



Dietary Habit and Lifestyle Practice of Patient with Irritable Bowel Syndrome: A Case-Control Study on Bangladeshi Population

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Abstract

Irritable bowel syndrome a common bowel problem presenting with frequent abdominal pain that is related with the changes of stool pattern. Of all the contributing factors of IBS, diet and lifestyle-related factors are unique and modifiable but difficult to understand. Several studies had done in western countries to find out the relationships between lifestyle practices and IBS but scarce among Bangladeshi population. This was a cross-sectional study with case-control design. In this study, a predesigned semi-structured questionnaire based on lifestyle habits and diet was used. Here we record the diet and lifestyle habits of 45 IBS subjects and 45 non-IBS subjects. Rome IV criteria was used to diagnose IBS. Cross-tabulation analysis and logistic regression were used to reveal any association among lifestyle habits, eating habits, food consumption frequency, and other associated conditions. The mean age of IBS patient was 31.6 (SD ± 8.3) years among them 32 (71.1%) were male. Regarding the sub-typing of IBS, 53.3% IBS-D, 33.3% IBS-M and 13.3% were diagnosed as IBS-C. The BMI of IBS group is 14.5 (SD ± 2.3). The results from logistic regression analysis indicated that IBS was associated with poor quality of sleep (Odds Ratio [OR], 4.5), physical inactivity (OR, 1.9), and diet change (OR, 2.3). Milk, vegetables, bakery items and artificial sweetener significantly associated with the IBS symptoms ($p < 0.05$) exacerbation than non-IBS group. On the other hand, rice, chickens and fishes does not produce any significant difference between two groups. This study reveals a possible association between diet and lifestyle habits and IBS. The offending diet and lifestyle practices should be focused on IBS treatment.

Keywords: Irritable bowel syndrome; Food; Diet habits; Life style; Odds ratio

Introduction

Irritable Bowel Syndrome (IBS) a common bowel problem presenting with frequent abdominal pain, related to the changes in stool pattern. It is related with significant disabilities, loss of productivity and excessive health care utilization cost. Pathophysiology of IBS, still not completely unveiled; therefore, clinicians have not come to a consensus about why some people develop IBS. Abnormal Gut motility, visceral hypersensitivity, low-grade inflammation, altered brain-gut communication and psychosocial factors have an important role in disease presentation. Of all the contributing factors of IBS, diet and lifestyle-related factors are unique and modifiable but difficult to understand comprehensive assessment of dietary intake is essential before designing a dietary plan for IBS patient. Assessment should focus on dietary type, element, quantity, and frequency of food and fluid consumption. Several studies had done in western countries to find out the relationships between lifestyle practices and IBS but there is scarce of information among Bangladeshi population. To explore the status and find out a relationship between lifestyle-related factors and IBS, which will ultimately guide the physician to develop a self-care program to minimize the severity of disease and enhance the quality of life of the patient with IBS.

Methods

This was a cross-sectional study with case-control design. In this study, a predesigned semi-structured questionnaire based on food frequency and lifestyle habits was used to record the diet and lifestyle habits of 45 IBS subjects and 45 healthy subjects. Rome IV criteria was used to diagnose IBS. A pretested semi-structured interviewed questionnaire was the main instrument for

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data collection. The questionnaire was based on previously published study conducted in Bangladesh and abroad by using internationally accepted Rome-IV criteria. The questionnaire contained 70% to 80% close-ended and 20% to 30% open-ended question. The Bengali translation of this Case Record Forms (CRF) was validated by forward and backward translation method. Cross-tabulation analysis and logistic regression were used to reveal any association among lifestyle habits, eating habits, food consumption frequency, and other associated conditions.

Results

The mean age of IBS patient was 31.6 (SD ± 8.3) years among them 32 (71.1%) were male. In this study 88.3% of IBS group and 93% came from urban area. Among the study participants, the distribution of the highest level of education status shows primary 2 (50%) in IBS group and 2 (50%) in non-IBS group; secondary 16 (59.3%) in IBS group and 11 (40.7%) in Non-IBS group, graduation 23 (42.6%) in IBS group and 31 (57.4%) in non-IBS group; post-graduation 4 (80%) in IBS group and 1 (20%) in IBS and Non-IBS group respectively. The socioeconomic status of IBS and Non-IBS group - lower middle class 19 (61.3%) and 12 (38.7%), upper middle class 24 (43.6) and 31 (56.4) and upper class 2 (50%) and 2 (50%) respectively (Table 1). The comparison between two groups shows 39 (86.7%) of IBS patient complain sleeping problem but only 11 (24.4%) non-IBS participants complain sleep problem. In this study 45 (100%) IBS patient complained sleeping problem related with IBS like somatic symptoms exacerbation and 13.3% patients of non-IBS group complain sleeping problem not related with any somatic problem exacerbation (Table 2). Here we have found that exercise improve the symptoms of IBS but smoking deteriorate it. Milk, vegetables, bakery items and artificial sweetener significantly exasperated the IBS symptoms (p<0.05) than healthy group (Table 3). On the other hand, both IBS and Non-IBS group can tolerate rice, chickens and fishes and there are no significant

Table 1: Sociodemographic characteristics of study participants.

	IBS	Non-IBS	P- value
Age group (years), n (%)			
1. 18-30	25 (55.6)	26 (57.8)	
2. 31-45	16 (35.6)	14 (31.1)	
3. 46-60	4 (8.9)	5 (11.1)	
4. >60	0 (0)	0 (0)	
Sex Distribution			
1. Male	32 (71.1)	29 (64.4)	0.14
2. Female	13 (28.9)	16 (35.6)	
Urban residence, n (%)	38 (48.7)	40 (51.2)	
Education, n (%)			
1. No	0 (0)	0 (0)	0.2
2. Primary	2 (4.4)	2 (4.4)	
3. Secondary	16 (35.5)	11 (24.4)	
4. Graduation	23 (51.1)	31 (68.9)	
5. Post-graduation	4 (8.9)	1 (1.1)	
Socioeconomic status, n (%)			
1. Lower class	0 (0)	0 (0)	0.29
2. Lower middle class	19 (42.2)	12 (26.7)	
3. Upper middleclass	24 (53.3)	31 (68.9)	
4. Upper class	2 (4.7)	2 (4.7)	

Table 2: Lifestyle habit and its impact on IBS.

Indicators, n (%)	IBS	Non-IBS	Total	p-value
Sleeping problem				
Yes	39 (86.7)	11 (24.4)	50 (55.6)	<0.001
No	6 (13.3)	34 (75.6)	40 (44.4)	
Sleep problem related with IBS like abdominal symptoms				
Yes	45 (100)	6 (13.3)	51 (56.7)	<0.001
No	0 (0)	39 (86.7)	39 (43.3)	
Exercise improve the IBS symptoms				
not every time	16 (35.6)	1 (2.2)	17 (18.9)	<0.001
Yes feeling good	29 (64.4)	44 (97.8)	73 (81.1)	
Smoking				
Yes	20 (44.4)	16 (35.6)	36 (40)	0.389
No	25 (55.6)	29 (64.4)	54 (60)	

Table 3: Diet item and its impact on IBS like symptoms.

Indicators, n (%)	IBS	Non-IBS	Total	p-value
Bakery Item- Bread, Biscuit, Burger, cake				
Yes	45 (100)	10 (22.2)	55 (61.1)	<0.001
No	0 (0)	35 (77.8)	35 (38.9)	
Rice				
Occasional	3 (6.7)	1 (2.2)	4 (4.4)	0.616
No	42 (93.3)	44 (97.8)	86 (95.6)	
Potato				
Occasional	7 (15.6)	2 (4.4)	9 (10)	0.157
No	38 (84.4)	43 (95.6)	81 (90)	
Honey				
Yes	40 (88.9)	5 (11.1)	45 (50)	<0.001
No	5 (11.1)	40 (88.9)	45 (50)	
Sugar				
Yes	4 (8.9)	0 (0)	4 (4.4)	0.117
No	41 (91.1)	45 (100)	86 (95.6)	
Artificial sweetener/Saccharine				
Yes	45 (100)	17 (37.8)	62 (68.9)	<0.001
No	0 (0)	28 (62.2)	28 (31.1)	
Vegetable				
Yes	44 (97.8)	5 (11.1)	49 (54.4)	<0.001
No	1 (2.2)	40 (88.9)	41 (45.6)	
Lantees (Chola, Motorshuti)				
Yes	45 (100)	3 (6.7)	48 (53.3)	<0.001
No	0 (0)	42 (93.3)	42 (46.7)	
Ripe Mango				
Yes	45 (100)	4 (8.9)	49 (54.4)	<0.001
No	0 (0)	41 (91.1)	41 (45.6)	
Fish				
Some specific fish	10 (22.2)	4 (8.9)	14 (15.6)	0.081
No	35 (77.8)	41 (91.1)	76 (84.4)	
Chicken				
Occasional	5 (11.1)	3 (6.7)	8 (8.9)	0.459
No	40 (88.9)	42 (93.3)	82 (91.1)	

Table 4: Multiple logistic regression.

IBS and Its relation with symptoms	Odds ratio	Std. Err.	z	p value	95% Conf. Interval
Sleep disturbance	4.5	2.46	2.8	0.005	1.57 - 13.16
Physical Activity	0.1	0.08	-2.9	0.004	0.02 - 0.49
Stressful life feelings	2.7	1.17	2.32	0.02	1.16 - 6.32
Diet and its effect on IBS	27.6	23.05	3.98	0	5.39 - 141.6
_cons	0.0001	0.0004	-2.7	0.007	2.48 - 0.09

differences. The results from logistic regression analysis indicated that IBS was associated with poor quality of sleep (Odds Ratio [OR], 4.5) (Table 4), physical inactivity (OR, 1.9), and diet change (OR, 2.3). This study reveals a possible association between diet and lifestyle habits and IBS. The offending diet and lifestyle practices should be focused on IBS treatment.

Discussion

Irritable Bowel Syndrome (IBS), a common bowel problem presenting with frequent abdominal pain that is related with changes of stool pattern. It has a significant impact on patient quality of life, social functioning, productivity of work and health care cost. Of all the contributing factors of IBS, diet and lifestyle-related factors are unique, modifiable but difficult to understand. That's why clinicians are now focusing on disease control by doing an intervention on lifestyle and diet and the ultimate goal is to eliminate the factors that have a negative impact on patient health and quality of life. Several studies had done in western countries to find out the relationships between lifestyle practices and IBS but there is no study on Bangladeshi patient population [1-20].

Lifestyle related factors, including physical inactivity, dietary habits, smoking, sleeping pattern psychological distress and obesity, have been studied in relation with IBS symptoms exacerbation; however, findings were conflicting and not from the developing countries like Bangladesh. Again, most these studies were focused on certain behavior, rather than all lifestyle factors including diet; the benefits of considering multiple components of a healthy lifestyle have not studied. This study is the first case control study to evaluate the effect of lifestyle on Bangladeshi IBS patients. This study showed that a poor lifestyle such as physical inactivity, sleep disturbance and specific diet and dietary practices like irregular eating, increase the symptoms of IBS [21-35].

In this study, the mean age (\pm SD) of IBS patient was 31.6 (\pm 8.3) years and most of the patient came from 45 years age group which is similar to other study from developed [36] and developing countries [27]. From this study it is observed that 92% patients came from less than 45 years of age. It is similar to most of the studies. For example, the prevalence of IBS was observed to be the highest in the age group of 21 to 30 years, with a decreasing trend after 30 years to the age group of 60 years or more that is similar to our study. A community-based survey from South Korea showed that high prevalence of IBS in young people may be due to psychological factors, such as stress related to studies, economic status, finding jobs and or marriage. The prevalence was higher in men, 71.1% but this difference is not statistically significant but most of the previous studies shows, IBS prevalence is higher among women than man. In USA, almost two third patients who seek treatment for IBS were female, ranging from 14% to 24% and the male female ratio was 2 to 2.5:1 [37] and another study showed the ratio was 3 to 4:1 [38]. Another community based

study in USA shows the gender distribution was less than 2:1 [39], but IBS has been reported to occur more in male than female In India, Sri Lanka [40], Korea [41] and Iran [42]. There may be some contributing factors to the differences in the female-to-male ratios, population selection and cultural influences on health care seeking behavior. Gender difference in the occurrence of could be the result of cultural, psychosocial, or healthcare access issues instead of purely psychological and physiologic influences.

Lifestyle and diet are the important triggering factors for IBS symptoms. This study evaluated the relationship between lifestyle, which include physical activity, dietary practice, smoking, sleep and psychological status with IBS among Bangladeshi adult IBS patients. Here we have a found significant relation between lifestyle and IBS symptoms. This association remained significant even after adjustments for potential confounders. Individuals with healthy lifestyle practices and dietary habits reduced the symptoms of IBS compared with unhealthy lifestyle practices and diet. Daily exercise is helpful for good bowel function and that prevent constipation and reduce the of feelings of borborymic. Physically active IBS patients have less symptom deterioration than physically inactive patients. Johannesson et al. showed that doing moderate aerobic physical activity has a good impact on IBS symptoms and quality of life. Lustyk et al. described that physically active person especially women complain less of incomplete evacuation than inactive IBS patient. Physical activity decreases the splanchnic blood flow; increases gut motility, neuroimmuno-endocrine alternations and mechanical bouncing during movement which ultimately improve the symptoms. Moderate aerobic exercise has a positive impact on psychological symptoms like fatigue, anxiety, and depression. Our findings are consistent with previous studies. Here IBS patients were less physically active than non-IBS healthy participants. Regular physical activity should be used as a primary treatment modality of IBS patients.

Our study has shown that the symptoms of IBS are related with the disturbance in sleep. That means sleep duration and quality of sleep of IBS patient was poor. Difficulties of getting to sleep, staying asleep and early morning awakenings are three major sleep problems. Sleep has also direct impact on quality of life and also treatment response. These findings are similar to the study of Goldsmith et al., where they found a positive correlation between poor sleep quality and IBS symptoms. Another study from Turkey showed that 36% of IBS patient had sleep problem in compare with healthy volunteers (18%). In our study we found that 33.3% had severe and 57.8% patient had some sleep problem and it has also direct impact on IBS symptoms.

Diet plays an important role on symptoms generation like bloating, flatulence and diarrhea of IBS patient. From previous studies it was found that 20% to 65% patients reported food specific symptoms and some foods increases the symptoms spontaneously

and vigorously. Our findings are consistent with earlier studies that investigate the role of dietary patterns, dietary habits and food groups, individually. In this study we had categorized 5 groups of food based on FODMAP concept and local food contents of Bangladeshi main meal; (1) Carbohydrate rich food item mainly rice, potato and wheat-based bakery product, (2) milk and dairy product, (3) sweet item that contains sugar, honey and artificial sweetener, (4) food from plant sources that contains fruits, vegetables and (5) food from animal sources like fish, chicken, beef etc. The more offending diet is milk and milk-based diet, cereal-based foods (wheat based) prepared in bakery (breads, biscuits, cakes etc.), vegetables, lentils and artificial sweetener especially saccharine and less symptom producing diet is rice, chicken and fish. Here the interesting findings are the well tolerated diet and it was rice, chicken and almost all kind of available fishes. Simple screening question to ask whether their symptoms are related with eating or not. The typical culprit foods are milk and wheat. As milk contains lactose wheat contains fructans, both of which are important for FODMAP food concept. A significant number of answered that onion and garlic of high FODMAP group has a relation of IBS symptoms. However, it is not always clear that garlic and onions are a good source for high FODMAPs diet and why they trigger IBS symptoms for many individuals.

Several population-based studies have shown that Body Mass Index (BMI) was associated with gastrointestinal symptoms of IBS. But in our studies, it is shown that 65% patients BMI was normal and there is no significant difference of BMI between healthy and IBS patient group. These findings were explained by Sadik et al., where they found that overweight patients had severe defecation symptoms specially increases urgency, consistency and frequency of loose stools and faster colonic and recto-sigmoidal transit than normal BMI healthy persons. Although BMI of subjects with IBS was significantly lower than that of controls, only IBS-D patients showed significant but a weak association with lower BMI after a multiple-adjusted model. The reason of the discrepancy between our study and the abovementioned study is unclear. Psychological impact mainly anxiety and depression were related with IBS symptoms.

Psychological co-morbidities are associated with symptoms exacerbation and psychological therapies are non-pharmacological treatment option for IBS. In our study we have found that anxiety measured by Hospital anxiety and depression scale was increased in IBS group than in healthy non-IBS group [42]. Depression is also a problem. Smoking has a crucial role on symptom exacerbation. Smoking decreases lower esophageal sphincter pressure that ultimately affects esophageal defensive mechanisms such as reduction of esophageal clearance and saliva secretion and increases acid and pepsinogen release that ultimately delays gastric emptying. Another effect of smoking on intestine is relaxation of colonic smooth muscles and increases intestinal permeability. The precise mechanisms of cigarette smoking associated with disease overlaps are unknown. A large epidemiological study showed that smoking was also associated with anxiety that is a risk factor of developing of IBS. IBS patient passes more stressful life and in every steps of their life stress has an important role on disease presentation. It impacts on their social, sexual and family life. Reduce work performance and life enjoyment; ultimately reduce the quality of life. It increases the treatment cost but hamper treatment outcome.

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