascular disease.

Microvascular disease, was not related to the dietary parameters analysed.

Glycaemic control was better in vegetarian and on diet compliant group.

Discussion

In patients of high income and who are non-vegetarians, fat consumption in excess of 35% of total calories was the evolving pattern. This was related to the incidence of higher serum cholesterol and macrovascular disease in this group.

Ratio of saturated : polyunsaturated fat was worse off (3 : 1) in low income group and vegetarians. However, a better ratio (15 : 1) was seen in non-vegetarians and higher income group, but this did not seem to be protective of against high values lipids or vascular disease.

However, non-vegetarians had a higher intake of cholesterol in their diets, i.e. 295 mg/day as compared to vegetarians who consumed only 70 mg of cholesterol/day.

Serum cholesterol value in the non-vegetarian group was 228 mg/ dl (4% higher) as compared to the vegetarians who had a value of 218 mg/dl. Serum triglycerides were 18 % higher with a value of 183 mg/dl. in the non-vegetarians as compared to vegetarians with a value of 150 mg/dl. The incidence of macrovascular disease was 28% in non-vegetarian while in vegetarian it was 20%.

Triglyceride values and microvascular disease were not related to the dietary parameters analysed.

Fibre content in different groups ranged between 9-14 g/day. It was higher in vegetarians and those who were diet compliant, and seems unrelated to serum lipids or vascular disease in the group studied here.

Conclusions

Vegetarianism and low cholesterol content of diet are related to lower lipids and less macrovascular disease but not to microvascular disease in the dietic analysis of this population.

Table 4
Relation between Serum lipids, Vascular disease and glycemic control

	Group A Income		Group B		Group C		Group D	
	<500/-	>Rs. 500/-	Vege- tarian	Non- vege- tarian	< 1500	> 1500	Compliance to diet therapy	Non-com pliance to therapy
No. of patients in each group.	40	110	74	76	57	93	91	59
Mean serum cho- lesterol (mg.)	231	215	218	228	211	238	213	234
Mean serum trig- lycerides (mg.)	168	165	150	183	157	176	163	170
Macrovascular disease % of total	21	27	20	28	21	45	21	30
Microvascular disease % of total	52	41	55	38	53	40	45	48
Glycaemic control (F <140 mg PP <200 mg) % of total	49	39	50	42	53	37	52	39

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