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A STUDY OF IMPACT OF NUTRITIONAL COUNSELING ON THE HEALTH STATUS OF PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

The present study was conducted in SUBHARTI UNIVERSITY (CSS HOSPITAL), situated in Meerut city (NH-58), UTTAR PRADESH .The purpose of study was to assess the impact of patient counseling, dietary intake, exercise and eating habits in patient with Type 2 Diabetes Mellitus. The study was conducted on 50 patients with Type 2 Diabetes Mellitus. The samples were randomly assigned into 2 groups counseling. Self constructed questionnaire was used to collect the data. The data was interpreted in terms of frequency and percentage. Patient received counseling at each visit and information leaflet from the pharmacist; the control group patients received counseling and information leaflets only at the end of the study. Improvement in dietary habits was correlated to weight reduction and increased fitness. The study conducts to determine the feasibility and effects of a program of changes in lifestyle designed to prevent or delay the onset of type 2 diabetes in subjects with impaired glucose tolerance. Nutritional counseling is the most effective way to lessen the complications of diabetes and its management.

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INTRODUCTION

Diabetes is fast gaining status of a potential epidemic in India with more than 62 million diabetic individual currently diagnosed with the disease .India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the "diabetic capital of the world". The prevalence of diabetes is rapidly rising all over the globe at an alarming rate. Nowhere is the diabetes epidemic more pronounced than in India as the World Health Organization (WHO) reports show that 32 million people had diabetes in the year 2002. The International Diabetes Federation (IDF) estimate the total number of diabetes subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025. The so called "Asian Indian phenotype" refers to certain unique clinical and biochemical abnormalities in Indians which include increased insulin resistance, greater abdominal adiposity i.e., higher waist circumferences despite lower body mass index etc.

Globally, as of 2013, according to International Diabetes Federation, an estimate 381 million people had diabetes .Its prevalence is increasing rapidly, and by 2030, this number is estimated to almost double .Diabetes Mellitus occurs throughout the world, but is more common(especially type 2) in the more developed countries. Obesity is one of the major risk factors of diabetes, yet there has been little research focusing on this risk factor across India. Despite lower over weight and obesity rates, India has a higher prevalence of diabetes as compared to western countries suggesting that diabetes may occur at a much lower Body Mass Index (BMI) in Indians compared with Europeans. Diabetes is a disease characterized by abnormal metabolism, most notably hyperglycemia, and an associated heightened risk for relatively specific long term complications affecting the eyes, kidney, nervous system. Patient counseling is a process that improves patient's ability to cope with their disease and make informed decisions regarding management and medication.

It helps motivate patients to change any harmful dietary and lifestyle habits. This study aims to assess the baseline knowledge, attitude, and practice of diabetic patients .The baseline results were used to develop a counseling program and to assess whether this intervention could produce any improvement in diabetes patient's health and lifestyle.

CLASSIFICATION OF DIABETES MELLITUS

Diabetes mellitus (DM), commonly referred to as diabetes, is a group of metabolic disease in which there are high blood sugar levels over a prolonged period .Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger.

Type 1DM: results from the body's failure to produce enough insulin .Type 1 diabetes mellitus is characterized by loss of the insulin-producing beta cells of the pancreas, leading to insulin deficiency. This form was previously referred to as "insulin-dependent diabetes mellitus"(IDDM) or "juvenile diabetes".

Type2 DM: begins with insulin resistance, a condition in which cells fail to respond to insulin properly. The defective responsiveness of body tissues to insulin is believed to involve the insulin receptor. As the disease progresses a lack of insulin may also develop. This form was previously referred to as "non – insulin –dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The primary cause is excessive body weight.

Gestational diabetes is the third main form and occurs when pregnant women without a previous history of diabetes develop a high blood glucose level. Gestational diabetes mellitus (GDM) resembles type 2 diabetes in several respects , involving a combination of relatively inadequate insulin secretion and responsiveness. It occurs in about 2-10% of all pregnancies and may improve or disappear after delivery. However, after pregnancy approximately 5-10% of women with gestational diabetes are found to have diabetes mellitus, most commonly type 2.Gestational diabetes is fully treatable.

Nutrition Counseling

Nutrition counseling is an ongoing process in which a health professional, usually a registered dietician, works with an individual to assess his or her usual dietary intake and identify areas where change is needed. The nutrition counselor provides information, educational materials, support, and follow-up to help the individual make and maintain the needed dietary changes. Dietary change may be needed to promote healthier eating, to adopt a therapeutic diet. Nutrition counseling is an integral part of treatment for persons with eating disorders or chemical dependencies.

MYTHS ABOUT DIABETES

There are many myths about diabetes that make it difficult for people to believe some of the hard facts – such as diabetes is a serious and potentially deadly disease.

Get the facts about diabetes and learn how you can stop diabetes myths and misconceptions.

- Myth: People with diabetes should eat special diabetic foods.
- If you have diabetes, you should only eat small amounts of starchy foods, such as bread, potatoes and pasta.
- People with diabetic can't eat sweets or chocolate.
- People with diabetes are more likely to get colds and other illness.
- If you are overweight or obese, you will eventually develop type2 diabetes

Objectives of the Study

- To study the lifestyle of Type 2 Diabetic Mellitus Patients.
- To aware the patient to understand and follow the modified dietary pattern through effective dietary counseling
- To provide nutrition counseling to diabetic patients to improve the dietary intake and nutritional status.
- To assess the impact of patient counseling, nutrient intake, exercise and eating habits in patient with Type 2 Diabetes Mellitus

METHODOLOGY

Survey method:-Survey methodology studies the sampling, of individual units from a population and the associated survey data collection techniques, such as questionnaire construction and methods for improving the number and accuracy of responses to survey. Surveys provide important all kind of public information. A single survey focus on different topics such as preferences for presidential candidate, opinions, behavior or factual information, depending on its purpose. The most important methodological challenges of a survey methodologist include making decisions and how to

- Identify and select potential sample members.
- Contact sampled individuals and collect data.
- Select the mode for posing questions and collecting responses.
- Train and supervise interviewers (if they are involved).
- Check data files for accuracy and internal consistency.
- Adjust survey estimates to correct for identified errors.

Sampling Techniques: Purposive random sampling,

Sample Selection: Fifty respondents are selected who are suffering from Type2 Diabetes Mellitus .Purposive random sampling method used in the study.

Sample Design: This study is conducted three steps.

Step 1: Collection of baseline data from selected samples, assessment of nutritional status, dietary intake, biochemical test, anthropometric measurement, coping strategies adopted by the person.

Step 2: Providing counseling according to the status of the individuals.

Step 3: Evaluating the effectiveness of counseling intervention by comparing their before after nutritional status, dietary intake, blood glucose level, anthropometric measurement after 10 weeks of counseling.

Patient counseling and Follow up all patients were counseled regarding disease, medication, nutrition, exercise, foot care, eye care, personal hygiene, self- monitoring of glucose and self care. At the time of counseling also provided information leaf late. The patients were asked to come back for follow –up once a week, for a period of one month .During each follow-up, the counselor were asked feedback questions to assess patients understanding

Tools and Techniques Questionnaire cum Interview Method, Diet counseling, weight record and 24 hours recall method.

Strengths: Low respondent burden, suitable for large scale surveys, can be administered by telephone.

Weakness: Estimation of portion sizes, single observation provides poor measure of individual intake, Bias in recording "good/bad" foods, memory dependent.

Anthropometric Measurement: Is the study of the measurement of the human body in terms of the dimensions of bone, muscles, and adipose (fat) tissue.

Some common anthropometric measurements include:

- Height
- Weight
- Mid- upper arm circumferences (MUAC)
- Skin fold thickness
- Head circumferences

Height and weight are the most common anthropometric measures used to indicate protein –energy nutritional status in emergencies.

BMI classification: Body mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m2).

Statistical Techniques used for data Analysis: statistical tools were used to analysis of the data for the prediction and suggestion. Percentage, arithmetic mean, standard error of mean (SEM), t-test for equal variance.

RESULTS AND DISCUSSION

The present study was carried out to assess the impact of nutritional counseling on diabetes mellitus type II patients. Purposively 50 respondents were selected with blood testing confirmed Diabetes belonging to Meerut and nearby cities were enrolled for 10 weeks of study. The age of the subjects varied from 30-70 years. Table 1 reveals that out of 50 respondents 50% were males (n-25) and 50% were females (n-25). Out of them 70% were sedentary working (n-35) and 30% were moderate working (n-30), however none of the patient was a heavy worker. 24% male (n-12), 26% female (n-13) belonged to middle income group and 26% male (n-13), 24% female (n-12) belonged to high income group. Table 2 (given below) is about the baseline data of 50 patients, before counseling. Out of 50 male respondents 90% were vegetarian (n-1) in both income groups, 6% were non-vegetarian (n-2) and 6% ovatarian (n-3). Out of them 4% consume egg white only (n-2) and 8% consume whole egg (n-4). 24%categorize in 3 meals with snacks, 16% categorize in 3 meals without anything in between and 10% categorize in two meals or less.

Table 1. General Information

General information	No. of subjects	%
Gender		
Male	25	50.00
Female	25	50.00
Age group		
30-40	10	20.00
40-50	27	54.00
	13	26.00
Marital status		
Married	50	100.00
Education		
Literate	50	100.00
Income group		
HIG	25	50.00
MIG	25	50.00
Nature of employment		
Sedentary	35	70.00
Moderate	15	30.00
Heavy	-	-
Family Details		
Joint	8	16.00
Nuclear	42	84.00
No. of family members		
Less than 5	40	80.00
5 to 7	10	20.00
More than 7	-	-

Table 2. Comparison of Food Habits and Regularity of Meal Before Counseling & After Counseling

Parameter	No. of Subjects (Before)	%	No. of Subjects (After)	%
Food Habits				
Vegetarian	45	90.00	45	90.00
Non-vegetarian	2	4.00	2	4.00
Ovatarian	3	6.00	3	6.00
Part of egg consumption				
Egg White only	2	4.00	5	10
Whole Egg	4	8.00	1	2
Consumption of meal/day				
3 meals with snacks	12	24.00	50	100.00
3 meals without anything in between	8	16.00	-	-
2 meals or less	5	10.00	-	-

Table 3. Consumption and Amount of Breakfast

Parameter	Before Counseling (%)	After Counseling (%)
Consumption of breakfast		
Yes	80.00	100.00
No	20.00	-
Type of Breakfast		
Parantha	60.00	30.00
Chapatti	06.00	15.00
Bread	20.00	15.00
Milk	10.00	20.00
Fruit	04.00	20.00

Table reveals that majority of respondents i.e., 80% take breakfast while 20% respondents do not consume breakfast. Out of them 60% respondents have parantha and 6% respondents have chapatti during breakfast. Out of them 20% have bread, 10% consume milk, 4% consume fruits. It was also found that people generally consume tea along with the parantha and chapatti during breakfast.

- Table shows that majority of the respondents don't exercise at all. Only 10 respondents out of 50 are conscious about exercise and they exercise 2-3 times in a week (18%) before counseling.

Table 4. Exercise schedule

Parameter	No. of Subjects	Before Counseling (%)	After Counseling (%)
Days/Week			
Daily	0	-	90.00
2-3 times in a week	10	18.00	05.00
Weekly	18	38.00	05.00
Monthly	5	10.00	-
Rarely	17	34.00	-
How much time/day			
30 min or more	6	12.00	36.00
20-30 min	20	40.00	50.00
10-20 min	20	40.00	14.00
<10 min	4	08.00	-
Kind of Exercise			
Brisk walking	30	06.00	60.00
Yoga	10	18.00	26.00
Swimming	5	-	06.00
Jogging	-	-	-
Cycling	5	-	08.00

- 38% respondents exercised weekly, 10% respondents monthly, 34% respondents did exercised rarely before counseling.
- Out of the 50 respondents 12%exercises for 30 minutes or more, 40% respondents exercises for 20-30 minutes, 40% respondents exercises for 10-20 minutes and8% exercise for <10 minutes before counseling.
- Out of 50 respondents only 6% did brisk walking in the morning before counseling and only 10 respondents do yoga (18%) the ratio between male and female in yoga category was 0:1, only 10 female respondents do yoga before counseling.

Table 5. Baseline characteristics of both group before & and after counseling

Parameter	Group I (Before Counseling)	Group II (After Counseling)
Sex	50	50
Age	48	48
Diabetes duration (yrs)	5.2	5.2
BMI (Kg/m2)	23.8	22.8
FPG	205.9	156.6
PPG	250.8	183.1
Total Cholesterol (mg/dl)	198	149
HDL (mg/dl)	27	40
LDL (mg/dl)	103	98

A total 50 patients were involved in the study .The patients were given dietary counseling which include changing their eating practices into healthier practice, incorporated at least 30 minutes of brisk walking, healthy choice of cooking fat, eating proper amount of fruits and vegetables a day, usage of toned milk instead full cream milk etc. Also all patient counseled after the selection into the study regarding disease, medication, diet, exercise and personal hygiene and motivate to improve life style .All patients baseline parameters were recorded before counseling as control values and recorded at each follow up. Also value of all parameters were recorded after 10 weeks of study and compare the effect of counseling with baseline values. The baseline characteristics of all patients at randomization are summarized in Table No.4.

Effect of counseling on Fasting Glucose level (FG)

The baseline value of FPG was 205.9 and it reduced significantly up to 156.6 after 10 weeks. Given below in Fig. 1 (a)

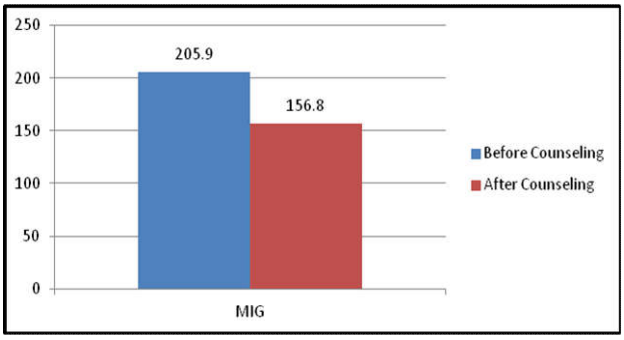

Fig. 1. a. Effect of counseling on fasting glucose level before and after counseling

Data represents

- t-test: paired two sample for means
- P<0.05 (df = 50, n =)
- t stat = 11.43009338
- t value = 11.43< 0.05

As compared with baseline data

The t-test showed that there is significant difference in baseline data before and after counseling that mean counseling is capable in lowering and maintaining fasting blood glucose level.

Effect of counseling on Postprandial Glucose Level (PPG)

(Given in Table 4.1) The baseline value of PPG of respondents was 250.8and it reduced up to 183.1 after 10 weeks of counseling.

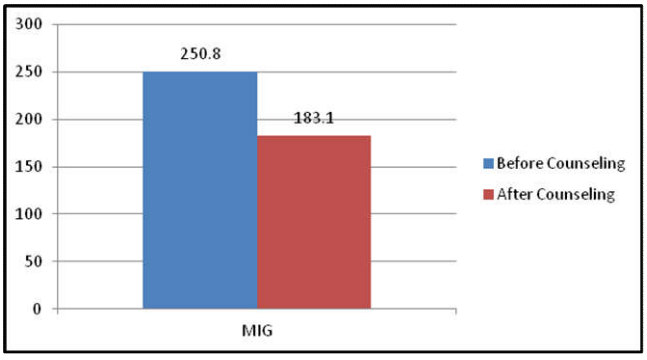

Fig. 1(b). Impact of Counseling on PPG

Data represents

- t-test: paired two samples for mean
- P<0.05 (df = 50, n =)
- t Stat = 11.57476484
- t value = 11.57< 0.05

As compared with baseline data

The t-test showed that there is significant difference in baseline data before and after counseling that mean counseling is capable in lowering and maintaining blood glucose level.

Effect of counseling on BMI

(Given in Table No. 4.1) The baseline values of BMI of MIG and HIG were 24.10 and 24.45 respectively. There was no large difference in BMI of final values and small decrease in values.

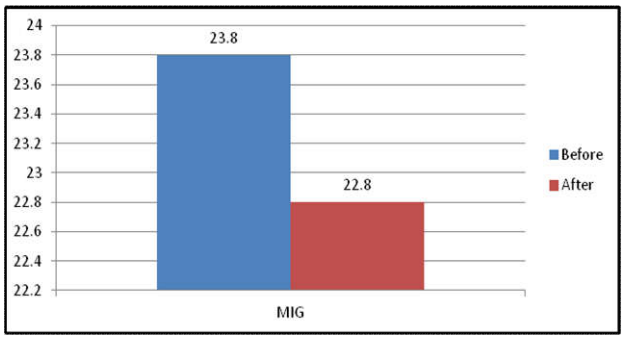

Fig. 1 (c). Impact of Counseling on BMI

Data represents

- t-test: paired two samples for mean
- P<0.05 (df = 50, n =)
- t Stat = -3.111319411
- t value = -3.11> 0.05

As compared with baseline data

The t-test showed that there is significant difference in baseline data before and after counseling that mean counseling is capable in lowering and maintaining BMI.

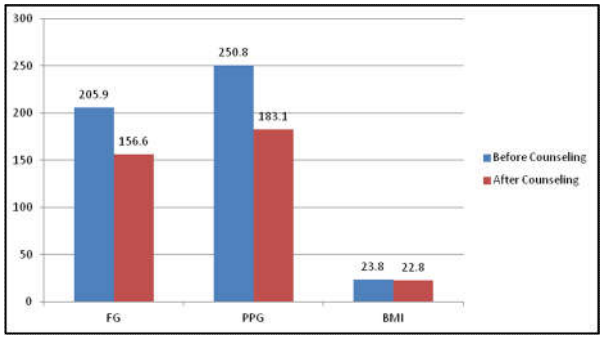

Fig. 2. Comparison BetweenFG, PPG and BMI Before And After Counseling

RESULTS

A total 50 patient was involved in the study out of which 25 patients belong to middle income group and 25 patients belongs to High Income group.

Before counseling FG rate was 205.9 after counseling FG rate reduced to 156.6 The PPG rate was250.8 before counseling which is reduced to 183.1 after counseling. There was a minor change in BMI rate from before to after counseling 23.8 to 22.8.

Effect of counseling on Cholesterol

(Given in Table No. 8) The baseline value of 50 respondent's cholesterol reduces significantly from 198 mg/dl to 149mg/dl total cholesterol, LDL 103 mg/dl to 98mg/dl and HDL increases from 27mg/dl to 40mg/dl after counseling.

Table 6. Effect of Counseling on Cholesterol Levels

Baseline Parameter of Cholesterol	Before Counseling	After Counseling
Total Cholesterols (mg/dl)	198	149
HDL (mg/dl)	27	40
LDL (mg/dl)	103	98

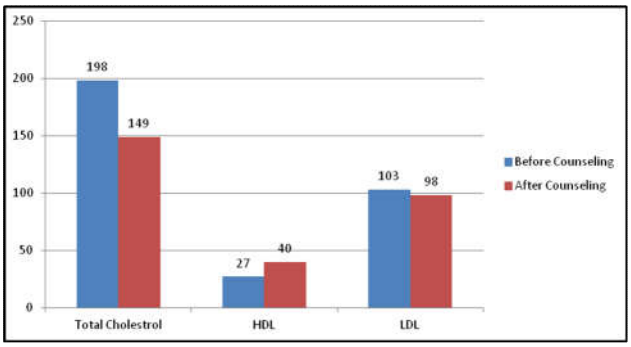

Fig. 3 (a). Effect of Counseling on Cholesterol Levels

DISCUSSION

The management of Diabetes Mellitus not only requires the prescription of the appropriate nutritional and pharmacological regimen by the physician but also intensive education and counseling of the patient. Diabetes is a chronic disease with altered carbohydrate, lipid and protein metabolism. The chronic complications of diabetes are known to affect the quality of life of diabetic patients. Various factors like understanding of the patients about their disease, socioeconomic factors, dietary regulation, self-monitoring of blood glucose are known to play a vital role in diabetes management. The present study was carried out for 10 weeks. Total 50 patients were selected for counseling regarding disease, medication, personal hygiene, diet and exercise at hospital. The values of all parameter were recorded before and after the counseling. A total 50 patients were included into the study and all patients were completed the study. All these patients already on the same medicine from 1-2 years but there is no significant reduction in FPG, PPG, BMI, HbA1c and lipids profile by before result chart because of resistance to the medication and patient Noncompliance. Also there is no awareness about Diabetes disease, foot care, eye care, teeth care, self-monitoring of glucose, diet and exercise. Also patient feedback form shows that there were less awareness in patients about personal hygiene and Life style modification .In the present study according to sex distribution curves, the ratio of Male: Female were 25:25. The baseline values of BMI were 23.8 and it reduced up to 22.8. There is not much reduction in BMI of patients due to no large weight reduction within 10

weeks. There were significantly reductions in FG and PPG found in patients due to there is positive impact of regular diet control and exercise on fasting glucose. The cholesterol values were significantly reduced. The baseline values of LDL were 103 and that reduced up to 98 after 10 weeks as compared to baseline. The value of LDL was significantly reduced of patients before and after counseling. Also the HDL levels of both the groups have increased significantly in both the groups, the baseline values of HDL were 27 and that increased up to 40 after 10 weeks. Diet therapy is the most effective means available for controlling diabetes.

Conclusion

Diabetes is a chronic illness that requires a combination of pharmacological and non-pharmacological measures for better glycemic control. Patient adherence to medication and lifestyle modifications plays an important role in diabetes management. The majorities of individuals with type 2 diabetes were overweight, did not engage in recommended levels of physical activity, and did not follow dietary guidelines for fats, fruits and vegetable consumption. Additional measures are needed to encourage regular physical activity and improve dietary habits in this population. This study provides evidence that a community based patient counseling regarding Disease, medication and Life style modification for type 2 diabetic patients, can be effectively implemented in developing nations and that important health indicators significantly improve. In particular, BMI and Glycemic levels decreased. The knowledge of the subjects visiting the first time was found to be inadequate. This probably is due to inadequate information, non-availability of educational material and improper guidance .Similar results were also observed in different educational modules. It means it is concluded that continuous education program and counseling should be conducted for Diabetic patients to emphasize and re-emphasize the importance of risk factor, prevention, adherence to medication and behavioral changes to prevent recurrences of disease, there progression, and ultimately minimize hospitalization. Overall outcome would be cost effectiveness in health care system and better life of the sufferer.

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