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Dietary habits in patients presenting with chronic constipation at Tertiary Care Hospital, Karachi.

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ABSTRACT… Objective: To determine dietary habits in patients presenting with chronic constipation (CC) at tertiary care hospital in Karachi. **Study Design:** Cross-sectional study. **Setting:** Department of Gastroenterology, Liaquat National Hospital. **Period:** June 2022 to December 2022. **Methods:** Patients of age 18 years and above of either gender, presenting with history of CC were enrolled. Dietary fiber intake was determined on the basis of self-reported history. Dietary fiber intake was categorized as higher fiber intake, medium fiber intake and low fiber intake. Data was entered in SPSS version 26 to perform statistical analysis. **Results:** Total 190 patients were enrolled with median age and disease duration of 40 (IQR=29-55) years and 16 (IQR=9-24) months respectively. Majority of the patients were males (n=121, 63.7%). Around three-fourth people had low fiber intake (72.6%), nearly quarter had medium level of fiber intake (26.3%) and very few had high intake (1.1%). Fiber intake was significantly higher among those with low literacy. Less fiber intake was significantly seen with patients having dyslipidemia and weight loss. Water glass consumption per day was significantly higher among those with medium to high fiber intake. **Conclusion:** The present study analyzed that fiber intake was quite low among CC patients. General public should be educated regarding importance of dietary fiber for disease cure and better gut health particularly those who are lower educated patients and those with dyslipidemia.

Key words: Chronic Constipation, Dietary Fiber Intake, Healthy Gut, Water Consumption.

INTRODUCTION

The symptom or illness known as constipation is characterized by difficult and sporadic bowel motions, usually occurring three or less times per week.[1] A number of symptoms are linked to it, such as bloating, pain in the abdomen, anorectal obstruction sensation, firm stools and straining.[2] Constipation can strike anyone at any age, from young children to elderly people, but generally speaking, women experience it more frequently than men.[3] Chronic constipation (CC) is the sixth most frequent gastrointestinal complaint in adults, with a prevalence of about 15%. CC frequently leads to referrals to gastroenterology and visits to ambulatory clinics.[4,5] According to reports, the prevalence of constipation among non-White people is 30% higher than that of White people.[6,7]

Constipation has a complex etiology that is not fully understood. It involves a complicated web of interrelated elements that impact the neurological system, gastrointestinal tract, and the pelvic muscles. The most well-known causes are pelvic floor dysfunction and colonic sensory-motor abnormalities. Additional factors may also be involved, including decreased calorie intake, microbiota disruptions, structural problems, or medication.[8] Constipation can have primary (slow transit or restriction of the outflow) or secondary causes. Simple dehydration or insufficient fluid intake, metabolic problems, medicines, neurological diseases, myopathy disorders, and structural anomalies are examples of secondary causes.[9] Patients experiencing constipation should first be assessed for secondary reasons of constipation. Once secondary causes have been ruled out, the patient should be tested for primary or functional constipation. Advanced

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age, a low-fiber diet, a low socioeconomic position, immobility, abdominal or pelvic surgery, and polypharmacy are risk factors for functional constipation.[10]

Every stage of life benefits from balanced eating practices and a healthy lifestyle, which can also help prevent and even treat some ailments. One such component of a balanced diet is dietary fiber (DF), which is the edible part of the diverse assortment of plant foods that are resistant to small intestine absorption and digestion, such as polysaccharides and lignin.[2] For adult subjects, the recommended daily intake of DF is generally between 18 and 38 grams. DF has a wide variety of complex carbohydrates, which are important for public health because they are underutilized in comparison to the recommended consumption in the majority of the world's countries. Dietary factors, including food group consumption preferences, dietary patterns and behaviors, and intake of macro- and micronutrients, have been found to affect the activity of the gastrointestinal system in conjunction with other factors.[1]

Chronic constipation is a prevalent and enduring ailment that impacts a large number of individuals globally, posing a huge financial burden and leading to a substantial increase in healthcare utilization.[1,4,5] Dietary patterns have been linked to bowel movements, which is not surprising given that nutrients can influence gastrointestinal food passage. Large amounts of fat, mostly trans and saturated fats, high intake of refined sugar, excessive salt intake, and low intake of fruits, vegetables, and dietary fiber are characteristics of the Westernized diet.[11,12] Western diets are highly popular right now, everywhere in the world. Nevertheless, there aren't many research from Pakistan that look into CC patients' eating habits. Therefore, we planned this study with the aim of determining dietary habits in patients presenting with chronic constipation at tertiary care hospital in Karachi.

METHODS

This cross-sectional study was performed in outpatient clinics in Gastroenterology Department at Liaquat National Hospital during June 2022 to December 2022. The study commenced after acquiring formal permission from ethics committee of hospital (App#0640-2021 LNH-ERC). Patients of age 18 years and above of either gender, presenting with history of CC were enlisted. Patients with type 2 diabetes mellitus, colorectal cancer, previous colonic surgery, melanosis coli, history of prolapsed hemorrhoids and chronic anal fissure, hypothyroidism or hyperthyroidism, stroke, asthma, renal impairment and chronic obstructive pulmonary disease and congestive cardiac failure, taking calcium channel blockers, and pregnant patients assessed by history and confirmed by dating scan were excluded from this study. In order to include patients in the study, a signed informed consent was obtained from them.

The required sample size came out to be 186 patients. By taking prevalence of high fiber diet from a pilot study to be 14%, margin of error =5% and confidence level =95%. Sample size calculation was performed on online available calculator Open-Epi. Non-probability consecutive sampling technique was used to enroll study participants.

As per criteria of The American College of Gastroenterology Chronic Constipation Task Force, Chronic Constipation was characterized as unsatisfactory defecation characterized by infrequent stool, difficult stool passage or both at least for previous 3 months.[13] Dietary fiber intake was determined on the basis of self-reported history. Dietary fiber intake was categorized as higher fiber intake, medium fiber intake and low fiber intake. Hiher intake was defined as intake of all these fours components including fruits, vegetables, nuts and grains daily. Medium fiber intake was considered for consumption of any of these two components and low fiber intake was labeled for consumption of any one of the above mentioned components. A person smoking 10 or more cigarettes per day for the last two years was considered a smoker. Obesity was labelled as body mass index (BMI) $\geq$ 30kg/m^2.[14] BMI was determined as weight in kilograms divided by the square of the height in meters (kg/m^2). The presence of at least one of the following

lipid profile abnormalities—high TC ≥200 mg/dl, high LDL ≥ 100 mg/dl, high TG ≥ 150 mg/dl, or low HDL ≤ 40 mg/dl—was categorized as dyslipidemia. An unexpected decrease of 5% or more from baseline weight over the previous six months was considered as weight loss which was labeled on self-reported history. Diabetes and hypertension were labeled based on the work-up done in clinic or having the evidence of use of antihypertensive or antidiabetic drugs to treat these medical conditions.

Data was entered in SPSS version 26 to perform statistical analysis. Categorical variables were expressed as frequency and percentages. Numerical variables were summarized as median with inter-quartile ranges as they were non-normally distributed. Normality assumption was checked using Shapiro-Wilk test. Chi-square or Fisher-exact test was applied to compare patients' features among those who were consuming low fiber diet and those having medium to high fiber diet. Statistical significance was defined in terms of p-value less than or equal to 0.05.

RESULTS

A total of 190 patients were studied with median age and disease duration of 40 (IQR=29-55) years and 16 (IQR=9-24) months respectively. Majority of the patients were males (n=121, 63.7%). Table-I displays socio-demographic features of patients. Around half of participants had family history of constipation (46.3%). Few had history of colon cancer (1.6%).

Around three-fourths of people had low intake of dietary fiber (72.6%), nearly quarter had medium level of fiber intake (26.3%) and very few had high intake of fiber (1.1%). Table-II compares patients' features consuming low and medium to high fiber intake. Frequency of low fiber intake was significantly higher among those with lower education. Low fiber intake was significantly higher among those with dyslipidemia and having weight loss. Water glass consumption per day was significantly higher than those having medium to high fiber intake.

Variables	Groups	Count	Percentage
Gender	Male	121	63.7
	Female	69	36.3
Education	Illiterate	25	13.2
	Primary	27	14.2
	Secondary	93	48.9
	Intermediate and above	45	23.7
Monthly income	<25k	6	3.2
	25-50k	75	39.5
	>50k	109	57.4
Residence	urban	171	90.0
	rural	19	10.0
Occupation	Employed	87	45.8
	Non-employed	103	54.2
Hypertension	yes	38	20.0
	no	152	80.0
Dyslipidemia	yes	45	23.7
	no	145	76.3
Smoking	yes	16	8.4
	no	174	91.6
Obesity	yes	35	18.4
	no	155	81.6
Laxative use	yes	97	51.1
	no	93	48.9
Weight loss	yes	24	12.6
	no	166	87.4

Table-I. Summary of socio-demographic features

DISCUSSION

Chronic illnesses are common in today's society. There are certain lifestyle choices we make that might lead to the development of these types of disorders. Chronic Constipation (CC) is a prevalent issue that is seen as a potentially fatal illness that has a significant influence on medical costs and quality of life.[5] To analyze this tip of the iceberg in our local population, we studied the pattern of dietary habits in CC patients.

In present study median age of patients was 40 years. A study performed in Pakistan evaluating frequency of functional constipation reported that constipation was most prevalent among the age group of 18 to 30 years.[14] Another study from Bangladesh assessing symptoms and prevalence of constipation analyzed that constipation was more common in individuals of age <30 years.[15]

Variables	Groups	Fiber Intake		P-Value
		Low Intake (%)	Medium to High Intake (%)	
Age (in years)#	-	40(29-55)	40(30-57.3)	0.938
Gender	Male	87(71.9)	34(28.1)	0.765
	Female	51(73.9)	18(26.1)	
Education	Illiterate	22(88)	3(12)	**<0.001
	Primary	24(88.9)	3(11.1)	
	Secondary	69(74.2)	24(25.8)	
	Intermediate and above	23(51.1)	22(48.9)	
Income	<25k	6(100)	0(0)	┼0.384
	25-50k	48(64)	27(36)	
	>50k	84(77.1)	25(22.9)	
Residence	Urban	126(73.7)	45(26.3)	0.329
	Rural	12(63.2)	7(36.8)	
Occupation	Employed	60(69)	27(31)	0.298
	Unemployed	78(75.7)	25(24.3)	
Hypertension	yes	27(71.1)	11(28.9)	0.807
	no	111(73)	41(27)	
Dyslipidemia	yes	38(84.4)	7(15.6)	*0.042
	no	100(69)	45(31)	
Smoking	yes	10(62.5)	6(37.5)	┼0.382
	no	128(73.6)	46(26.4)	
Obesity	yes	30(85.7)	5(14.3)	0.055
	no	108(69.7)	47(30.3)	
Family history of constipation	yes	60(68.2)	28(31.8)	0.201
	no	78(76.5)	24(23.5)	
Family history of colon cancer	yes	3(100)	0(0)	0.284
	no	135(72.2)	52(27.8)	
Laxative use	yes	67(69.1)	30(30.9)	0.261
	no	71(76.3)	22(23.7)	
Weight loss	yes	22(91.7)	2(8.3)	*0.025
	no	116(69.9)	50(30.1)	
Disease duration (months/weeks?)	-	18(11.8-24)	12(8-18)	0.059
Water glass consumption per day#	-	4(3-4)	5(4-8)	**<0.001

Table-II. Comparison of patients' features consuming low and medium to high nutritional value

#: Variables are presented as median with IQR, ┼:Fisher-exact test is reported, *Significant at p<5%, **Significant at p<1%

Higher prevalence of constipation in 18-29 years (38.7%) as compared to age group of 30-39 years (24.2%), 40-49 years (21.2%), 50-59 years (11.3%) and 60-65 years (4.6%) was also reported from Turkey.[16] However, a larger community based study from Iran revealed higher age of 55.7 ± 10.8 among constipated individuals.[17] Based on studies of adults who live in the community, a review article analyzing the factors that have contributed to constipation over the past 30 years showed that, for both chronic and non-chronic constipation, there does not appear to be a clear correlation with age because different results have been recorded. Studies that have reviewed the literature and conducted epidemiological research have suggested that constipation may be more common in older age groups. Other research, however, found a higher prevalence of constipation in younger age groups or no connection at all.[18]

In this study, we found that around three-fourths of people had low intake of fiber (72.6%), nearly quarter had medium level of fiber intake (26.3%) and very few had high daily consumption of fiber (1.1%). A study from Saudia Arabia reported

that among patients having constipation, 22.1% were not consuming fiber at all, 74.3% were consuming ≤2 grams of fiber and 3.5% were consuming fiber diet up to 3-4 grams per day.[19] A survey conducted among Iranian elderly population reported that on average patients with constipation were consuming 9.45 ± 2.32 grams of fiber per day.[20] Another study from Saudi Arabia associated fiber intake with health status and reported the commonest health problem among patients low fiber intake was constipation (28.9%) and it was also reported that patients were not aware of the fact that dietary fiber intake has major role in proper bowel movements.[21] Yurtdas et al reported in their study that highest quartile consumption of fiber intake was low among constipated individuals (19.7%) and in terms of quantification in grams it was average 26.7 ± 12.22 grams of fiber intake per day.[16] The measurement tool used for quantification of fiber intake among all studies is different; however, all of the studies have similar finding in a way that whatever approach they have used to measuring fiber intake, it indicated patients were commonly consuming fiber in low to medium amounts. Fiber consumption in higher amounts was rare in constipated patients.

The findings of present study did not find significant differences in fiber intake in terms of age. In contrast to our study, an American study reported that odds of consuming recommended fiber intake per day was higher in 31-50 years (OR= 1.88, 95% CI: 1.06 – 3.33) and among those who were ≥51 years older (OR=3.20, 95% CI: 1.78 – 5.76).[22] A study performed in Chile analyzing fiber intake in form of consumption of fruits, vegetables, bread, cereals, dried fruits and pulses and it was found that only cereals consumption was significantly different among age groups with significantly higher consumption of cereals among 15-29 years of age individuals.[23]

In this study, we did not find significant difference in fiber intake among two genders. Previous research has yielded inconsistent results about the differences in food and nutrient intake across genders.[24,25] This may therefore draw attention to the disparities between genders in terms of fiber consumption and potential health effects. As a result, research from developing nations like Bangladesh shows that women consume less fiber than males do, which puts them at greater risk of vitamin deficiencies and other health issues.[25]

This study analyzed that low fiber consumption showed a decreasing trend with increasing education levels which is consistently reported in literature.[20,23] The reason of this inverse relationship is obvious that educated individuals are more aware and knowledgeable of nutritional values of the food we consume and its impact on health which make their health behavior more cautious of consuming the right diet.

Majority of our participants had income of >50k, followed by those having income of 25-50k and only a few had individuals with <25k income. There was no significant association found between the income of a participant and their fiber intake. This is in contrast to the study findings published by Lin S et al.[26] and Li Y et al.[27], both of which revealed a significant association between family income and fiber intake. This discrepancy in results likely arises from methodological differences. While other studies incorporated the family income-to-poverty ratio, our study solely examined participants' monthly income. Moreover, these studies were conducted on a national scale, whereas ours was limited to a single center, potentially restricting the generalizability of our findings.

Most of the participants belonged to urban areas and were unemployed. In our study, no significant association was established between fiber intake with occupation, and place of residence. Our results are similar to another Pakistani study that reported no link between occupational status and consumption of fiber-rich diet, such as vegetables and fruits.[28] Conversely, a study published in Poland demonstrated that individuals residing in rural areas had an inverse association with high fiber intake. This disparity in results is due to variable food availability throughout the year in their region between rural and urban residences. The urban population has access to high fiber

foods like vegetables and fruits throughout the year, whereas the rural population only gets them on a seasonal basis.[29] However, such differences have not been observed in an agricultural region like Pakistan, as these rural areas are the main producers of vegetables and fruits in Pakistan mainly due to the availability of natural resources in Pakistan.[30]

A substantial portion of our participants did not have existing comorbidities such as hypertension, dyslipidemia, or obesity, and were non-smokers. Among these variables, only dyslipidemia was found to be associated with fiber intake, with a higher likelihood of dyslipidemia observed in those consuming less daily fiber. These results align with studies by Li Y et al[27] and Kwon YJ[31], which also revealed no association of fiber intake with smoking and hypertension, respectively. Contrary to our findings, Kwon YJ et al[31] reported no association of dyslipidemia and a significant association of increasing BMI with fiber intake. This difference between the studies could be due to varying prevalence of underlying conditions and obesity between the study populations of different regions.

In the current study, it was observed that the use of laxatives was a common practice among many participants. However, no significant association was found between the use of laxatives and the amount of fiber intake. Similar results have been demonstrated by the National Health and Nutrition Examination Survey (NHANES), which revealed no link between fiber intake and the use or frequency of laxatives.[27]

In our present study, we observed a significant relationship between daily water consumption and dietary fiber intake. Individuals with lower fiber intake tends to consume less water on a daily basis—typically around 3 to 4 glasses—compared to those with moderate to high fiber intake, who typically drank between 4 to 8 glasses of water daily. Similar to our findings, Murakami et al. concluded that decreased water intake is associated with constipation among a population with relatively low dietary fiber intake. However, it's important to note that this association was not observed for total daily water intake.[32]

CONCLUSION

The present study analyzed that fiber intake was quite low among CC patients. Patients should be given education regarding importance of dietary fiber for disease cure and better gut health particularly those who are lower educated patients and those with dyslipidemia.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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1	Moneeba Siddiqui	Conceptualized the study, Design the study protocol, Data collection, Manuscript drafting, approval for publication.	
2	Lubna Kamani	Designed the study protocol, Critical review and revisions, approval for publication.	
3	Adeel Rahat	Data analysis, Initial manuscript writing, approval for publication.	