

Food Habits and Consumption Practices of *Missi Roti* Among Diabetics

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ABSTRACT Consumption of *missi roti* is a common practice therefore present study was conducted to find out food habits and consumption practices of *missi roti* among diabetics. An interview schedule was developed and pretested to collect the information from one hundred urban diabetic subjects of Ratangarh (50) and Udaipur city (50) of Rajasthan. Results revealed that majority of the subjects were vegetarian and followed four meal pattern/day. Tea alone was taken by majority (62, 86 and 48, 96%) of the subjects of both the places in breakfast as well as in evening tea. Preparations included in lunch and dinner were same among the diabetics of both the places except the type of vegetable selected varied between the places as per their availability. Diabetics modified their diet by excluding carbohydrate rich and fatty foods and adding hypoglycemic foods such as green leafy vegetables, aloe, *sangri* (*Prosopis Cineraria*), *kachari* (*Cucumis Callosus*), *tulsi*, neemleaves, *bajra*, *bhujia* (a savoury preparation), berleaves (*Zizythus Jujuba*), bitter gourd, *jamun* (*Syzygium Cumini*), fenugreek seeds and bengalgram to normalize blood glucose level. All the patients of Ratangarh and only 34% of Udaipur were consuming *missi roti* at the time of study. The practice of consuming *missi roti* was discontinued by 66% of the diabetics of Udaipur because of difficulty in preparing *missi roti* flour and the roti requires more fat for its acceptability, whereas due to higher risk of cardiovascular disease in diabetes they are advised to take restricted amount of fat. Diabetics were consuming *missi roti* at least once in a day as per the advice of doctor (75%), friends (71%), mass media (41%) and tradition of family (8%) to maintain blood glucose level. Twenty two different combinations of composite flour from wheat, with or without barley and bengalgram/soyabean were reported by the subjects. The most commonly (37%) used combination was wheat, barley and bengalgram in equal proportion. The findings of the survey suggest that there is a need for development and marketization of low glycemic composite flour for diabetic patients to control the disease as *roti* is the main and major preparation of the meals.

INTRODUCTION

Indian diet is mainly cereal based. Cereals are not only a good source of complex carbohydrates but also provide substantial amount of vitamins, minerals, phytochemicals and antioxidants. Grains are eaten as whole, broken or in the form of flour in number of preparations and in different meals of a day. Roti is the main preparation and *missi roti*, a type of roti is eaten in north India. *Missi roti* is considered good for diabetics as it helps to maintain blood glucose level. However none of the study reports on composition, consumption and preparation of *missi roti* by diabetics, hence the present study was undertaken.

MATERIAL AND METHODS

One hundred urban NIDDM subjects of

either sex in the age range of 30-35 years, controlling diabetes with diet alone or with diet and drug and did not have any biochemical evidence of any other disease were selected from government hospital of Ratangarh and Udaipur city of Rajasthan, where diabetics were easily available under one roof. An interview schedule was developed and pretested to collect the information on food habits, composition, consumption and preparation of composite flour for *missi roti*.

RESULTS AND DISCUSSIONS

The general information about the diabetics of two places revealed that majority of the families were nuclear (64, 82%). Most of the families had 3-4 members in the family. The family size ranged from 2-9 member per family. The educational status of diabetics of Udaipur city was better as 40 percent of them were graduate and equal number were post graduate in comparison to those at Ratangarh where 40 per cent were tenth pass. The diabetics of both the places had polyuria, polydypsia, polyphasia and weight loss before diagnosis of

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the disease which was confirmed later at the hospital. Male diabetics at Ratangarh and Udaipur were 62 and 52 per cent respectively indicating higher prevalence among males.

Majority of the diabetics were vegetarian. Four meal pattern a day was followed by 50 per cent and 58 per cent of the diabetics of Ratangarh and Udaipur respectively. Rests of the diabetics were following three meal pattern. The diabetics were following family meal pattern indicating that the diabetics did not make any modification in number of meals due to disease. The information on the foods consumed in days meal revealed that in breakfast as well as in evening tea, tea alone was taken by majority (62, 86 and 48, 96%) of the subjects of both the places (Table 1). However, in breakfast, snacks with or without tea were consumed by 16 per cent and

14 per cent of the patients of Ratangarh and Udaipur, respectively. Twenty two percent of Ratangarh and 38 percent of Udaipur diabetics were taking hypoglycemic foods such as fenugreek seeds, bengalgram, berleaves (*Zizyrhus Jujuba*), bitter ground, jamun (*Syzygium Cumini*), neem leaves at the time of breakfast. In evening tea, fruit juice or fruit was taken by 12 per cent of Ratangarh patient while only 2 per cent of Udaipur patients were taking these foods in evening tea. There was not much difference in lunch as well as dinner of the two places except the type of vegetables selected, which were as per the availability in the areas. In lunch and dinner chapati was consumed with dal/vegetable with or without curd/butter milk or salad by the patients (Table 1).

Patel and Nicholas (2003) reported eating habits of Asian Indian diabetic patients. Asian sweets were consumed weekly by $\frac{1}{3}$ of the patients. Almost 80% drank Indian tea with a high sugar content, $\frac{3}{4}$ of the patients ate snacks cooked in fats/oils at least once a day. These included *pakor*as and *samos*as. Most Asian Indian eat three huge meals, and view mealtime as family time as well as an important part of the daily activities. Consequently, many patients interviewed during this study felt that the received dietetic recommendations were inappropriate to their life style and not relevant to the type of food they ate.

Hypoglycemic, foods such as green leafy vegetables (40%) and *sangri*, aloe and mint combination (20%) were consumed by most of the subjects at Ratangarh (Table 2). At Udaipur, fenugreek leaves and bitter gourd (44%) and in addition jamun (16%) were consumed by most of the subjects to normalize blood glucose level. Other than these, foods like cluster beans,

Table 1: Common menu followed by diabetics

Food consumed in different meals	Percentage		
	Ratangarh (n=50)	Udaipur (n=50)	Total (n=100)
Breakfast			
Tea only	62	48	55
Snacks with or without tea	16	14	15
Hypoglycemic foods only	22	38	30
Lunch			
Chapati + veg. + dhal	14	28	21
Chapati + veg + salad	26	24	25
Chapati with veg/dhal and salad/curd/butter milk	60	48	54
Evening Tea			
Tea	86	96	91
Juice/Fruit	12	2	7
Dinner			
Chapati with vegetable	18	20	19
Chapati with dhal	28	36	32
Chapati + veg + dhal	42	20	31
Chapati with veg/dhal and salad/curd/butter milk	12	24	18

Table 2: Foods preferred and avoided due to diabetes

Name of the foods	Preferred (%)			Name of the food	Avoided (%)		
	Ratan-garh (n=50)	Udai-pur (n=50)	Total (n=100)		Ratan-garh (n=50)	Udai-pur (n=50)	Total (n=100)
Green leafy vegetables	40	2	21	Potato and rice	100	100	100
Fenugreek leaves and bittergourd	4	44	24	Sweet fruits and sugar	100	100	100
Sangri, aloe and mint	20	0	10	Fat, dry fruits and Colocasia	50	74	62
Bitter gourd, Jamun and fenugreek leaves	0	16	8				
Other foods	36*	38**	37				

* Clusterbean, Phophalia, Kachari, Sangri, Bhujia, Gokharu, Neem fruit

** Bengalgram, Tulsi, Neemleaves, Bajra

phophalia (*Dried Citrullus Vulgaris*), *kachari*, *sangri* (*Prosopis Cineraria*), *bhujia* were consumed at Ratangarh while bengalgram, tulsi, neem leaves and bajra were consumed at Udaipur as hypoglycemic foods. All the patients of both the places excluded carbohydrate rich foods such as potato, rice, colocasia from daily diet. Fat and dry fruits were excluded by 50 and 74 percent of the patients respectively. The findings of dietary practices show that the diabetics modified their diet either by adding hypoglycemic foods or excluding food rich in carbohydrates and fat. Results also show that there was not much difference in meal pattern and number of recipes included in daily diet but the type of hypoglycemic foods selected varied from place to place. It may be due to the availability of foods in these areas.

Information on preparation, composition and consumption of composite flour for *missi roti* given in Table 3 reveals that all the patients of Ratangarh were consuming *missi roti*, whereas only 34 percent subjects of Udaipur were consuming *missi roti* at the time of study. The practice of consuming *missi roti* was discontinued by 66 percent of the diabetics of Udaipur because of difficulty in preparing *missi roti* flour and the roti requires more fat for its acceptability whereas due to higher risk of cardiovascular disease among diabetics, they are advised to take restricted amount of fat. Subjects of both the places were taking *missi roti* from last 5 to 10 years. Majority of the subjects were consuming *missi roti* as per the advise of the doctor (96, 54%), friends (60, 82%) and mass media (34, 48%). The main reason reported for consuming *missi roti* was that it controls blood glucose level (96, 84%). The other reasons reported were its good taste, nutritious, beneficial for health and as a family tradition. (Table 3).

Missi roti was consumed once a day by 56 percent of the subjects and twice a day by 41 percent. *Missi roti* was consumed with the vegetable/dhal/butter milk alone or in combination of any two of these preparations. In Ratangarh majority of the subjects were consuming it with vegetable and butter milk whereas in Udaipur with vegetable alone.

The source of information for proportion of food grains in preparing composite flour were mainly friends (40, 24%) and printed material (40, 50%). Further, information on mode of preparation of composite flour revealed that at

Table 3: Consumption, composition and preparation of composite flour by diabet

Detail	Percentage		
	Ratangarh (n=50)	Udaipur (n=50)	Total (n=100)
<i>Consuming Composite Flour</i>	100	34	67
Daily	64	56	60
Weekly/fortnightly/monthly	36	44	40
<i>Duration of Consumption</i>			
< 5 years	68	8	38
5-10 years	30	18	24
> 10 years	2	8	5
<i>Advised by</i>			
Doctor	96	54	75
Friends	60	82	71
Mass media	34	48	41
Others	2	14	8
<i>Reasons to Consume</i>			
Controls blood glucose	96	84	90
Nutritious/beneficial for health	50	50	50
Family tradition/tasty	4	32	18
<i>Mode of Preparation</i>			
Mixed before grinding	88	82	85
Mixed after grinding/mixed by the miller	12	10	11
Purchasing readymade from market	0	2	1
<i>Composition Advised by</i>			
Doctor	20	10	15
Printed material	40	50	45
Friends	40	24	34
Family tradition	0	16	8

both the places grains were mixed before grinding by most of the subjects. The flour quantity prepared at one time ranged from 5-10 kg which was sufficient for about two weeks.

The composite flour was prepared at both the places by using wheat (WT), bengalgram (BG) and/or barley (BY). The proportion of these grains used to prepare the composite flour varied between the places and among the families of the same place. In all 22 combinations of wheat with pulse like bengalgram or soyabean(SN) and with or without barley were reported. Majority of the subjects of both the places were taking WT + BG (20%) and WT +BG+BY (37%) in equal proportion (Fig. 1) to prepare composite flour for *missi roti*.

Bijlani et al. (1993) studied the glycemic index of composite flour from wheat bengalgram and barley in equal proportion and recommended for diabetics. Shukla et al., (1992) and Narian et al. (1992) reported that barley not only improves lipoprotein profile but also lowers the blood glucose. Similar reasons for adding bengalgram has been reported by Carpo (1983),

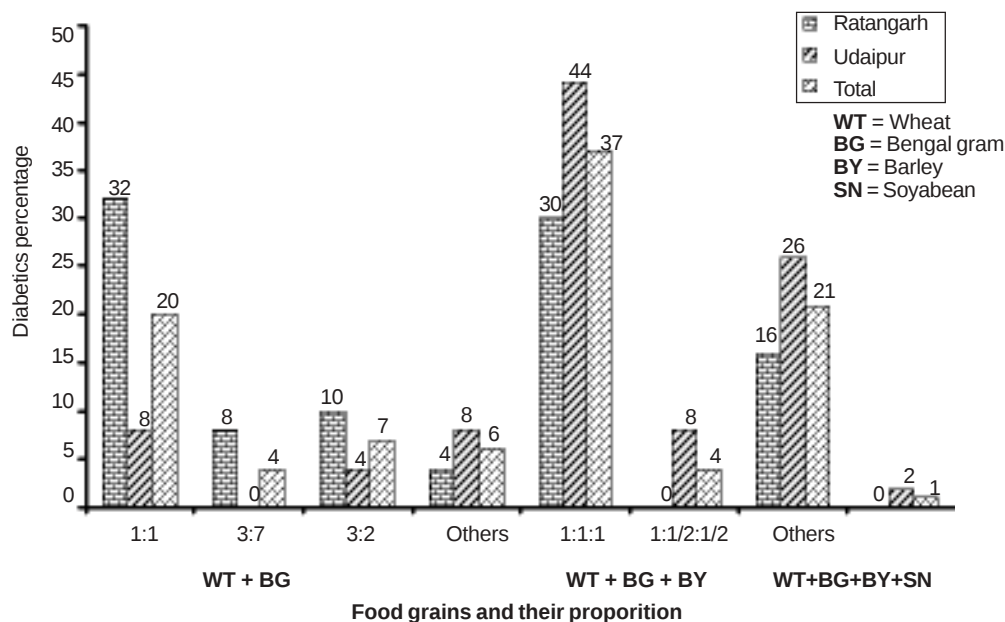


Fig. 1. Composition of composite flour consumed

Jenkins et al. (1981), Anderson and Gustafson (1988), Mathur et al. (1968) and Shulter et al., (1989).

The results of the survey suggest that a composite flour of a low glycemic index and longer shelf life be developed, commercialized and popularized as the prevalence of the disease is increasing day by day.

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