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Evaluation of Italian millet based diabetic mix in rural areas of Dharwad Taluka, Karnataka through Institution Village Linkage Programme (IVLP)

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ABSTRACT

The cases of prevalence of diabetes and heart diseases are increasing alarmingly due to various factors. At present about 150 million people are affected by diabetes globally and in India the figure is 40 million. Various foods and herbs have been tested for management of diabetes of which millets have been widely tested and found successful. The evaluation of Italian millet based diabetic mix was carried out through the Institution Village Linkage Programme (IVLP) in rural areas of Dharwad Taluka of Karnataka. Based on the focus group discussion fifteen diabetic volunteers were selected for 6 months intervention study from Mugali, Madanabhavi and Hosatti villages of Karnataka. They were counselled regarding dietary modifications, medications, use of diabetic mix and preparation of millet recipes. The diabetics consumed 80 g diabetic mix per day for 6 months. The height, weight, random blood glucose, dietary practices were recorded before and after the intervention. The nutritional status of the diabetics improved as assessed by body mass index (BMI). Organoleptic evaluation showed high acceptability of the mix. After the intervention the normal glucose response was found in 60 per cent subjects compared to initial assessment of 20 per cent. Only 20 per cent subjects were categorised into impaired glucose tolerance and 20 per cent as diabetics. Thus Italian millet based mix helped to control glycemic responses of rural diabetics. About half of the subjects restricted the use of sugar, sweets, jaggery, rice and ghee. The foods specially included were jowar Nuchu, Roti, bitter gourd and fenugreek seeds.

Keywords: Diabetic mix; Italian millet; nutrition intervention; subjects

INTRODUCTION

The prevalence of diabetes for all age groups worldwide was estimated to be 2.8 per cent in 2000 and 4.4 per cent in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is higher in men than women but there are more women with diabetes than men. The urban population in developing countries is projected to double between 2000 and 2030. The most important demographic change to diabetes

prevalence across the world appears to be the increase in the proportion of people 65 years of age. These findings indicate that the 'diabetes epidemic' will continue even if levels of obesity remain constant. Given the increasing prevalence of obesity it is likely that these figures provide an underestimate of future diabetes prevalence (Wild et al 2004).

At present 150 million people are affected by diabetes globally and in India where 40 million people are affected is the largest country with diabetics. According to the World Diabetes Atlas, India is projected to have around 51 million people with diabetes. However these data are based on small sporadic studies done in some parts of the country (Anjana et al 2011). Diet remains corner stone for diabetic patients especially non-insulin dependent diabetics. Foods with low glycemic index like whole grains and millets slightly increase the blood sugar. The diabetic mix has been developed at College of Rural Home Science, Dharwad that is mainly composed of Italian millet and lesser proportion of Suji, blackgram Dal in the ratio of 8:1:1 and spice mix. The objective of the study was to test the acceptability and performance of diabetic mix among diabetics.

The life style factors such as foods restricted and specially included, vices prevalent, exercise behavior and knowledge and practices of 50 type-2 diabetics have been assessed by Malagi et al (2007) and concluded that about 30 and 16 per cent diabetics had poor knowledge of diabetes practices. Thus the diabetics need education to improve the knowledge and practices for the proper management of disorder.

METHODOLOGY

Mugali, Madanbhavi and Hosatti cluster villages from Dharwad district of Karnataka state were selected for the study. Assessment of diabetic mix was made among 15 diabetic subjects (5 from each village) who were selected through focus group discussions with the self help groups. The subjects were given diabetic mix and educated regarding its use. Each subject consumed 80 g of mix in two intervals in the form of Upma for a period of 6 months. Organoleptic evaluation of diabetic mix was carried out and acceptability index was calculated. The body mass index was calculated using height and weight of the subjects and they were categorised in to different degrees of malnutrition using James et al (1988) classification before and after the intervention. The capillary blood glucose was estimated by prick method using glucometer before and after intervention. The awareness of the subjects about the dietary practices for diabetes was tested and nutrition education was provided to them.

Majority of the subjects (33.33%) belonged to age group of more than 60

years followed by 51-60 years (26.67%), 41-50 (20.00%) and 31-40 years (20.00%) age groups. The subjects comprised of 53.33 per cent males and 46.67 per cent females (Table 1).

RESULTS AND DISCUSSION

Data given in Table 1 depict that majority of farmers (53.33%) visited hospital once in two months for medical check up followed by 26.67 per cent subjects who visited hospital once in six months. It was found that 20.00 per cent of the subjects had not visited the hospital for the last one year.

As can be seen from Table 2 after intervention ie feeding diabetic mix for 6 months the number of diabetic subjects reduced from 9 to 3 (60% to 20%). Contrary to it the number of normal subjects rose from 3 to 9 (20% to 60%) and 3 (20%) subjects were in impaired glucose tolerance category after intervention. The blood glucose response was more than 180 mg/dL whole blood in only 3 of the subjects (20%). The diabetic mix which was used regularly helped in reducing the blood glucose. Italian millet which is a major component in diabetic mix has low glycemic index because of high fibre content of 8g/100g of millet and might have helped in lowering the blood glucose level.

The organoleptic evaluation by the subjects showed that the diabetic mix was highly acceptable (Table 3). The overall mean acceptability score was 4.8 showing high acceptability for the diabetic mix. Similarly the acceptability index was 97.32 per cent thus showing that diabetic mix was highly acceptable. The subjects scored maximum average score of 5 for appearance, colour and texture and 4.8 for taste and 4.73 for flavour. The subjects also expressed that satiety value of diabetic mix was high and the subjects never felt hungry for 4-5 hours after it was consumed.

After intervention with diabetic mix and nutrition education the percentage of normal subjects increased from 33.33 to 53.33 and the percentage of chronic energy deficit Grade II (CED Gr II) was reduced from 13.33 to nil (Table 4). The subjects in CED Grade II and CED Grade I were shifted to CED Grade I and low weight normal grades respectively due to diabetic mix intervention, better concern towards food, adoption of suitable dietary practices and nutrition education. There was reduction in the number of obese Grade I subjects from 26.67 to 13.33 per cent.

The details of foods that were restricted and specially included are given in Table 5. About half of the subjects (46.67%) restricted sugar, sweets and jaggery followed by rice (40.00%) and ghee (40.00%). Fried foods were restricted by 33.33 per cent. Similar results of food restriction with respect to sweets, sugar, jaggery, rice and mutton were reported by

Table 1. Demographic profile of the subjects

Particulars	Number	Percentage
Age (years)		
31-40	3	20
41-50	3	20.0
51-60	4	26.67
>60	5	33.33
Total	**15**	**100**
Gender		
Male	8	53.33
Female	7	46.67
Frequency of medical check up		
Once in 2 months	8	53.33
Once in 6 months	4	26.67
Not visited for 1 year	3	20.00

Table 2. Random blood glucose among diabetic subjects selected under intervention (n=15)

Normal (<120mg/dL whole blood)		Impaired glucose tolerance (120-180 mg/dL whole blood)		Diabetes (>180 mg/dL whole blood)	
Before Intervention (no)	After Intervention (no)	Before Intervention (no)	After Intervention (no)	Before Intervention (no)	After Intervention (no)
3 (20.0)*	9 (60.0)	3 (20.0)	3 (20.0)	9 (60.0)	3 (20.0)

*Per cent value

Table 3: Organoleptic evaluation of diabetic mix

Characteristics	Average score of 15 subjects *
Appearance	5
Taste	4.8
Colour	5
Flavour	4.73
Texture	5
Overall acceptability	4

* Maximum scores 5

Table 4. The nutritional status of diabetic subjects

Body Mass Index	Nutrition grade	Before Intervention		After Intervention	
		(no)	(%)	(no)	(%)
16.0-17.0	CED Gr II Moderate	2	13.33	-	-
17.0-18.5	CED Gr I Mild	1	6.67	1	6.67
18.5-20.0	Low weight Normal	2	13.33	3	20.0
20.0-25.0	Normal	5	33.33	8	53.33
25.0-30.0	Obese Gr I	4	26.67	2	13.33
>30.0	Obese Gr II	1	6.67	1	6.67

CED: Chronic Energy Deficiency

Table 5. Foods restricted and specially included for management of diabetes

Foods restricted	No	%	Foods included	Frequency	%
Sweets, sugar, jiggery	7	46.67	No inclusion	2	13.33
Rice	6	40,00	Ragi dumpling, porridge	5	33.33
Potato	-	-	Italian millet, rice	3	20.00
Sweet potato	2	13.33	Jowar Nuchu	6	40.00
Carrot	2	13.33	Jowar, porridge	3	20.00
Mutton	3	20.00	Jowar Roti	9	60.00
Eggs	2	13.33	Increased quantity of vegetables	3	20.00
Ghee	6	40.00	Bitter gourd	6	40.00
Butter	2	13.33	Leafy vegetables	5	33.33
Fried foods	5	33.33	Citrus fruits	2	13.33
Fruits in general	1	6.67	Jamun fruits	2	13.33
Banana	3	20.00	Fenugreek seeds	6	40.00
Sapota	1	6.67	Cumin	-	-
Grapes	1	6.67	Milk	2	13.33
Salt	3	20.00			

Malagi et al (2007). The foods specially included were jowar Roti (60.00%), jowar Nuchu (40.00%), bitter gourd and fenugreek seeds 40.00 per cent each. However the percentage of subjects with special foods inclusion was lower in the study conducted by Malagi et al (2007).

CONCLUSION

Diabetic mix was highly acceptable by the subjects. The regular consumption of diabetic mix for six months helped the diabetics, to move towards normal glucose response in 60 per cent of the subjects. The subjects restricted sugar, jaggery, sweets and rice in their diet and specially included jowar Roti, jowar Nuchu, bitter gourd, fenugreek seeds and vegetables. The percentage of normal nutrition grade subjects increased after the intervention.

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