Original Article

EFFECT OF DIABETIC PATIENT EDUCATION IN THE MANAGEMENT OF DIABETES MELLITUS

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Abstract

Diabetic Patient Education (DPE) was imparted for a period of 30 days to 31 maturity onset diabetics. The DPE included knowledge about the disease, types, symptoms, complications and ways of achieving a good control with major emphasis on diet and exercise. The education was imparted using visual aids, printed pamphlets and oral communication. The efficacy of DPE was monitored by measuring the fasting and 2 h postprandial blood sugar levels, GHb, serum lipid and lipoprotein cholesterol levels. In addition, dietary analysis of the diet consumed by the patient was done by 24 hr recall method and chemical analysis of a meal was estimated for its fat and crude fibre content- The results indicated a significant reduction in fasting and postprandial blood sugar level which paralleled to reduced intake of total carbohydrate and a small increase in crude fibre content of diet along with non-statistically significant changes in GHb levels. On the other hand, a marked reduction was noted in serum lipid levels. Both HDL-cholesterol and LDL-cholesterol level* decreased significantly.

Introduction

Many "western" studies have suggested the incorporation of an active educational programme in the successful management of diabetes (1-5) over and above the diet, drug and exercise regimen. Education programme based on the person's intellect, motivation, physical ability, social and personal resources results in a better control over the disease. The available literature on the teaching methods that can be employed has been extensively reviewed by Ajgaonkar (6). A one-to-one teaching method using audio-visual aids has been found to be most beneficial. As the studies in the Indian set-up are scanty the present study was undertaken with a view to explore the short term effect of intense DPE for a period of 1 month in control of diabetes mellitus as evidenced by glycaemic and lipamic profile in NIDDM patients.

Key words : Diabetes Mellitus, Diabetic Patient Education, Glycosylated Haemoglobin, Serum Lipids

Abbreviations : DPE : Diabetic Patient Education
NIDDM : Non Insulin Dependent Diabetes Mellitus
GHb : Glycosylated Haemoglobin
TC : Total Cholesterol
HDL-C : High Density Lipoprotein Cholesterol LDL-C : Low Density Lipoprotein Cholesterol VLDL-C : Very Low Density Lipoprotein Cholesterol

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Materials and Methods

All chemicals used were of analytical grade or the best commercially available grades.

Subjects

The diabetic patients were selected from the outpatient diabetic clinic of SSG Hospital, Baroda with the consent of the patient as well as the treating physician. All these patients were confirmed diabetics of NIDDM type and were regularly attending the clinic for follow up and treatment. There were 35 patients (14 males and 21 females) and the clinical data of these patients is given in Table 1.

Once the patients were selected, they were kept on observation for a period of 2 weeks before starting the educational programme. Fasting blood was drawn and the patients were asked to eat a regular meal (with the nutrient composition approximately same during the subsequent visits) and were asked to remain in the clinic till 2 h post-prandial blood sample was collected. Also, physical examination, medical check-up, fundoscopic examination and assessment of knowledge using a scoring questionnaire were done (Appendix 1). The whole pattern was repeated on all subsequent visits (i.e. Baseline and after a month for follow up). Patients who developed any problems during any stage of the study period were asked to report immediately and were dropped from the study. Data on daily activity, eating habits, food preferences, food pattern and intake were recorded using a pretested questionnaire and reviewed by personal interviews Appendix 2). The subjects were asked to report on day 45. During this 30 day period weekly home visits were made to impart education, to observe the dietary pattern and modify it for the subjects in experimental group and to collect the diet for analysis before and after DPE.

Table 1.

Clinical data of diabetic patients

	Males	Females
Number of patients	14	21
Mean age (years)	55.3	51.7
Mean duration of diabetes (years)	2.3	2.9
Mean body weight (kg)	60.6	57.1
Mean height (cms)	162.6	152.0
Mean body mass index (kg/m^1)	22.9	25.3
Treatment	Oral hypoglycaemic agents Glibenclamide, Chloropropamide and Tolbutamide	

DPE Programme

The programme included knowledge about the disease, types, symptoms, complications and ways of achieving a good control. Major emphasis was laid on diet and exercise. The education was imparted using visual aids (charts and hosters), printed pamphlets, oral comunication and personal interviews which were conducted every fortnightly. On an average the total hours spent per patient was 6-8 hours per month. One to one teaching method was used to impart knowledge to the patient.

Biochemical Parameters

Venous blood sample was collected after an overnight fast of 12-14 hours. The blood sample collected was used for blood sugar estimation and GHb estimation. The

serum was used for the determination of triglycerides, total cholesterol, HDL-cholesterol and LDL-cholesterol levels. The VLDL-cholesterol was obtained by subtracting HDL and LDL-cholesterol values from the total cholesterol values.

The diet collected was analysed for crude fibre and total fat.

Assay Methods

Fasting and 2 h post-prandial blood sugar were estimated using O-toluidine method (7). GHb was estimated by the Colorimetric method of Fluckiger (8) modified by Diwanji (9). LDL-C and VLDL-C were precipitated by the addition of Phosphotungstic acid and $MgCl_a$ (10) and the supernatant was used for the HDL-C estimation using CSIR diagnostic kit which utilizes the method of Watson (11). LDL-C was precipitated using sodium citrate buffer (pH 5.04 containing heparin) as per the method of Wieland and Seidel (12). Total cholesterol was estimated by the method of Watson (13) using CSIR diagnostic kit. Crude fibre and total fat were analysed from the diet by methods as described in National Institution of Nutrition Manual (13).

Statistical Analysis

Paired Y tests was used to determine the significance of difference between two means and all tests were considered significant at $p < 0.05$ level.

Results

Intensive DPE for a period of 1 month resulted in a significant decrease in both fasting and 2 h post-prandial blood sugar values (Table 2) with appreciable changes in GHb levels (Table 2).

The dietary analysis using the 24 h recall method showed a reduction in the intake of carbohydrate and fat and slight increase in the intake of fibre after 1 month of DPE programme. However chemical analysis for fibre indicated a small increase as shown in Table 3.

The mean values for lipid profile are presented in Table 2. Inspite a significant decrease in fat intake, no appreciable changes was noted in TG and TC levels. However, significant reductions were observed with respect to cholesterol fractions namely HDL-C, LDL-C and VLDL-Cholesterol.

Table 3 : Effect of DPE programme on the carbohydrate, fibre and dietary fat content of diet

	Carbohydrate (g/day)	Crude Fibre (g/day)		Total Fat (g/day)	
		24 hr recall	Chemical analysis	24 hr recall	Chemical analysis
Initial (baseline)	208.87 ±15.54	4.63 ±0.26	2.76 ±0.31	50.03 ±3.51	19.03 ±2.48
1 month after DPE	193.75 ±15.46	5.23 ±0.47	2.91 ±0.39	42.76* ±2.96	17.75 ±1.94

*Significant at $p < 0.05$

Discussion

The present study was focused on the role of DPE in its efficacy in the improvement of glycaemic and lipidemic control as no such study has been conducted in the Indian set-up. DPE in terms of knowledge regarding the disease, diet and exercise had a beneficial impact. Imparting DPE for month resulted in a significant decrease in both the fasting and post-prandial blood sugar levels with appreciable changes in GHb levels indicating that an intensive diabetic education programme even in our set up brings out short term beneficial aspects to diabetic patients. However further long term DPE programme might be necessary to see the remarkable changes in the diet, even-though a reduction in the intake of carbohydrate and a slight increase in the intake of fibre was noticed in the present study. It will be further interesting to see whether the reduction in the level of key metabolites noticed, can be maintained in the long run.

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