Original Article

ASSESSMENT OF KNOWLEDGE AND IMPACT OF NUTRITIONAL EDUCATION AND COUNSELING ON CHANGE IN DIETARY HABITS AND BEHAVIOUR

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ABSTRACT

Objective: To evaluate the impact of nutritional education and counseling on change in dietary habits and behaviour of type-2 diabetic patients. **Methods:** The study was carried out on 180 type-II diabetics, belonging to the middle income group subjects who were on hypoglycemic drugs and not on insulin. The selection of the subjects was done on the basis of duration of the disease; i.e. diabetics suffering from, last 5 years (stratum-I) and last 10 years (stratum-II). Questionnaires were compiled to assess the knowledge (related to the disease) of the subjects prior and after the counseling. All the data obtained after counseling were assessed statistically applying ANOVA test. **Results:** The mean percent scores of knowledge calculated before and after the counseling were noted as 21.20 and 69.70 per cent in males and 15.60 and 55.19 per cent in females. We also observed a significant improvement in the mean blood glucose level (mg/dl) of the diabetic subjects prior (1.39) and after counseling (1.33). The level of knowledge scores was found to be slightly higher in male subjects as compared to female subjects and in the mean HbA1c (%) level of the diabetic subjects prior (0.48) and after counseling (1.6). **Conclusion:** On the basis of the study we conclude that education is the most powerful mode for improving quality of life and management of diabetes.

Key words: Nutrition, Diabetes, hypoglycemic drugs

Introduction

Diabetes mellitus is a group of diseases characterized by high blood glucose levels that result from defects in the body's ability to produce insulin and/or use of insulin.

Diabetes is a disease being brought to the fore in developing countries through the demographic and epidemiological transitions associated with the advent of urbanization, industrialization and mechanization. The prevalence of diabetes is increasing globally. It was estimated that in the world, there were 135 million diabetics in the year 1995, which increased upto 177 million in the year 2002.[1] This rising figure in absence of proper measures, is estimated to rise upto 300 million globally till the year 2025.[2] Prevalence rises with the age and is considerably higher in Asian population.[3] Its incidence is increasing rapidly, and it is estimated that by 2030, this number will almost double.[4] The greatest increase in prevalence is, however, expected to occur in Asia and Africa, where most patients will probably be found by 2030. The increase in incidence of diabetes in developing countries follows the trend of

urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet. This has suggested an environmental (i.e., dietary) effect, but there is little understanding of the mechanism(s) at present, though there is much speculation, some of it most compellingly presented.[5]

Maximum number of diabetics in India makes it 'Diabetic Capital of the World.[6] This rise in prevalence rate is observed since last 3 decades in India. A multicentric urban and rural diabetes prevalence study organized by ICMR in different regions of the country reveals an enormous increase in urban areas than in rural areas.[7] It has raised from 0.9-3.8per cent (1978) to 9.5-13.5 per cent (2001) in varied regions.

Diabetes in any form is one of the most daunting challenges. Because of its relationship with other diseases, it proves more dreadful. Diabetes is a disease that should be prevented and/or controlled, as it cannot be cured completely. The approach for the treatment of diabetes has been radically changed in the recent decades. Due to advanced technologies, diabetes is now one step closer to control by means of diet management, insulin/hypoglycemic drugs and exercise along with other life style changes.

In fact, the success of treatment of diabetes mellitus largely depends upon effective motivation of the patients, for which education is the best way. Education has now become an integral part of managing diabetes and has proved to improve the various outcomes. A study done by Stone on reasons of poor control of disease concluded that in most cases, due to lack of knowledge and inefficient counseling, diet therapy was not practiced effectively to have control on disease.[8]

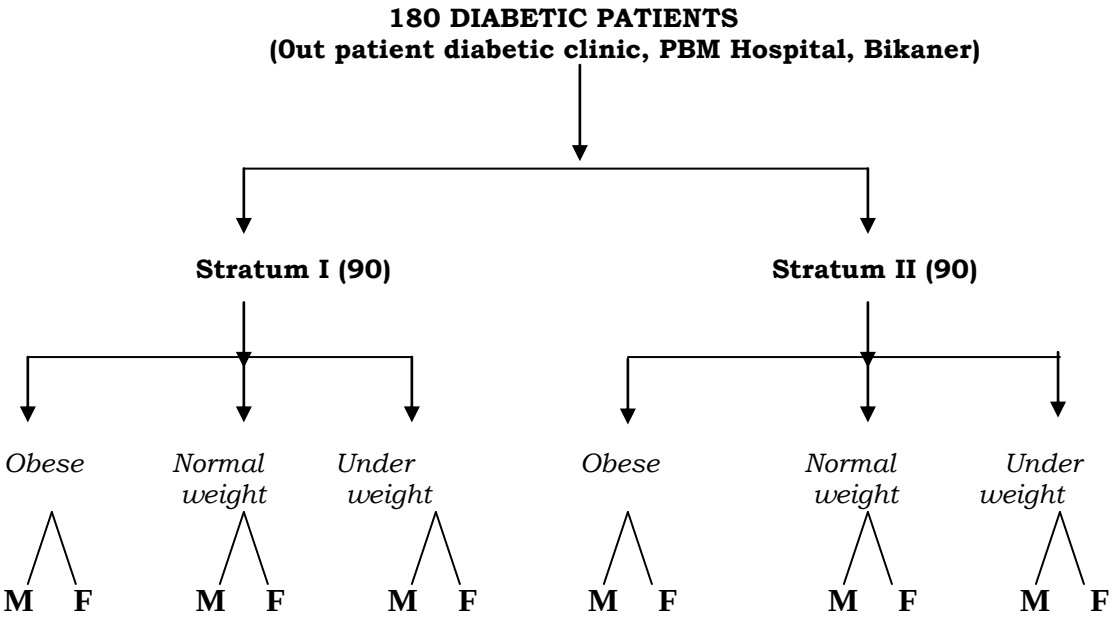
Proper nutritional education and individual counseling help the patients to understand the disease and follow the therapy effectively. This in turn reduces the risk of complications to a greater extent and improves the quality of life.[9] The diabetic diet is not a complete deviation from the normal diet rather the vital aspect is routine of meals and quantity of food consumed. The programme of diet follows "divide (meals) and conquer (disease)".[10] Of all the nutrients, particularly carbohydrates play an important role in planning the diet. Intake of high amount of fibres in diet helps in the management of disease by sustained slow release of glucose.[11]

The number of diabetics in Bikaner city is increasing with a rapid rate for which heredity, ignorance and lack of knowledge are the main causative factors. Thus, to equip the patients with skill, knowledge and attitudes, to enable them to solve their health problems and better living with diabetes, the present investigation "Assessment of knowledge and impact of nutritional education and counseling on change in dietary habits and behaviour w*as* framed.

Material and Method

The study was carried out at S.P. Medical College and Hospital. For the purpose, 180 type 2 diabetics, belonging to the middle income group were selected. Only those subjects were chosen who were only on hypoglycemic drugs and not on insulin for the treatment.

The selection of the subjects was done on the basis of the duration of the disease: diabetics suffering since, last 5 years (stratum I) and last 10 years (stratum II).



Study Design

M = Males; F = Females

An interview schedule was developed and administered to collect the information regarding age, religion, education, occupation, type of family, food habits and type of life style (sedentary, moderate and heavy) of the subjects. Specific information related to the disease was also gained in the terms of age at onset of disease, family history, symptoms observed and associated complications.

Nutritional status of an individual was assessed by anthropometric measurements, dietary survey using 24 hours recall method, biophysical and biochemical estimations. Nutritional status of each of the subject was assessed twice-once before imparting education and counseling and second after the counseling. Questionnaires were used as a tool of counseling when they were enrolled for this study general information about their life style and education was gathered (interview schedule) compiled to assess the knowledge (related to the disease) of the subjects prior and after the counseling.

On the basis of anthropometric measurements patients were classified according to their body weight. Diet chart and recommended Dietary allowances schedule was given to them to follow.

A list of recipes was provided to the patients informing them how a product example-Chappatis, Biscuits etc. could be made by a little effort as per nutritional requirement of a diabetic patient.

Results

For the enrollment of subjects a baseline (table 1) was prepared which shows that both the groups were comparable in terms of age, type of family, family size, food habits and type of life style.

The impact of education in counseling was assessed in terms of acceptance of imparted knowledge, change in personal habits, exclusive / inclusion of specific hyper / hypoglycemic foods in daily diet and change in quality of life was assessed on the basis of questionnaire.

Table- I: Baseline characteristics of Stratum I and Stratum II

General	Stratum I				Stratum II				χ^2	p value
	Obese	Normal	Under	Overall	Obese	Normal	Under	Overall		
Age (yrs)										
40-45	8	8	9	25	9	6	9	24	0.318	NS
45-55	19	16	15	50	13	15	15	43	0.656	NS
55-60	3	6	6	15	8	9	6	23	1.603	NS
Total	30	30	30	90	30	30	30	90	2.23	NS
Religion										
Hindu	27	30	27	84	29	26	29	84	1.076	NS
Muslim	3	0	3	6	1	4	1	6	5.5	0.2
Total	30	30	30	90	30	30	30	90	-	-
Type of family										
Nuclear	13	13	14	40	10	10	11	31	0.195	NS
Joint	17	17	16	50	20	20	19	59	0.035	NS
Total	30	30	30	90	30	30	30	90	1.88	NS
Family size										
1-3	0	1	4	5	9	1	2	6	3.57	NS
4-6	10	14	16	40	8	11	16	35	0.258	NS
7-9	5	7	2	14	5	10	9	24	2.53	NS
10	15	8	8	31	14	8	3	25	1.572	NS
Total	30	30	30	90	30	30	30	90	3.68	NS
Food Habits										
Vegetarian	19	23	24	66	25	25	28	78	0.475	NS
Ovo veg	5	3	3	11	3	4	2	9	4.43	<0.05
Non veg	6	4	3	13	2	1	0	3	0.183	NS
Total	30	30	30	90	30	30	30	90	4.47	<0.05
Type of life style										
Sedentary	28	30	26	84	25	25	28	78	0.475	NS
Moderate	2	0	4	6	3	4	2	9	4.43	<0.05
Heavy	0	0	0	0	2	1	0	3	-	-
Total	30	30	30	90	30	30	30	90	4.47	<0.05

The mean percent scores of knowledge calculated before and after counseling (table 2) were noted as (21.20±0.60 to 69.70±2.48) percent in males and (15.60±1.36 to 55.19±2.60) percent in females. A significant difference was noted in the percent knowledge scores in between the two sexes at both before and after counseling. The percent scores of males were noted to be higher than females at both the levels.

Table- II: Mean per cent knowledge scores related to the disease, of the diabetics.

Knowledge per cent scores	Males	Females	t Value
Prior Counseling ± S.E.	21.20 ± 0.60	15.60 ± 1.36	3.78*
After Counseling ± S.E.	69.70 ± 2.48	55.19 ± 2.60	4.04*
t Value	19.01*	4.60*	

***** Significant at 0.5 per cent level.

Improvement in the mean blood glucose level of the diabetic subject of both the stratum was also observed after the counseling. There was a significant improvement in the blood glucose level of the obese subjects of both the strata after counseling (191.1 ± 15.89 to 115.5 ± 3.89) and (197.0 ± 16.45 to 124.2 ± 4.88) respectively. Likewise the mean blood glucose level of the normal subjects also improved significantly in both the strata (168.0 ± 10.7 to 113.1 ± 2.98) vs (178.6 ± 12.13 to 118.9 ± 2.78) after counseling. There was also an improvement in the mean blood glucose level of the underweight subjects (142.3 ± 8.26 to 110.15 ± 3.88) vs (151.8 ± 11.5 to 110.85 ± 4.51) in I and II stratum. By applying ANNOVA test for comparison between both the strata we found significant improvement (1.52, 1.42 and 0.44) in all the three groups respectively after counseling, overall improvement in mean blood glucose level of the subjects after counseling was (1.33) (table 3).

Table- III: Mean blood glucose level mg/dl of the diabetic subjects prior and after counseling

Stratum		Obese	Normal	Under	Overall
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
I	Prior	191.1±15.89	168.0±10.7	142.3±8.26	166.2±5.34
	After	115.5±3.89	113.1±2.98	110.15±3.88	113.9±4.43
II	Prior	197.0±16.45	178.6±12.13	151.8±11.5	174.9±5.70
	After	124.2±4.88	118.9±2.78	110.85±4.51	116.8±4.09
ANNOVA	Prior	0.082	0.426	0.36	1.39
	After	1.521*	1.423*	0.44 NS	1.33*

* Significant at 0.5 per cent level.

Table -IV: Mean Glycosylated Haemoglobin level (%) of the diabetic subjects prior and after counseling

Stratum		Obese	Normal	Under	Overall
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
I	Prior	8.2±0.55	7.5±0.17	7.4±0.19	7.6±0.16
	After	6.7±0.13	6.9±0.08	6.5±0.11	6.8±0.05
II	Prior	8.35±0.26	7.6±0.17	7.5±0.21	7.8±0.09
	After	6.9±0.12	6.7±0.13	6.4±0.10	6.6±0.05
ANNOVA	Prior	4.42	0.001	0.005	0.48
	After	2.51*	1.34*	0.12 NS	1.6*

* Significant at 0.5 per cent level.

There was a significant improvement in the mean HbA1c % level of the diabetic subjects after counseling. Mean HbA1c % of the obese subjects improved significantly from (8.2±0.55 to 6.7±0.13) vs (8.35±0.26 to 6.9±0.12) after the counseling. Mean HbA1c % of normal subjects also significantly improved in both the strata (7.5±0.17 to 6.9±0.08) vs (7.6±0.17 to 6.7±0.13) and improvement in the HbA1c % of under weight subjects was (7.4±0.19 to 6.5±0.11 vs 7.5±0.21 to 6.4±0.10). However, it was found that there was an overall significant improvement in the mean HbA1c % of subjects after counseling ($p<0.05$) (table 4).

Table- V: Percent distribution of the diabetics according to the percent knowledge scores related to the disease (prior and after counseling)

Percent scores	Category	Prior			After		
		Male	Female	Overall	Male	Female	Overall
0-20	Very poor	83.34 (75)	91.12 (82)	87.22 (157)	5.56 (5)	4.44 (4)	5.00 (9)
20-40	Poor	11.11 (10)	4.44 (4)	7.77 (14)	5.56 (5)	6.67 (6)	6.12 (11)
40-60	Average	1.11 (1)	2.22 (2)	1.67 (3)	16.67 (15)	27.78 (25)	27.77 (40)
60-80	Good	2.22 (2)	1.11 (1)	1.67 (3)	38.88 (35)	33.33 (30)	36.11 (65)
80-100	Very good	2.22 (2)	1.11 (1)	1.67 (3)	33.33 (30)	27.78 (25)	25.00 (45)
Mean		15.75	13.33	14.56 (3)	61.10	64.67	62.79
SD		13.87	10.76	14.56	22.05	21.54	19.89
SE		1.28	1.76	12.42	2.21	2.15	1.98
t				1.24	19.38	18.53	20.69
p					<0.001	<0.001	<0.001

According to the percent knowledge scores related to the disease prior and after counseling a highly significant increase in the mean percent of the diabetic male and female subjects was noted (15.75±1.28 to 61.10±2.21 and 13.33±1.76 to 64.67±2.15) respectively. (table 5)

Discussion

In this study nutritional education is needed in diabetics what foods are good for them and what foods will further deteriorate the condition. For instance, high fat food consumption leads to excess weight which causes the body of type 2 diabetics to not absorb insulin properly. Diet and especially exercise are the keys to weight loss and will in turn cause the body to use insulin properly.

Lead researcher Dr. Mara C. Vitolins of the Wake-Forest University School of Medicine in Winston-Salem. North Carolina says that the most important thing type 2 diabetics need to remember is that proper nutrition and a proper exercise plan is the key to controlling blood sugar levels, unsaturated fat instead of saturated fat and balance calorie intake.

Vitolins said "*The findings clearly illustrate a need to provide ongoing nutrition education for people with diabetes regardless of the amount of time they've had the disease*,"

The mean percent knowledge scores was calculated before and after counseling which shows a highly significant ($p<0.005$) increase in the knowledge scores of both males and females. But the scores of males were noted to be higher than females (table 2). This may be due to the reason that the academic qualification was higher in males than in females and that males are more likely to accept changes. A conclusion drawn by the study conducted on 50 NIDDM subjects by Ntion and Zea (2001) supports the present study.[12] They concluded that males show more adherence and acceptance to new changes as compared to the females.

On the basis of the questionnaire it was assessed that there was improvement in the personal habits of diabetic subjects after counseling. They were advised to improve their dietary intake of whole grains, vegetables, fruits, low-fat, dairy and meat products and vegetable oils rich in monounsaturated fatty acids. They were also advised to spend a minimum of 30 minutes daily walking, jogging, swimming, aerobics in similar endurance exercise and/or regular weight-train. This improvement in personal habits of diabetic subjects led to an overall significant improvement in mean blood glucose level of the diabetic subjects of both the strata after counseling (166.2±5.34 to 113.9±4.43 vs 174.9±5.70 to 116.8±4.09, 1.33) (table 3).

Overall, a significant improvement was also found in the mean HbA1c % of subjects after counseling ($p<0.05$) (table 4). Norris et al have concluded that Patient Diabetes Education is effective in the short term.[13-15] Recent systemic reviews have demonstrated that integrating theories of behaviour change into educational interventions (including psychosocial concepts such as patient centered care, self-efficacy and empowerment) may help to strengthen the link between Patient Diabetes Education and self-management in type2 diabetic patients.[16-18]

The findings highlight the importance of "individual, patient-centered counseling and regular follow-up," so that patients can receive a better chance to manage diabetes.

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