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Impact of nutrition education on non insulin dependant diabetic subjects

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Abstract

The present investigations were carried out to see the impact of nutrition education on non insulin dependent Diabetic subjects. It is concluded that knowledge of diabetic patients regarding their disease or health status was improved after nutrition education programme of three weeks. During the investigation the mean score of diabetic knowledge was 6.57±5.12 before the nutrition education which improved significantly (P< 0.01) to 23.72±8.16 after imparting nutrition education to them. During the study three recipes (Oat seera, Oat –Jamun Noodles, Macaroni and Spaghetti and Dhokla) were prepared by utilizing indigenous flora with high fibre and low glycemic index, which were helpful to the diabetic subjects in controlling blood sugar level. Outcomes of the present investigation depicts that prior to the nutrition education programme intake of cereals, fats and oils and refined carbohydrates was more but a decrease in intake was found after the nutrition education programme. The intake of pulses, green leafy vegetables and milk and milk products increased significantly after nutrition education.

Introduction

Diabetes Mellitus is a metabolic disorder in which nutrition education plays a very important role .It also helps in improving the knowledge of diabetic patients and in developing the positive attitude toward for dietary intervention. The prevalence of diabetes mellitus is variable in the global population and is predicted to grow world wide as an epidemic proportion in the first quarter of 21st century. According to WHO (2002), there are about 177 million people are suffering from Diabetes mellitus world wide, which underestimates the previous estimation of 225 million by 2010. Diabetes is closely linked to diet and exercise, both with respect to its causation and management. Traditional Indian diet basically cereal based low fat diet and high fibre diets are considered as important component of the treatment strategy for adult with Type-II diabetes. Therefore, an appropriate use of diet and exercise can improve insulin sensitivity and glycemic control and decrease the need for oral medications or insulin. Most of the people though educated are quite ignorant about the impact of diet and exercise on diabetes.The affluent sections of society lead sedentary life and prefer to eat high energy food irrespective of the requirement of the body and do not realize the importance of balance diet and healthy eating habits. Keeping in view the increasing incidents of diabetes, there is an urgent need to educate the masses regarding the nature of disease, type of diabetes, the option for treatment, organ complications and dietary management etc. Therefore, nutrition intervention aimed at lowering blood glucose level, improving blood lipid level, reducing their potential for complications such as renal disease, hypertension, promoting reasonable body weight and encouraging healthy eating habits. For this purpose, the present studies have been designed to impart nutrition education to diabetic patients.

Material and Methods

The 30 non insulin dependent diabetic subjects above 40 years of age representing two blocks viz. Baijnath and Bhawarna of district Kangra were evaluated before and after the experimental period to test their knowledge regarding diabetes before the

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initiation of experiment by using knowledge testing questionnaire. They were tested for their knowledge regarding various aspects of diabetes before imparting nutrition education. After assessing the basic knowledge of selected diabetic subjects regarding the disease, nutrition education was imparted to the patients through lectures regarding diabetes, type of diabetes, its causes, symptoms, complications and dietary management etc., discussions and demonstration, various modules like charts, pictorial diagrams, model, posters, leaflets, pamphlets on diabetes food pyramid, myths and facts about diabetes, glycemic index of common foods etc.and educational game(snakes and ladders) were also used and medium of interaction was used in Hindi and local dialect. The lectures were repeated at least twice for better retention and they were cross examined throughout the experimental period, whether they were consuming the prescribed diets and medicinal species or not. Teaching materials and lesson plans pertaining to above aspects were prepared, modified and used for imparting general awareness. Personal contact with the respondents was maintained throughout the experimental period to know whether they were incorporating the suggested modification in the daily diet or not which is required to bring effective changes in their blood glucose level. A leaflet containing all the above mentioned information's along with Sample menu of different caloric diets(1200,1500 and 2000 Kcals) and modified recipes(recipes no. 1,2&3) were distributed to all the subjects. After imparting nutrition education for a period of three weeks nutritional knowledge was again assessed. For evaluating the questionnaires, one score was awarded for each correct and zero for wrong answer, respectively. The impact of nutritional surveillance was assessed through pre and post dietary intake, physical fitness, blood glucose level. Effect of nutrition education was assessed by applying impaired't' test to see its impact on gain in knowledge which was calculated using the following equation.

Gain in knowledge = Score of post test - score of pre test.

A 24 hours recall method for three consecutive days was used to find out the pre and post dietary intake of the subjects before and after nutrition education period. The subjects were provided with different sets of standardized katories and glasses to record the exact amount of foods and beverages consumed by them. The weight and volume of different cooked foods consumed by the patient was recorded in terms of household measures/number/kg to find out quantity of raw food intake. From the cooked and raw amount of foods, the raw amount consumed by the patients was then calculated as follows:

$$\text{Raw amount of a particular food stuff consumed by the patients from a preparation(g)} = \frac{\text{Individual intake of cooked amount of the preparation (g/ml)} \times \text{Total raw quantity of food stuff used in the preparation (g)}}{\text{Total cooked quantity of the preparation (g)}}$$

In case of chapatti's, the amount of flour used in the preparation of one chapattis was calculated by dividing the total amount of flour used by number of chapatti's prepared; this value was then multiplied by the number of chapatti's consumed by the patients to find out the raw amount of flour consumed by the patients. The mean intake of different food stuffs was then computed for a day and compared with the balanced diet for diabetes given by Raghuram (2000)

Recipes

1. Oat seera

Ingredients	Quantity
Whole wheat	1.0 Kg
Sorbitol	50.0 g
Ghee	80.0 g
Water	150.0 ml

Method

Extraction of starch from oat

Seera is the extraction of fermented starch out of oat. Oat grain were kept for soaking in three times of water for 4-5 days .After soaking oat grains were washed by crushing the husk particlesand then were ground to a fine paste ,allowed to ferment for 2 days at room temperature . After fermentation, allowed to settle down, decanted of the liquid and made small balls of the paste and dried in the cabinet drier at 60±1°C for 2-3 days.

Seera Halwa

After proper drying these dried balls were mixed with water and sorbitol and kept as such for 5-10 minutes so that it dissolve and mixed properly .In a pan ghee was melted and the paste was cooked in ghee till the seera thicken ,turned brown and left the side of the pan.

2. Oat–Jamun Noodles, Macaroni and Spaghetti

Ingredients	Quantity
Wheat flour	65.0 g
Oat flour	30.0 g
Fruit pulp	5.0 g

Method

The preparation of all these products involved the mixing of oat flour with wheat flour and fruit pulp by adding optimum water. All these ingredients were mixed together to get a desirable consistency dough .The prepared dough was smeared with refined oil .The resultant dough was filled into the extruder. Then it was extruded by the hand extruder through suitable shaped dies. The product was then dried for six hour at 50-55°C.After drying, cooled and packed in polyethylene bags and stored under ambient temperature.

3. Dhokla

Ingredients	Quantity
Gram flour	60.0 g
Samolina	60.0 g
Curd	80-85 ml
Salt	According to taste
Mustard seed powder	2 teaspoon
Baking powder	1 teaspoon

Method

Samolina and gram flour were sieved along with salt and baking powder .Then curd was added in it and mixed well .After proper mixing, mixture was kept aside for15 minutes for fermentation. Fermented mixture was poured in a greased container and steamed for 20-25 minutes till done. After cooling the dough was cut into cubes and seasoned with mustard seeds and curry leaves and served.

Results and Discussion

Information pertaining to nutrient education of diabetic subjects had been given in Table 1. From the table it is evident that knowledge of diabetic patients regarding their disease or health status was improved after nutrition education programme of three weeks. It is clear from the Table that out of the total score of 34, zero score of knowledge test was obtained by 20.0 per cent of the subject before imparting nutrition education. None of the subjects had a test score of zero after nutrition education. A test score of more than 80.0 per cent was observed in 43.3 per cent of the subjects after nutrition education.. The mean score of diabetic knowledge was 6.57±5.12 before the nutrition education which improved significantly ($P< 0.01$) to 23.72±8.16 after the onset of diabetes, similar results were reported by Gulati (2000) and Kapoor (2001). The use of traditional medicinal plant i.e. bitter gourd, jamun and fenugreek seeds was 23.3 per cent by the subject before the nutrition education, but consumption of these medicinal plants in one or another form increased to 76.6 per cent after nutrition education. None of the subject having knowledge regarding glycemic index, high fibre diet and role of antioxidants before the nutrition education. But after nutrition education 86.6 per cent of the patients were able to know about the glycemic index, high fibre diet and role of antioxidants in curing diabetes. This could be because of the interest of subjects and their access to information from popular magazines, articles, intake and personal communication with doctors Mehta *et al.* (1982) also agreed with this result.

Table 1. Improvement in nutrition knowledge due to their participation in Nutrition Education Programme

Knowledge test scores	Before imparting nutrition education (n=30)	After imparting nutrition education (n=30)
Subjects getting zero score	6 (20.0)	None
Subjects getting above 80 per cent	None	13 (43.3)
Mean knowledge test score	6.57±5.12	23.72±8.16
Subjects using traditional medicinal plants	7 (23.3)	23 (76.6)
Subject having knowledge about glycemic index, high fibre diet, and role of antioxidants	None	26 (86.6)

Figure in parentheses indicate percentages
Significant at 1 per cent level

An effort was made to collect information's on the average intake of different food groups by the subjects before and after the nutrition education periods of three weeks. The figures obtained were compared with standard values established by the Raghuram *et al.* (1993). The information given in Table 2 shows that the average intake of cereals, roots and tubers, fat and oil and sugar and jaggery were reduced after the nutrition education. The subjects had gained knowledge regarding the restriction of cereals which are rich in simple starch and helpful in raising blood sugar level. For this reason starchy foods were not consumed by them. The intakes of saturated fats from animal products such as butter, hydrogenated fat and desi ghee that tend to raise the cholesterol in blood were reduced and the intake of vegetable oil was increased. They had also restricted the use of sugar and jaggery. The intake of meat and meat products was decreased after the nutrition education programme because maximum number of patients was aware of the presence of saturated fat in meat, harmful to the diabetic patients. However, the intakes of these food groups were higher than the suggested intake. While the intake of pulses, green leafy vegetables, other vegetables, milk and milk products and fruits were increased after the nutrition education. They were opined that pulses and green leafy vegetables contain fibre, vitamins and antioxidants that are helpful in delaying glucose absorption thus, preventing diabetic complications. Increased intake of milk was harmful to diabetic patients being unawared, they were taking whole milk which contains saturated fat thereby, increasing the cholesterol level in blood. Intake of fruits like jamun, amla, papaya and citrus fruits were also increased because these fruits contain antioxidants having neutralizing effect on cell damaging free radical compounds and also have low glycemic index helpful in maintaining blood sugar level. The intake of pulses was near to the suggested intake, whereas, other vegetables were taken half the suggested intake as per Raghuram *et al.* (1993). Vasanthamani and Savita (2001) also agreed with these results.

Conclusion

It is concluded that knowledge of diabetic patients regarding their disease or health status was improved after nutrition education programme of three weeks. The outcomes of the present investigation also depicts that prior to the nutrition education programme intake of cereals, fats and oils and refined carbohydrates was more but a decrease in intake was found after the nutrition education programme. The intake of pulses, green leafy vegetables and milk and milk products increased significantly after nutrition education

Table 2. Average food intake by the subjects before and after the Nutrition Education

Food Groups (g/day)	RDA's (n=30)	Before Nutrition Education (g) (n=30)	After Nutrition Education (g) (n=30)	't'value*
Cereals	165	343±45.2	235±38.9	22.12
Pulses	66	48±10.3	61±6.7	12.76
Green leafy vegetables	220	48±11.5	70±13.3	15.60
Other vegetables	220	66±10.7	90±73.9	3.89
Root vegetables	NA	73±12.9	50±11.07	16.41
Milk and milk products (ml)	330	394±53.5	457±74.02	8.39
Fat and oil	11	54±10.4	25±6.8	28.95
Sugar and jaggery	NA	63±13.5	11.8±6.7	41.80
Fruits	110	36±11.8	78±13.30	29.23
Meat and Meat products	30	67±26.6	31±14.70	14.62

Values represent mean + S.E.
All the't' values are significant at 5 per cent level
*Raghuram *et al.* (1993)
NA: Data not available

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