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Research Article

**IRRITABLE BOWEL SYNDROME PATIENTS DIETARY SURVEY
AND TOTAL DIETARY FIBER INTAKE**¹ Dr. Mehboob yameen, ² Dr. Ali Nasir, ³ Dr. Muhammad Hassan¹ Independent Medical College Faisalabad.² Independent Medical College Faisalabad.³ Independent Medical college faisalabad**Abstract:**

Background: Based on their chemical extraction, dietary fibers are classified into crude fibers and total dietary fibers (TDF). TDF shows an estimate that is best in fiber diet content. Whereas data on intake of crude fibers are available, there is a lack of data on intake of TDF in patients with irritable bowel syndrome (IBS).

Aim: In our study we will be finding the TDF and its source in diet with IBS and healthy controls (HC).

Methods: 81 patients with IBS were categorized into constipation-predominant (IBS-C, n=48), diarrhea-predominant (IBS-D, n=16) and mixed type (IBS-M, n=17). A pretested, open-ended, semi-quantitative food frequency questionnaire was used to collect dietary information on food groups and TDF. We studied healthy individuals (n=89) who were recruited as HC. The mean age of patients (SD) and HC was 36.5 (11.4) years respectively (59 men), and 36 (12) years (62 men).

Results: 39 (48%) patients took medicinal fiber supplements, of which twenty took supplements every day. The mean daily TDF intake was 51.7 (23.1) g vs. 52.3 (21.6) g respectively for patients and HC, (p=0.8). There was similar intake of TDF in patients who had less (n=41) or more (n=40) preference for fiber-rich foods (55 [23] g vs. 47 [22] g, p=0.16). The mean cereal intake per day in patients was significantly lower than that in HC (322 g vs. 404 g, p=0.001). However, consumption of fruits (150 g vs. 80 g, p=0.001) and vegetables (348 g vs. 219 g, p=0.006) was more in patients as compared to HC. There was a positive correlation between TDF with cereals (p=0.001), pulses (p=0.001), vegetables and fruits (p=0.033) in patients with IBS but only with cereals (p=0.001) in HC. **Conclusion:** The intake of TDF in patients with IBS and HC is much higher than the dietary recommendation for healthy individuals. Patients who had IBS took more fruits and vegetables rather as compared with HC who had more cereals.

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INTRODUCTION:

Dietary and supplemental fibers are important constituents in the treatment of irritable bowel syndrome (IBS).^{1,2,3} High-fiber foods add bulk to the stools and promote colonic motility.¹⁻⁴ Based on their chemical ex- traction, dietary fibers are classified into two types: crude fibers and total dietary fibers (TDF). Some insoluble and most soluble fibers are lost during estimation of crude fibers in the diet and therefore crude fibers lead to an underestimation of the total fibers present in the food.⁵ TDF gives the best estimate of the fiber content in the diet. The recommended dietary fiber intake for healthy people is 20–40 g per day.⁶ A recent report from i gives the estimation of crude dietary fibers in patients with IBS and healthy individuals.⁷ However, there are insufficient data on the intake of TDF by patients with IBS as well as by healthy individuals. Therefore, we assessed the intake of TDF (and its source) in the diets of patients with IBS and healthy controls.

METHODS:

This pilot, cross-sectional study was done in the outpatient department of a tertiary care academic hospital in Faislabad from November 2017 and November 2018. Eighty-one consecutive patients with IBS (mean age 36.5 [11.4] years; 59 men) were recruited and the diagnosis of IBS was made on the basis of Rome II criteria.⁸ Patients were categorized into constipation-predominant (IBS-C), diarrhea-predominant (IBS-D) and mixed type (IBS-M) of IBS according to their predominant symptom(s). All patients underwent a hemogram with ESR, stool microscopic examination for ova and parasites, stool culture, liver and renal function tests, and sigmoidoscopic examination. Patients with apparent milk intolerance, microscopic colitis, inflammatory bowel disease, colonic neoplasms, diabetes mellitus, autonomic neuropathy, and laxative abuse were excluded from the study.

All patients were interviewed by a nutritionist (NS) regarding their dietary intake, fiber supplementation (duration and daily intake), preference for high-fiber food items, and perception of foods aggravating and relieving their symptoms. The educational, sociodemographic profile and duration of illness were also recorded.

Healthy controls

Eighty-nine apparently healthy and asymptomatic relatives and attendants of patients (age 36 [12] years;

62 men), who were matched for age, gender and economic status, were recruited as controls. A detailed dietary and fiber intake in them was recorded.
Dietary and nutrient analysis

A pretested, open-ended, semi-quantitative food frequency proforma was used to collect nutrient and dietary information on seven food groups and miscellaneous food items from each patient and control. The proforma consisted of three sections according to the guidelines pre-pared by National Institute of Nutrition.⁹ In the first section of the proforma the patients were asked to recall all the food usually consumed during the day. The second section was meant for recording various food items not usually consumed daily but on a weekly or monthly basis. The third and final section listed the types and amount of oils used as the cooking medium. For easy recollection of dietary intake, standardized *chapattis* (wheat tortillas), cups, bowls, spoons and glasses were shown to the patients. The qualitative intake of dietary fiber was estimated by asking the preference of fiber-rich food items by subjects such as whole pulses, peel of fruits, bran of flour, etc.

Daily intake of nutrients and food groups were estimated by adding all the raw foods consumed on a daily, weekly and monthly basis. Conversion of raw foodstuffs into nutrients was done by using standard nutrient values of local foods.⁶ Food items taken daily to at least once a week were included in the final dietary analysis. Food items taken infrequently were not considered. Daily intake of food items by each subject was entered into the software to derive 7 food groups and 4 nutrients along with crude fibers and TDF.

Data were collected on a predesigned proforma. Before entering the data on a spreadsheet, proformas were reviewed for incomplete information. All entries were rechecked to avoid any error.

Statistical analysis

The distribution of each variable was checked for continuous variables; for variables following approximate normal distribution, mean and standard deviation values were computed. For non-normally distributed variables, summary statistics were computed by median and range. Statistical analysis was performed using independent-*t* test and Pearson correlation. SPSS version 8 was used for statistical analysis. A *p* value of <0.05 was considered to be statistically significant.

Results

Fiber intake in patients with IBS and healthy controls

The amount of insoluble dietary fiber intake was thrice that of soluble fiber (40.1 [17.8] g vs. 13.3 [5.8] g; 40.2 [16.6] g vs. 12.4 [5] g, respectively) in both patients and healthy controls. The TDF intake in

patients with IBS and healthy controls was similar (Table 1). The daily crude fiber intake in patients with IBS was higher than that in healthy controls ($p=0.027$).

Table 1: Daily nutrient and fibers intake in patients with IBS and healthy controls

<i>Nutrients</i>	<i>IBS patients</i>	<i>Healthy controls</i>
Number	(n=81)	(n=89)
Energy (kcal)	2060 (699)	2089 (649)
Carbohydrate(g)	341 (129)	347 (130)
Protein (g)	63 (23)	61 (22)
Fat (g)	48 (21)	50 (20)
Crude fibers (g)*	7.2 (3.2)	6.3 (2.2)
Total dietary fibers (g)	51.7 (23.1)	52.3 (21.6)

Values are given as mean (SD); * $p=0.027$

The intake of TDF in patients having less preference for fiber-rich foods ($n=41$) was similar as compared with patients having more preference for fiber-rich food (55 [23] g vs. 47 [22] g; $p=0.18$). There was no difference in the mean intake of TDF in patients preferring whole pulses ($n=36$; 56.4 [24] g) vs. those who preferred washed pulses ($n=45$; 47.9 [21] g; $p=0.1$).

Fiber supplements in patients with IBS

Thirty-nine patients (48%) with IBS were on fiber supplements as advised by their physicians, of which 28 patients were taking fiber daily, while others (11 patients) took fibers from 5 times a week to once in 2 weeks. The mean intake of fiber supplement in them was 2.1(0.8) (range 1–4) teaspoonfuls and they had received fiber supplement for mean duration of 3 months (range: 1–84 months). Of these 39 patients, 25 patients had IBS-C and 7 each had IBS-D and IBS-M, respectively.

Perception of patients about diet-related increase in symptoms

While 64 (79%) patients reported some form of food intolerance and excluded some food item from their diet, only 17 (20.9%) patients did not exclude anything from their diet. Food items that aggravated their symptoms included milk 26 (32%), rice 26 (32%), fried food 10 (12.3%), spices 10 (12.3%), and others including vegetables, fruits, whole pulses, non-vegetarian food, oil, tea, sour foods, cold foods in 36 (44.4%). Although 26 patients reported intolerance to rice, 8 of them changed the intake of plain rice to (rice and lentil cooked together). These patients perceived

khichri to be better than rice for relief of their symptoms.

Nutrient and dietary intake (Tables 1, 2)

Thirty seven (45.6%) patients and 24 (26.9%) healthy controls were non-vegetarians. There was no difference in the nutrient intake in those with IBS and healthy controls. Consumption of fruits ($p=0.001$) and vegetables ($p=0.006$) was higher in patients with IBS than that in healthy controls. Visible oil (oil used for cooking) and visible sugar (added sugar) in the diet of patients with IBS was less than that in the diet of healthy controls ($p=0.023$ and 0.021 , respectively).

There was a positive correlation between TDF with cereal ($p=0.001$), pulses ($p=0.001$), vegetables and fruits ($p=0.033$) in patients with IBS but only with cereals ($p=0.001$) in healthy controls.

DISCUSSION:

We assessed the TDF and source of fiber in the diets of patients with IBS and healthy controls. There was no difference in the TDF in patients with IBS and healthy controls.

Several commercial preparations of fibers are available. Soluble dietary fibers such as pectin, gums, psyllium or oat bran offer the theoretical advantage of enhancing water retention properties of the stool; whereas insoluble dietary fibers such as cellulose, hemicellulose or lignin are likely to be more effective as a bulking agent.¹⁰ TDF is the sum of these two fractions, i.e., soluble and insoluble dietary fibers. We observed that the intake of insoluble fibers was

thrice that of soluble fibers in both patients and healthy controls.

Dietary fibers refer to components which are not digested by the enzymes of the stomach and small intestine. About 15 years ago, the measure of dietary fiber intake was crude fiber. Crude fiber content of food was estimated by subjecting the nutrients to dilute acid and alkali. During the process of extraction, soluble dietary fiber and some of insoluble

dietary fiber are lost. Therefore, crude fiber is not a good measure of dietary fiber intake. Crude fiber and TDF therefore have different meanings. The process of measurement of TDF by the methods recommended by the Association of Official Analytical Chemists¹¹ is almost similar to the human physiological digestive process and, therefore, reliable.

Table 2: Daily dietary intake (food groups) in patients with IBS and healthy controls

<i>Foodgroups</i>	<i>IBS patients</i>		<i>Healthy controls</i>		<i>p value</i>
	<i>No.</i>	<i>Mean (SD)</i>	<i>No.</i>	<i>Mean (SD)</i>	
Cereals (g)	81	322 (151)	89	404 (173)	0.001
Pulses (g)	70	44 (36)	85	35 (24)	0.068
Vegetables (g)	79	348 (214)	87	218 (114)	0.001
Fruits (g)	55	150 (137)	38	80 (83)	0.006
Milk and its products (mL)	70	294 (221)	85	266 (207)	0.427
Meat (g)	37	46 (53)	22	27 (17)	0.131
Egg (g)	7	21 (15)	16	26 (16)	0.506
Oil (g)	78	27 (11)	89	31 (16)	0.023
Sugar (g)	64	20 (13)	86	26 (16)	0.021

Values are given as mean (SD)

A recent study from North showed that patients with IBS consumed lower amounts of crude fibers than healthy controls (8.1 g vs. 15.7 g, $p=0.001$).⁷ In the present study, the intake of crude fiber was higher in patients with IBS (7.2 [3.2] g vs. 6.3 [2.2] g, $p=0.02$). The United States Department of Agriculture¹² has reported that the average intake of fiber in Americans is about 15 g/day; therefore the Institute of Medicine and the Dietary Guidelines for Americans 2005 recommended that children (≥ 1 year of age) and adults consume 14 grams of fiber for every 1000 calories of food consumed.¹³ For patients with IBS, a daily fiber intake of 20–30 g is recommended for relief of constipation. The evidence for use of high fibers supplementation in relieving constipation in patients with IBS-C was found to be weak in a recent meta-analysis including 51 double-blind clinical trials.¹⁴ A systematic review of 17 randomized controlled trials involving treatment of IBS with fiber supplementation showed that the benefits are only marginal in terms of relief of symptoms and constipation. Insoluble fiber has even been reported to increase abdominal pain and constipation in them.¹⁵

The recommended TDF intake for healthy individuals is 20–40 g/day.⁶ In this study, we observed that the intake of TDF in patients with IBS and healthy

controls is much higher than the recommended dose. Therefore, the role of additional fiber supplementation in patients with IBS is questionable. Although, there was no difference in TDF in patients with IBS and healthy controls, the predominant source of TDF in them was found to be different kinds of food items. While patients with IBS derived their dietary fiber predominantly from cereals, pulses, vegetables and fruits, the source of dietary fiber in healthy controls was cereals. This observation reflects the advice to eat a lot of fruits and vegetables given to patients by their physicians. This study highlights that our patients with IBS took a well-balanced diet with adequate fiber intake. The intake of cereals, oil and sugar was lower but intake of vegetables and fruits were higher in them as compared with that in healthy controls.

Perceived food intolerance is a common problem with significant nutritional consequences in patients with IBS. In a recent study from Norway, 70% of patients with IBS had symptoms related to intake of food and 62% of them limited or excluded food items from their diet.¹⁶ There was no association between the tests for food allergy and malabsorption and perceived food intolerance. Half of our patients with IBS-D complained of milk intolerance; however, there was no difference in the intake of milk or milk products in them as compared to those with IBS-C

and healthy controls. Patients with IBS perceived fried food and oil intake as aggravating factor for their symptoms and this was reflected by less oil intake in them. Although one- third of patients with IBS perceived rice as aggravating factor for their symptoms, the intake of rice was higher in them as compared to controls. Of 26 patients reporting intolerance to rice, 8 patients preferred to take *khichri*. Patients with IBS blame food intolerance for many of their symptoms, although not uncommonly this is caused by the non-specific increase in gut motility that occurs with food ingestion.¹⁷

In conclusion, the intake of TDF in patients with IBS and healthy controls is much higher than the dietary recommendation. Therefore, the role of fiber supplementation to relieve their symptoms is questionable.

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