Original Research Article

A study to assess the efficacy of medical nutritional therapy in reducing blood sugar level in type 2 diabetic patients

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ABSTRACT

Background: Physicians in India have less time for Diet consultation, despite the fact that diet planning plays an important role in management of diabetes mellitus type II. Medical nutritional therapy is defined as Nutritional diagnostic therapy, and counseling services for the purpose of disease management. The objective of the study was to study the efficacy of medical nutrition therapy in type 2 diabetics.
Methods: A study was done on residents of Fatehgarh and Shaheed Nagar area of Bhopal. 44 patients with known history of diabetes with age 45 years or above were selected by house to house visit using purposive sampling. Subjects were divided in 2 groups. 1. Intervention group- known cases of diabetes mellitus type 2 with medical nutritional therapy. 2. Non Intervention group- known cases of diabetes mellitus type 2 without medical nutritional therapy. Diet plan according to the calorie requirement on the basis of the desired body weight was prepared and prescribed to the subjects of group 1. Monthly home visits for blood glucose monitoring was done.
Results: The mean RBS of group 1 was 200mg and of group 2 was 194. The mean RBS of group 1 decreased by 6.5% in second reading and 8.2% in third reading.
Conclusions: Only 19 out of 22 Diabetics belonging to intervention group adhered to the prescribed medical nutrition therapy. The reason being poor patient compliance because of casual attitude towards health. Better results could be obtained if the study duration was longer and HbA1c was considered.

Keywords: Medical nutrition therapy, Diabetes mellitus type 2

INTRODUCTION

Diabetes is chronic health problem with severe but preventable consequences. The defect in either insulin production, insulin action, or both leads to characteristically raised blood sugar levels in individuals. The projected rate of type 2 diabetes is expected to increase to 36.6 million by 2030 from 15.1 million in 2000 worldwide. Although new treatments and technology have helped in controlling the disease in many individuals, the challenges of diabetes self-management are serious obstacles for most. Non communicable diseases like diabetes demand patients self-management that include monitoring blood glucose levels, taking medication, maintaining a healthy diet and regularly exercising.[1] There is a well documented evidence linking importance of diet control with diabetes, in conjugation with medications for the same. Patients largely depend on their primary care physicians for every advice pertaining to diabetes care, be it medicines or diet

control, but survey studies have revealed that doctors feel uncomfortable advising patients on the sensitive issues of weight loss and diet.[2] The most challenging part for suggesting diet modification is that it could not be individualised and thus a generalised plan did not fit the life style, cultural and socioeconomics of many. Even for the well motivated patients suffering from diabetes, the challenge lies in determining what to eat. It is the position of the American Diabetes Association (ADA) that there is not a "one-size-fits-all" eating pattern for individuals with diabetes.[3] It has been established through various researches that diet modification and diet control in diabetes plays a complimentary role to treatments offered by physicians if it is well planned and customised as per individual requirement and properly administered by health professionals or dieticians. Such a structured diet in patients of diabetes mellitus is called the medical nutritional therapy (MNT). MNT is defined as "nutritional diagnostic, therapy, and counselling services for the purpose of disease management, which are furnished by a registered dietician or nutrition professional. It consists of multiple, individualised sessions between a health professional or a registered dietician and a patient, which consist of nutrition assessment, diagnosis, counselling, and other therapy services.[4] Despite efforts made through various studies to identify the optimal mix of macronutrients for the diabetic diet, it is hard to find out the perfect combination of macronutrients for the same. The beauty of MNT for diabetes lies in addressing individual needs, taking both personal and cultural factors in account and the patient's own willingness to change.[5]

The spectrum of MNT for type 2 diabetes ranges from prevention of obesity or weight gain to improving insulin resistance to contributing to improved metabolic control.[6]

With the idea of introducing MNT for diabetic patients in the field practice area and also to assess its efficacy in lowering their blood glucose level, this study was conducted amongst 44 diabetic patients.

Objective

- To study the efficacy of MNT in type 2 diabetics.
- To check the compliance of MNT in patients.

METHODS

The study was done on residents of catchment area of urban health and training centre of medical college of Bhopal. The study duration was 3 months (October2017-December 2017) House to house survey was done to identify all known cases of diabetes in the locality. All the patients aged 45 years or above and willing to participate in the study were included. The patients who are severely ill or suffering from complications were excluded. 44 patients were thus chosen for the study. Subjects were divided in 2 groups equally and matching was done so that both groups have similar characteristics.

The 2 groups were- 1. Intervention group- known cases of diabetes mellitus type 2 who were prescribed with MNT. 2. Non Intervention group- known cases of diabetes mellitus type 2 who were not prescribed MNT. The data was collected by team of two investigators who were initially trained for the same. In the first visit to the house, the purpose and methodology of the study was explained in detail to the members eligible for the study. Their consent was taken. Data was collected using a questionnaire, consisting of questions on socio-demographic details, dietary intake, lifestyle practices, anthropometric measurements such as weight and height, Physical measurement such as heart rate and blood pressure and random blood sugar were recorded. Their BMI was calculated and desired body weight of the individual and calorie requirement was calculated accordingly. Customised diet plan according to the calorie requirement of the individual was prepared and prescribed to the subjects of group 1. Later, monthly home visits were done for two months to see adherence to MNT and monitor blood glucose. The collected data was entered in MS Excel and analysed using EpiInfo-7. Descriptive analysis was done and frequencies, mean, standard deviation and proportions were calculated wherever appropriate. Dependant t-test was used to calculate difference of mean of RBS. Suitable test of significance were applied elsewhere. P value of less than 0.05 was considered statistically significant.

Ethical considerations

Ethical approval was taken from the institutional ethics committee to conduct the study. The purpose of the study was explained to subjects and consent was obtained from them. Confidentiality of participation was maintained. Appropriate advice about their health, dietary practices and referral was given to the participants of intervention group as a part of study, and the same was done to the other group after completion of the study.

RESULTS

Table 1 shows the distribution of participants according to socio-demographic characteristics. The maximum participants in both groups belonged to the age group of 55-64 years of age followed by 45-54 years of age. The participants belonged to upper class (40.9%, 36.36%) followed by upper middle class, middle class and lower middle class. The highest level of education was post graduate and above but maximum were educated up to higher secondary.

Table 2 shows the comparison of means of two groups and that the difference in their mean is insignificant. The mean age of group 1 is 54.6 which is not significantly different from 52.04 of group 2. Similarly, the differences of mean of height (1.5, 1.6), weight (72.04, 69.54), BMI (29.16, 27) and RBS at beginning (233.0, 228.5) are not different significantly. Therefore, this table show that

individuals of both the group have been matched properly and the two groups are similar in characteristics.

Table 1: Distribution of participants according to their socio-demographic characteristics.

Characteristic	Group 1 (%)	Group 2 (%)
Age		
45-54	6 (27.27)	7 (31.81)
55-64	7 (31.81)	7 (31.81)
65-74	5 (22.72)	5 (22.72)
≥75	4 (18.18)	3 (13.64)
Gender		
Male	12 (54.54)	13 (59.1)
Female	10 (45.45)	9 (40.9)
Religion		
Hindu	8 (36.36)	5 (22.72)
Muslim	14 (63.63)	17 (77.27)
Social class		
Upper class	9 (40.9)	8 (36.36)
Upper middle class	5 (22.72)	6 (27.27)
Middle class	5 (22.72)	6 (27.27)
Lower middle class	3 (13.64)	2 (9.1)
Education status		
Primary	1 (4.54)	2 (9.1)
Middle	1 (4.54)	1 (4.54)
High school	4 (18.18)	5 (22.72)
Higher Secondary	7 (31.81)	6 (27.27)
Graduate	5 (22.72)	4 (18.18)
Post graduate and above	4 (18.18)	4 (18.18)

Table 2: Comparison of mean values of the two groups (age, height, weight, BMI, RBS at beginning).

Mean	Group 1	Group 2	t-Value	P value
Age	54.6±11.9	52.04±5.2	0.91643	0.182336
Height	1.5±0.99	1.6±0.08	1.28918	0.102195
Weight	72.04±17.9	69.54±9.4	0.57762	0.283302
BMI	29.16±7.02	27.0±4.36	1.2204	0.11456
RBS at beginning	233.0±83.71	228.5±64.66	0.19954	0.421402

Table 3: Mean RBS comparison of the two groups at beginning and monthly intervals.

Group	RBS1	RBS2	RBS3
Group 1	233.0±83.71	215.41±77.38 (decreased by 7.55%)	199.09±74.58 (decreased by 14.6%)
Group 2	228.5±64.66	226.72±70.39 (decreased by 0.78%)	220.82±69.74 (decreased by 3.36%)

Table 3 shows the successive RBS means of the two groups. The mean RBS value of group 1 decreased by 7.55% after 1 month and by 14.6% after 2 month of the study, whereas, the decrease in the group 2 was only 0.78% after 1month and by 3.36% after 2month of the study. Therefore this table tells that the decrease is more in the group following MNT as compared to the other group not following it.

Apart from the above findings, 3 people from the group 1 did not adhere to the prescribed MNT. It was due to lack of dietary control in them and preference for sweets. After the completion of study, the participants of group 2 were also prescribed MNT but they could not be followed for adherence and outcome.

DISCUSSION

Apart from pharmacotherapy, diabetes management largely relies on a healthy eating pattern and regular physical exercise. The obstacle in many well motivated patients is in deciding what to eat while figuring out the diet plan.[7]

According to the American Dietetic Association, MNT is defined as a supportive process to set priorities, establish goals, and create individualized action plans which acknowledge and foster responsibility for self-care.[8]

Since it has been well established that diet plays an important role in diabetes management, MNT provided by a health care professional or dietician is an essential component in diabetes care complementing medical interventions.

In our study maximum number of patients in both groups belonged to the age group of 55-64years of age followed by 45-54years of age. This is in accordance with the diabetes prevention program, reported in 2002.[9] The participants according to social class were in following order, upper class (40.9%, 36.36%) followed by upper middle class, middle class and lower middle class.

There were no statistically significant difference between the two groups in terms of mean age of the patients i.e. mean age of group 1 is 54.6 years, which is not significantly different from 52.04 years of group 2.

In the same way, the differences of mean of height (1.5, 1.6), weight (72.04, 69.54), BMI (29.16, 27) and RBS at beginning (233.0, 228.5) are not different significantly. It shows that individuals of both the groups have been matched properly and the two groups are similar in characteristics.

In this study the mean RBS value of group 1 is decreased by 7.55% after 1 month and by 14.6% after 2 months of the study, whereas, the decrease in the group 2 was only 0.78% after 1 month and by 3.36% after 2 months of the study. Similar results were also found in the studies conducted by UKPDS Study Group, Franz et al and Kulkarni et al.[10-12]

Therefore this study tells us that the decrease is more in the group following MNT (MNT) as compared to the other group not following it.

Apart from the above findings, 3 people from the group 1 did not adhere to the prescribed MNT. It was due to lack of dietary control in them and preference for sweets. The diabetes control and complications trial (DCCT) research group recognized the importance of the role of the RD in educating patients on nutrition and adherence to achieve HbA1C goals; the RD was a key member of the team.[13]

CONCLUSION

With the advances in drugs available for control of diabetes, the burden of morbidities has fallen. Along with this, another affordable and effective method for the prevention and treatment of diabetes is MNT. It has been accepted and endorsed by the American Dietetic Association. It recommends that individualized nutrition counselling should be offered to the patients by Diet experts, so that the burden on physicians is reduced for diet counselling. For all people with diabetes, the goals of MNT is to assist in achieving and maintaining glucose, lipids, and blood pressure goals in addition to the medications they take. The beauty in prescribing MNT interventions lies in the strategies selected that meets the individual's goals and lifestyle and strategies that the individual with diabetes is willing and able to implement.

In our present study, Only 19 out of 22 diabetics belonging to intervention group adhered to the prescribed MNT. The reason being poor patient compliance because of casual attitude towards health. Better results could be obtained if the study duration was longer and HbA1c was considered.

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