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Effects of Proper Nutrition Education on BMI Reduction and Changes on FBS, Chol and TG Rates of Type 2 Diabetic Patients

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In this study we have assessed the short-term effectiveness of diabetes education on BMI reduction, changes on (FBS, Chol, TG Rates) of type 2 diabetic patients in relation to proper nutrition. A sample of 125 diabetic patients was systematic randomly chosen. The method chosen for collecting the information (Data) was through questionnaires and laboratory tests (fasting blood sugar, total cholesterol, TG) that was conducted before educational programmes and after constantly education, finally the FBS, Chol, TG and weight were compared. The study showed significant improvements in several aspects of research. This study has shown a high level of illiteracy amongst our patients, which is of course common in developing countries. Diabetics did not gain weight and their relatives lost weight after nutrition curriculum. The mean fasting blood glucose before education was 216.27 mg %, whereas it fell to a mean level of 178.39 mg % after education. The patients had significantly lower serum cholesterol after 7 month education (172 mg %), $p = 0.005$. The present study clearly demonstrate the great benefits of diabetes self-care education. Most of these studies and our own, have been short term. We conclude that diabetes education is appropriate achievable and worthwhile. The challenge remains as to how to continue benefit long term.

Key words: Metabolic diseases, proper nutrition, education, intervention

INTRODUCTION

Type 2 diabetes is a common chronic disease with rapidly increasing prevalence and will probably continue to increase in the future. It is associated with devastating complications, usually classified as micro vascular (visual loss, end state renal disease and neuropathy) and macro vascular (including coronary vascular disease, stroke and peripheral vascular disease) (Akbar, 2002).

Diabetes accompanies the patient throughout his whole life span and ultimate cure is not known for it, unawareness from its consequences in advanced states can cause irreparable physical and spiritual loss. But if the patient did not aware of the problems and the proper nutrition to take, this may result into irretrievable side effects. As in time awareness can stop physical and mental loss and also ceases or stops the development of the disease therefore more attention should be paid to it (Rahilly, 1997).

Cardiovascular disease (CVD) complications are far more common than micro vascular complications and are the leading cause of death and disability in type 2 diabetes (Akbar, 2002). Nephropathy is one of the most serious long-term complications for the diabetic patients (Ibrahim and Hostetler, 1997). The diabetes control and complication trial demonstrated that intensive blood glucose control delays the onset and slow the progression, of diabetic nephropathy that is the main cause of the increased morbidity and mortality in diabetes (Anonymous, 1995).

It is well known that diabetes mellitus predisposes to bacterial infections and that such infections when they occur may be more serious than in non-diabetic subjects infected foot ulcers are a classic example of this diabetes related sepsis (Kathleen and Krause, 2000). Without prompt and adequate treatment, the result can be disastrous-with amputation and even death being not uncommon end results (Ben bow and Gill, 1998; Bosseri and Gill, 1997).

Obesity is now recognized as a most important factor in both primary and secondary prevention interventions in type 2 diabetes (Ofoegbu, 2002). Studies in populations of pacific islanders, urban African population and African Americans implicate obesity as the driving force of the currents type 2 diabetes epidemic (Rosen bloom *et al.*, 1999; Colditz *et al.*, 1995; Osei, 1997).

Health education intervention is a combination of activities aimed at facilitating changes in behavior and adoption of practices that may decrease the risk of disease and illness and thus reduce death and disability (Uddin and Ahmed, 2001). The burden of a non-communicable disease such as diabetes on global morbidity and

mortality is increasingly gaining recognition (Admason, 2001). Living with diabetes requires knowledge and experience, built up over time. It is important for health care professionals to appreciate the gaps between learning (knowledge), understanding (attitude) and doing and the reason why occur (Uddin and Ahmed, 2001).

Food selection is a key component in the management of diabetes. The foods selected affect the caloric and nutrient composition of the diet and blood glucose levels among people with diabetes. The nutrition information on the food label can guide decisions for food purchases (Miller and Brown, 1999). Diabetes diet in the year 2000 consists essentially of carbohydrates. Slowly metabolized form of carbohydrate should be preferred. Fat and proteins should not exceed more than 20% of the respective total caloric intake (Kappeler, 2000). There is strong relation between diet and risk factors for cardiovascular diseases. Generally a high fat consumption will increase the serum cholesterol level. Different fatty acids have different effects on total cholesterol, LDL and HDL lipoproteins and therefore on the risk for cardiovascular diseases (Muls and Vansant, 1999).

The importance of education in the management of diabetes is recognized but has rarely been assessed in the city of Zahedan. The main purpose of this study is to evaluate the effect of correct diet educational intervention on reducing FBS/Chol/TG/BMI rate of type 2 diabetic patients.

MATERIALS AND METHODS

This was a semi-experimental study based around a health education and correct nutrition project launched at Buali-Hospital Diabetic Clinic in Zahedan. The educational intervention focused on behavioral issues related to dietary self-management and be follow-Up. The Group under study contained 125 patients with type 2 diabetes that had files in Buali's diabetes clinic in Zahedan and were selected systematic randomly.

The method chosen for collecting the information (Data) was through questionnaires and laboratory tests (fasting blood sugar, total cholesterol, TG) that was conducted before educational programmes and after constantly education. Finally the FBS, Chol, TG and weight were compared. Patients' Age, sex, duration of diabetes were recorded and Body Mass Index (BMI), Presence of hypertension (blood pressure persistently over 140/90 mm Hg) were used to assess before and after education.

The educational programme was developed by diabetes specialist consultants: a public health consultant, a nutritional specialist, an internal specialist,

a statistician and a social worker. It was piloted with 30 patients. The programme inducted for covering all the major aspects of diabetes patients should know about. The sessions took place over seven months (Mid, 2003). All the materials used were printed in Farsi. Pamphlets and handouts were given to the literate patients and video films were shown in the waiting area. Arrangements were made to lend the audio and video material to patients.

In addition to this specific programme, One-to-One counseling sessions, Face to face/Buzz group/problem solving (weekly) were also arranged with the specialist. The blood samples were taken before breakfast and at different time after programme and in these samples we determined the (FBS Chol/TG)... concentrations of ... calculated. Differences between the min and max values. Body Mass Index (BMI) was assessed and recorded by trained staff.

The subjects based on Height, Weight, Age, Sex and energy required to performed normal daily tasks were divided into three types of intake calories according to a diet regimen (... which complex carbohydrate constituted at least : 1300, 1500 and 1800 kcal) recommended by Benedict-Herris. We recommended patients with type 2 diabetes who should loose weight have to be extremely careful regarding the fat intake; vegetable fat should be preferred compare to animal fats.

Statistical analysis was carried out using the SPSS (statistical package for social sciences). Mean and Standard Deviations (SD) were determined for quantities data and frequency was determined for categorical data. Chi-square was used to analyses group differences for categorical variables. The student's test was used to compare differences between means. A $p < 0.05$ was considered significant. A trend to improvement in several aspects of diet was noted and diet reached significance.

RESULTS

The results shows the mean age of the patients was 47 years, diabetes duration 12 ± 7 years, 52% male and 48% females. Sixty one percent of patients include either illiterate people or people who can only read and write. Table 1 shows that the initial diagnoses were done by general practitioner for over 68% of the patients who were unaware to their diseases. Obesity was more common in females. Sixty eight percent diabetic patients didn't know that obesity poses a health hazard. Most of them did not know their individual ideal weight. Forty five percent subjects know that sweets and fatty foods should be avoided but only 19.6% were avoiding them.

Foot care was done by 62.4% through regular washing. Monitoring of blood sugar was poor (23.6%)

Table 1: Distribution frequency and percentage of subjects according to patients disease awareness

Route of diagnosis	Frequency	
	No.	%
By GP	86	68.8
By patient-alone	39	31.2
Total	125	100

Table 2: Practice before and after diabetes education (all changes were significant, $p < 0.005$)

Questions	Before (correct %)	After (correct %)
Regular-blood sugar	30	72
Monitoring	22	57
Carry sweet and sugar	18	49
Urine monitoring	12	87
Foot care	5	56

Table 3: Comparison of diabetic patients according to: Weight, BMI, FBS, Chol, TG before and after education

Variables	Before Means±SD	After Means±SD	p≤paired t-test
Weight	69.28±6.26	62.97±7.02	0.001
FBS	216.27±35.06	178.39±28.82	0.001
Chol	194.09±21.95	172.34±19.7	0.005
TG	241.13±40.65	192.37±48.84	0.001
BMI	26.85±2.2	24.01±2.05	0.004

before educational programme. Fortunately, most of the patients were non-smokers. Twenty percent patients never attended any classes for the first two months, the most frequently cited reasons for non-attendance were socioeconomic, Table 2 shows five components relating to practice, a marked change after education was noted.

The diabetic patients significantly increases their consumption at complex carbohydrate, physical activities and decreased fat intake, on this regimen, diabetics did not gain weight and their relatives lost weight after nutrition curriculum. The mean fasting blood glucose before education was 216.27 mg %, whereas it fell to a mean level of 178.39 mg % after education. The patients had significantly lower serum cholesterol after 7 month education (172 mg %), ($p = 0.005$), TG rate decreased from 241.13 mg % before the programme to 192.37 mg % after education ($p < 0.001$) body mass index decreased from 26.85 ± 2.2 to 24.01 ± 2.05 kg m⁻² ($p = 0.004$) (Table 3).

DISCUSSION

Education has an important and effective role in increasing people's knowledge, an improved and constant educational strategy appears necessary to enable diabetics to take better care by themselves and have a better understanding about diets. Patients need to improve their understanding of the role of nutrition. Food selection is a key component in the management of diabetes (Kappeler, 2000).

Recent studies have shown that CVD morbidity and mortality associated with diabetes can be considerably reduced through intensified treatment of hyperlipidemia (Akbar, 2002). Several clinical trials have addressed the hypothesis that type 2 diabetes can be prevented by dietary modification, physical activity, or drug treatment (Pfohn and Chatz, 2001).

This study has shown a high level of illiteracy amongst our patients, which is of course common in developing countries. This necessitates education by verbal teaching sessions, rather than by posters or booklets. The results show that many patients had only a poor understanding of disorder and the treatment were receiving. This study demonstrates the difficulty of achieving on acceptable level of awareness and understanding in a diabetic population.

Barriers to staying on the prescribed diet were habit, cultural ritual, ideal body image and limited budget. Weight reduction and the mean fasting blood glucose fell to suitable rate after education and thus testify that knowledge significantly and beneficially affected diabetic control.

These and other studies clearly demonstrate the great benefits of diabetes self-care education. Most of these studies and our own, have been short term. The challenge remains as to how to continue benefit long term. Nevertheless, these results are encouraging, as diabetes education is an appropriate and achievable mode of therapy in developing countries.

We suggest centers of consultation people-wide and in all towns throughout the province. Meanwhile, patient education, proper training of health workers and community mobilization all have a role in ensuring better outcomes (Muula, 2000).

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