Impact of Nutrition Counseling on Blood Glucose Level of Patients Suffering from Non Insulin Dependent Diabetes Mellitus

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ABSTRACT Thirty non insulin dependent female diabetic subjects in the age group of 40-60 years were selected from a hospital of Ganga Nagar (Rajasthan). Nutrition counseling was imparted to the subjects through educational package for gaining knowledge and to improve the dietary practices to reduce fasting blood glucose level of subjects. Nutrition counseling improved the knowledge of diabetics and control of diabetes through diet. Significant decrease was observed in fasting blood glucose level of patients. The mean fasting level was reduced to 154.46± 4.45 mg/dl and 152.90± 4.39 mg/dl from 158.09± 4.25 mg/dl (initial value) after ten and thirteen days of counseling. Thus, nutrition counseling is an effective measure to bring about the favourable and significant change in diabetic state.

INTRODUCTION

Diabetes Mellitus is a metabolic disorder in which the ability to oxidize the basic fuel i.e. glucose is more or less lost. This change affects the metabolism of other energy nutrients, fat and protein, because of a lack of available insulin, the pancreatic islet hormone. Glucose accumulates in the blood and is lost in the urine, causing excessive urination, thirst and hunger and leads to other complications.

Diabetes is of two types, insulin dependent (IDDM) and non insulin dependent (NIDDM). Insulin dependent diabetes is a more severe form of diabetes where the glucose level of the blood is much higher than the normal levels of 80-100mg/dl of blood. This type is found more in children and the patients suffering from diabetes for a long duration. This type of diabetes requires injection of insulin hormone for its control. Non insulin dependent diabetes is found more in the people of middle age groups and is comparatively less severe. This type of diabetes can be easily managed through diet, exercise and drugs.

Diabetes mellitus, as we know today is a complex disorder that in turn encompasses a whole spectrum of disease in westernized societies. India is known as the capital of this disease as the rate of diabetes is increasing day by day. Among these, type 2 diabetes is among the top ten leading causes of death. The management cost of the disease has been reported to be 2.5 times more than the management cost of the individuals without the disease. Diabetes is an inherited disease. It can affect people of any age from young infants to the elderly. It is estimated that 90-95 percent of all patients with diabetes mellitus are of 40 years or older (Balachandran 2001).

Many factors contribute to the onset of diabetes and these are termed as predisposing or risk factors. Environmental factors such as diet, obesity and sedentary life style increase the risk of diabetes. Other important risk factors include high family aggregation, insulin resistance, nutritional status, age and lifestyle change due to urbanization (Deepashree et al. 2007).

Diabetes mellitus is an endocrinological disorder in which nutrition education plays an important role in the control of hyperglycemia and further help in the retardation of secondary complications (Kochhar et al. 2005). Adequate basic information on diabetes enables the diabetics to comprehend and improve their psychological acceptance of disease. People at high risk of type 2 diabetes may reap long lasting benefits from lifestyle counseling benefits that continue years after the counseling ends. In order to know the impact of counseling with respect to diabetes, this study has been planned.

MATERIALS AND METHODS

Selection of the Subjects: Thirty non-insulin dependent female diabetic subjects in the age group of 40-60 years were selected from hospital of Ganga Nagar (Rajasthan) for counseling.

Development of Package: An educational

package consisting of lectures (PowerPoint presentation) and other visual aids like posters, charts, flash cards, folder and booklet were developed on dietary management and other relevant information to help the patient in gaining knowledge about the disease and its management. The developed package was evaluated (Keiffer and Cochron 1966) by a panel of five members consisting of three nutritionists, a doctor (diabetes specialist) and an extension expert.

Nutrition Counseling: The developed educational package on diabetes was used to disseminate information during group and individual counseling for ten days along with an exhibition including various exhibits regarding the disease, its symptoms, causes, complications, dietary modifications, food exchanges, different calorie diet to reduce their blood glucose levels. Queries of the patients were also solved through group discussions and individual counseling.

Information about the personal particulars, family history and duration of disease was collected from all the subjects. Anthropometric measurements like height, weight was measured and Body Mass Index of the subjects was calculated.

A questionnaire was developed and administered before and after counseling to gather information related to nutritional knowledge of patients with regard to diabetes mellitus and the dietary practices followed by them in the management of disease, dietary modifications made by the patients like inclusion and exclusion of any particular food due to disease.

Blood Glucose Measurements: Fasting blood glucose level of the patients was measured after overnight fast of about 12 hours, using one touch Horizon Blood Monitoring System. The fasting level of blood sugar was measured before counseling and after ten and thirteen days of counseling.

Statistical Analysis: The mean, standard error and paired 't' test was used to assess the impact of counseling on fasting blood glucose levels.

RESULTS AND DISCUSSIONS

Results revealed that more than half (56.67%) of the respondents were in the age group of 40-50 years while 43.33 percent in the age group of 50-60 years. All the subjects were Hindus and educated. Majority of the subjects were housewives while remaining 15 percent were in service. Majority of the families were nuclear and having income (per capita) below Rs. 5000. Regarding food habits it was found that 93.33 percent were vegetarian and 6.67 percent were ovo-vegetarian.

The mean body weight and height of the subjects was 69.86±1.17 kg and 1.62±1.15 m. respectively with the mean BMI 26.44±0.44 kg/m^2 (Table 1).

Table 1: Anthropometric measurements of the subjects (n=30)

Body measurements	Mean ± SE
Height (m)	1.62 ± 1.15
Weight (kg)	69.86 ± 1.17
BMI (kg/ m^2)	26.44 ± 0.44

The magnitude of the effect of counseling on fasting sugar is presented in table 2. The mean fasting blood glucose level of the patients ranged from 127.66±0.85mg/dl to 189.6±2.06mg/dl with a mean value of 158.09±4.25 mg/dl before counseling.

Prior to counseling, in the ranges of 120-140 mg/dl, 140-160 mg/dl, 160-180 mg/dl and 180-200 mg/dl there were 30, 30, 23.33 and 16.67 percent respondents respectively.

The mean fasting blood glucose level of the subjects, having fasting blood glucose 120-140mg/dl before counseling was 127.66±0.85mg/dl and 122.22±0.88mg/dl after ten days of counseling. The mean fasting blood glucose level after thirteen days of counseling was reduced to 120.88±0.85mg/dl from 127.66±0.85mg/dl, which is statistically significant (P<0.05).

Table 2: Impact of counseling on fasting blood glucose levels (mg/dl) of the patients (n=30)

Blood glucose levels mg/dl	Mean ± SE			't' value	
	Initial (a)	After 10 days (b)	After 13 days (c)	a v/s b	a v/s c
120-140 (n=9)	127.66 ± 0.85	122.22 ± 0.88	120.88 ± 0.85	2.35*	2.14*
140-160 (n=7)	147 ± 0.87	143.42 ± 0.90	142± 0.95	1.05^{NS}	2.26*
160-180 (n=9)	168.11 ± 0.97	166 ± 0.98	163.55 ± 0.88	1.63^{NS}	2.86**
180-200 (n=5)	189.6 ± 2.06	186.2 ± 1.85	185.2 ± 1.83	1.08^{NS}	1.76 ^{NS}
Mean	158.09 ± 4.25	154.46 ± 4.45	152.90 ± 4.39	1.76^{NS}	2.26*

* Significant 5% level, ** Significant 1% level, NS – Non Significant.

Decline was also observed among the subjects having 140-160 mg/dl blood glucose levels before counseling. The mean fasting blood glucose level after ten days of counseling was 143.42±0.90mg/dl reduced from 147±0.87mg/dl initially which was statistically non-significant (P<0.01). After thirteen days of counseling, the mean fasting blood glucose level was 142± 0.95mg/dl, which reduced significantly (P<0.05) from initial value.

There was a significant decrease in the blood glucose levels of the subjects having 160-180mg/dl blood glucose levels before counseling. The mean fasting blood glucose level was 168.11± 0.97mg/dl before counseling, which was 166± 0.98mg/dl and 163.55±0.88 mg/dl after ten and thirteen days of counseling, the reduction is non-significant after ten days of counseling but significant (P<0.01) after thirteen days of counseling.

The mean fasting blood glucose levels of subjects having 180-200mg/dl blood glucose level before counseling reduced to 186.2±1.85mg/dl and 185.2±1.83mg/dl from 189.6±2.06mg/dl (initial value) after ten and thirteen days of counseling respectively.

The mean fasting blood glucose level of the patients ranged from 122.22± 0.88 mg/dl to 186.2± 1.85 mg/dl with a mean value of 154.46± 4.45 mg/dl after ten days of counseling and ranged from 120.88± 0.85 mg/dl to 185.2± 1.83mg/dl with a mean value of 152.90± 4.99 after thirteen days of counselling.

Adoption of Desirable Practices by the Subjects: Before counseling the respondents were either unaware or gave wrong answers about the general facts, etiology, clinical manifestations and associated problems of disease, balanced diet and management of NIDDM. After counseling there was increase in knowledge of respondents and they also started adopting desirable practices to manage their disease. Subjects had certain misconcepts before counseling like saturated fats can be used as unsaturated fats, oils can be used repeatedly for cooking and frying purposes, whole milk can be used and single flour alone can be used. But after imparted nutrition counseling for a period of ten days, subjects understood certain nutritional aspects and improve their diet.

Due to adoption of desirable practices and dietary modifications such as use of skim milk, combination flour, unsaturated fats instead of saturated fats and increased consumption of fiber, there was significant decrease in the fasting blood glucose level of the patients.

In accordance with the present findings Millar et al. (2002) observed increase in total knowledge scores and greater decrease in fasting plasma glucose levels among diabetic patients after nutrition education.

Srivastava et al. (1998) also conducted a study in which intensive diabetic education on diet, drugs and exercise, complications and prevention was given to the patients, for one month. A marked decrease in fasting blood sugar level, cholesterol and lipoprotein fractions was found.

CONCLUSION

Adequate basic information on diabetes enables the diabetic to comprehend and improve their psychological acceptance and control of disease. Thus, nutrition counseling is an effective measure to bring about favorable and significant changes in diabetic state.

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