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Studies on effect of nutritional education and supplementation on diabetic patients

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Abstract

Diabetes is a condition that happens when your blood sugar (glucose) is too high. It develops when your pancreas doesn't make enough insulin or any at all, or when your body isn't responding to the effects of insulin properly. Diabetes affects people of all ages. Most forms of diabetes are chronic (lifelong), and all forms are manageable with medications and/or lifestyle changes. Specific dietary advice is essential for these pregnant women, whose diets are affected by economic level, family situation, religious beliefs, ignorance and associated health issues. Much emphasis should be given towards nutrition education to improve their nutritional status.

Keywords: Diabetes Mellitus, insulin, lifestyle, supplementation and nutrition, education

Introduction

Diabetes mellitus is a chronic condition characterized by major derangements in glucose metabolism and abnormalities in fat and protein metabolism. Patients use many products and modalities to treat diabetes or its comorbidities. People with diabetes are 1.6 times more likely to use a complementary and alternative medicine (CAM) treatment modality than those without diabetes. The World Health Organization (WHO) estimates that currently more than 180 million people worldwide have diabetes and it is likely to double by 2030, with India, China, and the United States predicted to have the largest number of affected individuals. The lowest rates of diabetes are found in rural communities where people retain traditional lifestyles. Dramatic changes in the prevalence or incidence of diabetes have been observed in communities where there have been major changes in the type of diet consumed, changing disease rates are almost certainly explained by changes in several dietary factors as well as by changes in other lifestyle related factors, notably a reduction in physical activity.

Millets vs Diabetes

Millet is actually a group of related plants that produce small pearl-like grains and not a single plant. Millet is low in essential amino acids and higher than most grains in fat content, 75 percent of which is heart-healthy polyunsaturated fat. Millet has been shown to be potentially beneficial in the management of diabetes. Millet's high fiber content slows digestion and releases sugar into the bloodstream at a more even pace. This helps diabetics avoid dangerous spikes in blood sugar that lead to glucose spilling over into the urine, known as glucosuria. In comparison to rice, millets with their low carbohydrate content, low digestibility and water-soluble gum content (β -glucan) have been attributed to improve glucose metabolism. These grains release sugar slowly in the blood and also diminish the glucose absorption. For all these superior properties of minor millets, they are designated as nutritious millets.

Materials and Methods

Sample Description

The Minor millets-based breakfast food mix (Pongal) was standardized on sensory evaluation in terms of acceptability with special reference to colour and appearance, flavour, texture taste and overall acceptability.

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The diabetes patients were selected by purposive sampling. An interview schedule was formulated to get base line data. Nutrition education was imparted to the diabetic patient using charts, handouts, flash cards, posters and demonstration. The minor millet-based breakfast food (Pongal) was supplement to selected diabetes patients.

Results and Discussion

General Information

34 percent were between 18 and 22 years of age and age at menarche was mostly between 13 and 14 years of age and age at marriage between 18 and 32 years. Joint family system is still prevalent.

Dietary Pattern

Table 1: Distribution of pregnant women according to their dietary pattern

Dietary Pattern	No. of Pregnant Women
Vegetarian	13
Non-Vegetarian	87
Total	100

* Figures in parenthesis indicate percentage

Table 1 shows that a majority of the pregnant women (87%) were non-vegetarians, consuming eggs, meat, fish and poultry but the frequency of consumption was low, the main reason being high cost and difficulty in digestion. In India, those who consider themselves as vegetarians are generally lacto vegetarians. Religious customs influence the frequency of consumption of non-vegetarian foods. In both the categories, although the pregnant woman followed a three-meal pattern it was observed that rice was most frequently consumed (millet consumption being rare) with minimum of vegetables and fruits.

During pregnancy, increased energy and protein requirements are small and can be met without any obvious change in food intake. If energy and protein intake is reduced due to appetite changes or morning sickness then a reduction in high fiber foods and increased nutrient dense foods may be appropriate. The extra vitamins needed are generally present at higher levels in vegetarian than non-vegetarian diets, with the exception of vitamin D (Department of Health, 2001). Consumption of a non-vegetarian diet is not harmful during pregnancy. Pregnant women can continue with intakes of chicken, fish, egg, etc. unless they have any particular allergy towards these foods. Ideally, an intake of a portion of either of the non-vegetarian foods everyday can contribute to healthy growth of the baby by providing essential fatty acids to the mother's body (Saha, 2009) [12].

A well-balanced diet should contain something from all the food groups: dairy products, fruit, vegetables, fish, meat, eggs, fat and carbohydrates. A pregnant woman needs to eat something from all these food groups every day in order to get the proper amounts of energy. Well-planned vegetarian and vegan diets are nutritionally adequate and are appropriate for all stages of the life cycle, including during pregnancy. A vegetarian diet can provide adequate protein, iron, zinc, vitamin B12, and calcium intake, though these nutrients can be relatively low in poorly planned vegetarian diets, particularly when not enough calories are consumed (www.wikipedia, 2002).

Mean Nutrient Intake

The mean nutrient intake (Table 2 and Fig. 1) of all the nutrients was significantly lower than the ICMR RDA, except for fat.

Table 2: Comparison of mean nutrient intake with RDA and Percentage Deficit/Excess of Pregnant Women

Nutrients	Actual Intake	RDA 2010	% Deficit/Excess	't' Value
Energy (k.cal)	1934.88	2250	-14.01	10.081*
Protein (g)	61.64	82.2	-25.01	18.050*
Fat (g)	42.23	30	+40.76	9.592*
Calcium (mg)	842.46	1200	-29.795	32.339*
Iron (mg)	32.64	35	-6.74	4.562*
Vitamin-A (µg)	1820.32	6400	-71.55	84.589*

* Indicates 5% level of significance

The low intake of energy, protein, calcium, iron and vitamin-A noted among the pregnant women is due to the inadequate intake of pulses, green leafy vegetables, fruits and non-vegetarian foods. Nutritional adequacy is one of the key elements before, during and after pregnancy for support of foetal growth and the maintenance of the mother's body. Due to inadequate intake of nutrients in diet like energy, protein, vitamin, iron and calcium etc. various deficiency disorders occur (Gopalan, 2003) [5]. These results correlate well with the study by Panwar and Punia (1998) [9] who have reported the mean daily intakes of 90 farming and non-farming pregnant women of Haryana to be lower for energy, calcium and iron than the RDA.

Anderson, L.T.I., Thilsted., S.H., Nielsen,B.B. and Rangasamy, S. (2003) [1] have reported that the pregnant women's diet is insufficient in energy and other nutrients and aggravating low intakes of micronutrients were found which was due to low intake of foods other than rice.

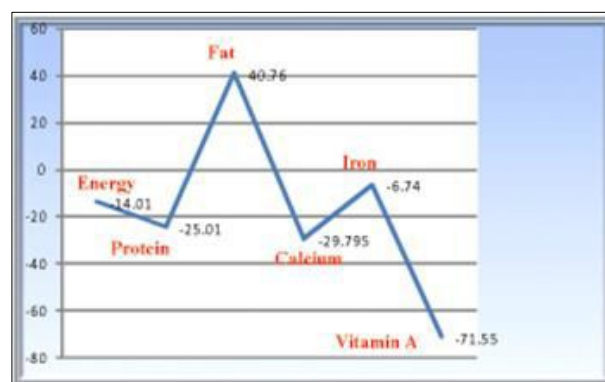


Fig 1: % Deficit/ Excess of Nutrients

The deficit of nutrients being as high as 25.01%, 29.79% and 71.55% for protein, calcium and vitamin A respectively shows that interventions should be given to the pregnant women to ensure successful pregnancy.

Food Consumed During Pregnancy

It is evident from the table, that only fifteen of the selected pregnant women respectively consumed ragi malt on a daily basis. Forty four of the pregnant women respectively consumed kanji occasionally. Sixty one of the selected pregnant women consumed dates occasionally while 12 consumed it daily due to doctor's recommendations.

Table 3: Special foods consumed during pregnancy

Special Foods	Daily	Number of Pregnant Women			
		Once a Week	Once a Month	Occasionally	Total
Ragi malt	15	25	17	43	100
Kanji	13	22	21	44	100
Dates	12	10	17	61	100
Greens	13	57	12	18	100
Banana	62	78	10	-	100
Orange	18	63	9	10	100
Carrot	26	63	11	-	100
Sweets	17	18	15	38	100
Meat	-	46	40	14	100
Egg	16	40	14	11	100
Fish	19	45	18	18	100
Milk	100	-	-	-	100

Greens were consumed by 57 of the selected pregnant women respectively once a week. A greater number of the pregnant women consumed orange and carrot once a week. A fairly good number of the pregnant women studied consumed meat, egg, fish once a week. All the pregnant women studied consumed milk daily. This may be due to the awareness about the goodness of such foods through parents and village health nurse of the primary health centre. It is also clear that the pregnant women (although belonging to low socio economic status group) of all the categories consumed one or two special foods during the course of pregnancy as they were all keen to give birth to a healthy child. These results correlate well with those of Anderson, Thilsted., Nielsen and Rangasamy (2003) ^[1] who have also

reported the addition of green leafy vegetable and milk and milk products to their diet to improve the health of women and her child.

Although it is well known that ragi which is a locally available low-cost millet rich in calcium it is only occasionally consumed by the selected pregnant women. Gopalan, RamaSastri, and Blasubramanian (2004) has confirmed that ragi is rich in fibre and minerals, especially calcium and is cheaper and is an easily available source of energy. Their contribution to energy intake is the highest among poor income families and it decreased with increasing income.

House Hold Medicines

Table 4: Presents the foods used as house hold medicines by the selected pregnant women

House Hold Medicines	Yes	No
Dry Ginger <i>kasayam</i>	38	62
Cumin Seed <i>kasayam</i>	72	28
Vellanga <i>Rasam</i>	30	70
Pepper <i>kasayam</i>	-	-
Coriander <i>kasayam</i>	9	-
Sombu <i>kasayam</i>	15	28
Green Soup	33	67
Soda	8	-
Hot Water	4	-

A majority of the pregnant women used dry ginger *kasayam* to treat and prevent cold during pregnancy and cumin seed *kasayam* to purify the stomach so that the baby becomes healthy. Ensiyeh and Sakinesh (2008) have reported that 82.8 percent women showed an improvement in nausea and vomiting after consuming ginger.

Thirty of the pregnant women studied used *vellanga rasam* to increase the digestability of the ingested foods. Pepper and sombu *kasayam* were consumed to prevent cold during pregnancy. Coriander seeds *kasayam* was used to improve digestion and increase hunger. Carbonated water was consumed to reduce heartburns and improve digestability of the ingested foods. The use of household medicines, herbs and nature cure to relieve several health problems is quite common in India as the people still believe on these

traditional foods and medicines. Ayurvedha which is a type of medicines originating in India, uses medicines made from herbs (Wikipedia Ayurvedha).

WHO (2002) has also reported that 80 percent of population of Africa use traditional medicines for health care. Anderson, Thilsted, Nielsen and Rangasamy (2003) ^[1] Rangasamy have reported in their study in Haiti that 22.6 percent of women used herbs during labour.

Results of KAP Study

Data in Table V show that nutrition education had improved the knowledge, attitude and practices of the pregnant women as there was an increase in the number of women who gave the right answers after counselling and the results were statistically significant (Table 5).

Table 5: Results of KAP Study

Variables	Number of women who gave right answers to all questions	
	Before	After
Knowledge	8	86
Attitude	12	88
Practice	8	92

Table 6: Scores obtained to test the nutrition knowledge, attitude and practice

Variable		Mean Scores	Mean Difference	't' Value
Knowledge	Initial	1.72	6.48	40.314*
	Final	8.20	-	-
Attitude	Initial	1.4533	2.71333	27.307*
	Final	4.1667	-	-
Practice	Initial	1.6667	2.6667	24.383*
	Final	4.3333	-	-

* Indicates 5% level of significance

KAP studies are highly focused evaluations that measure changes in human knowledge, attitudes and practices in response to a specific intervention, usually outreach, demonstration or education. The knowledge possessed by a community refers to their understanding of that topic. Attitude refers to their feelings toward this subject, as well as any preconceived ideas they may have towards it. Practice refers to the ways in which they demonstrate their knowledge and attitudes through their actions (Eckman and Walker, 2008) [3].

Subapriya and Chandrasekar (2011) [13] have reported similar findings in their study on KAP of pregnant women. Ramaswamy and Sathyasubha (2010) have affirmed that the knowledge of pregnant subjects improved considerably after imparting nutrition education. Kaur and Sangha (2010) [7] have also reported an increase in KAP scores by 1.60 times after nutrition counselling. Since pregnant women are most receptive at this time of their life, they are able to assimilate the information and hence it is most fitting that nutrition education be given during this period to all pregnant women. Nutrition education can be made a compulsory part of all antenatal clinics. Through nutrition education more pregnant women will be able to follow a balanced diet and improve their health condition.

Conclusion

Balancing the nutrient content of the diet by eating a variety of foods ensures good nutrition for all individuals and this is especially true in pregnant women, who are not only eating for themselves but also for the growing foetus. Specific dietary advice is essential for these pregnant women, whose diets are affected by economic level, family situation, religious beliefs, ignorance and associated health issues. Much emphasis should be given towards nutrition education to improve their nutritional status.

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