RESEARCH PAPER

Prevalence of Irritable Bowel Syndrome: A Comparison Between Rural and Urban Setting in Bangladesh

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Abstract

Background: Irritable bowel syndrome (IBS) is a common gastrointestinal disorder. The prevalence of irritable bowel syndrome (IBS) varies from 4% to 20% in different Asian nations.

Objective: This community-based study was aimed to find out the prevalence of IBS in rural and urban setting in Bangladesh using Rome-III criteria.

Methods: This cross-sectional study was conducted with 3500 respondents aged 18 years and above in both rural and urban communities of Bangladesh. The respondents were interviewed using a validated questionnaire in a door-to-door survey. A Rome III criterion was used for diagnosis of IBS. IBS was further classified as constipation predominant, diarrhoea predominant, mixed and un subtype. Statistical analysis was performed with Statistical Package for Social Sciences (SPSS), version 17.0.The level of significance was set at pd" 0.05.

Results: The study population consisted almost equal percent respondents from urban (50.1%) and rural (49.9%) community. Among the respondents, 55.06% was male and 44.94% female. Overall prevalence of IBS 7.2% (95% CI, 6.39-8.10) and majority of the participants were associated with IBS belongs to age group 31-40 years with mean age 39.9%. The prevalence of IBS-C, IBS-D, IBS-M, IBS-U were 0.48%, 1.3%, 4.6%, and 0.8% respectively. In rural setting, the prevalence of IBS was 6.5%, (95% CI, 5.46-7.78) and in urban was IBS 7.8% (95% CI, 6.71-9.23). In this study, the prevalence of IBS was higher in males i.e. 57.2% in rural and 52.9% in urban compared with 42.8% in rural and 47.1% in urban females.

Conclusion: In conclusion, the prevalence of IBS in urban 7.8% and rural 6.5% among Bangladeshi population. The result of the study suggests that IBS is a major health issue among these respective populations.

Keywords: Constipation, Diarrhoea, Irritable bowel syndrome, Rome III Criteria

Introduction

Irritable bowel syndrome (IBS) is a highly prevalent chronic functional gastrointestinal (GI) disorder (FGID) that can be continuous or remittent. The clinical phenotype is heterogeneous with various symptom combinations including abdominal pain, bloating, constipation, and diarrhea. The prevalence of IBS varies by geographic area and population, and also depends on the diagnostic criteria used.[1] Using Manning, Rome I, Rome II, or Rome III criteria, a global prevalence for IBS of 11.2% was reported.[2]

In the United States and European countries, the prevalence of IBS in the general population ranges from 9% to 22%.[3-7] The rapid social and economic development of the past 20 years has also changed health and environmental conditions in Asia. The prevalence of irritable bowel syndrome in Asian communities appears to be increasing.[8-9] Using Rome II criteria, the prevalence of IBS in Singapore (8.6%) and Japan (9.8%) are comparable to that in Australia (6.9%) and Europe (9.6%), although not as high as in Canada and the UK (12%).[10-14] In the first community survey conducted using Rome II criteria in rural Bangladesh, the prevalence of irritable bowel syndrome was 24.4%, and in the first urban community study in Bangladesh it was 7.7%.[15-16]

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Irritable bowel syndrome places an enormous burden on resource challenged healthcare systems. Medical costs for IBS patients were 50% higher than the equivalent costs for non-IBS patients. Increased costs were driven more by frequent use of medical services, including care not directly related to lower GI problems, rather than the cost of prescriptions.[17] There are significant differences between urban and rural populations in Bangladesh in terms of access to healthcare facilities, socio-cultural and environmental factors, which theoretically affect epidemiological characteristics.[16] Only 10-56% of adults with symptoms of IBS present for medical evaluation.[13] This may be related to cultural factors, the existence and degree of pain and psychological disorders, and access to medical care. Women with IBS consult their doctors more frequently than men, although extensive reviews of the literature found no such differences in rural areas of India, Sri Lanka or Bangladesh. However, both urban and rural communities in Bangladesh lack data on all aspects of IBS.

The prevalence of irritable bowel syndrome among rural and urban populations in Bangladesh, and finally discover the pattern of IBS symptoms in the general population of Bangladesh were assessed.

of IBS in Singapore (8.6%) and Japan (9.8%) are comparable to that in Australia (6.9%) and Europe (9.6%), although not as high as in Canada and the UK (12%).[9-13] The prevalence of IBS was 24.4% in the first community-based survey using Rome-II criteria in rural Bangladesh and 7.7% in first urban community study in Bangladesh.[14-15] IBS prevalence estimates vary depending on geographical locations and the use of diagnostic criteria. By using Rome-II criteria, authors reported variable prevalence of IBS in national (12.1%), urban (8.5%) and suburban (5%) surveys. Significant differences exist between urban and rural populations in Bangladesh with respect to the access to healthcare, socio-cultural, and environmental factors, which may theoretically affect epidemiological features.[15] Only 10-56% of adults with symptoms of IBS present for medical evaluation.[12] This may relate to cultural factors, the presence and degree of pain and psychological disturbances and access to health care. Women with IBS consult physicians more than men, although such differences were not found in India, Srilanka or in rural Bangladesh through extensive

literature review. Nevertheless, data on various aspects of IBS are lacking in both the urban and rural communities of Bangladesh. This study aimed to compare the prevalence of irritable bowel syndrome in rural and urban population in Bangladesh and finally to find out the pattern of symptoms of IBS in general population of Bangladesh.

Materials and Methods

This cross-sectional study was conducted in rural and urban communities in Bangladesh from July 2013 to June 2014 with technical support from the Gastroenterology department of the Shaheed Suhrawardy Medical College & Hospital, Dhaka. The rural community in this study was in Ghior, one of the largest Upzillas in the Manikganj district of Bangladesh. Ghior Upazilla is made up of seven unions, one of which is called "Poila" was selected by lottery, and there is an urban community called Dhaka Uddan of Adabor Thana in Mohammadpur, Dhaka.

The study included all apparently healthy people of any gender over the age of 18 in the regions mentioned. Respondents with functional dyspepsia or organic bowel disease were excluded from the study. People who are unwilling to participate in the study were also excluded from the study.

The sample size was calculated by the $N = Z^2 pq/d^2$, p =10% for both urban and rural population. Simple random sampling technique was used in this study. The sample of the study was 3500 respondents who fulfilled the inclusion and exclusion criteria.

Data were collected through face-to-face interviews with respondents who meet the selection criteria. This study used a standard questionnaire based on the Rome III IBS module. The English version of the questionnaire was translated into the native Bengali language by relevant professionals.

IBS was diagnosed on the basis of Rome III criteria, according to which, recurrent abdominal pain or discomfort at least 3 days per month in the last 3 months with onset of symptoms at least 6 months back was essential for suspecting IBS. In addition, to diagnose a person as IBS, the pain needed to be associated with at least 2 out of 3 features which included improvement of pain or discomfort with defecation and onset of pain or discomfort associated with a change in frequency or form of stool. IBS were

further sub-classified into diarrhea predominant IBS (IBS-D) constipation predominant IBS (IBS-C) mixed IBS (IBS-M) and un-subtype IBS (IBS-U).

Data were collected by well-trained personnel and medical officers, and supervised by the study investigators prior to the data collection. After self-introducing themselves and informing the purpose of their visit, the field investigators sought written consent from the respondents for participating in the study. First compile all the relevant data in the main graph and then use the window-based computer software designed by Social Science Statistical Software Package (SPSS-17) (SPSS Inc, Chicago, IL, USA) to perform a statistical analysis of the results. The results are presented in the form of tables, graphs and diagram. Data are expressed as frequency, percentage, average, and standard deviation. The importance of individual symptoms and combined symptoms were analyzed by applying a multivariate logistic regression model adjusted for age and sex. The result was presented as odd ratios with 95% confidence intervals. A two-sided p value less than 0.05 was regarded as statically significant, and 95% confidence intervals was computed using a logistic regression model. The consent form was ensured the right to refuse and withdraw of the participants from the study at any time and also kept confidential. Prior to conduct the study ethical clearance was taken from the ethical review committee of Bangladesh Medical Research Council (BMRC) [Ref: BMRC/Revenue-Grant/2019-20/753 (1-31)].

Results

The study population consisted of 3500 respondents, almost equal percent taken from urban (50.1%) and rural (49.9%) community. In this study, 55.0% male and 44.9% female were interviewed. The majority (29.4%) of the study respondents belonged to age group of 21 to 30 years and male to female ratio was 1.225. Nearly 80.9% of the sample population was married of which 81.4% was female and 80.5% was male. In regards to the occupation of the respondents majority was from housewives (30.0%), about 17.0% from Non-Government employees and about 16% from business and the rest 37% constituted other occupation like, industrial workers, students, drivers and day laborers. With respect to the educational background, 8.04% of the respondents were poorly educated and remaining 16.0% were highly educated (Graduate and above).

Among the respondents, 252 cases were found to be IBS positive using Rome III criteria, which given a prevalence of 7.2% (95% CI, 6.39-8.10). Majority of IBS individuals belongs to age group 31-40 years (n= 35.7%) followed by age group 21-30 years (n=21.4%) with mean age 39.9% and among them 64% are male, 36% female (figure 1 and 2).
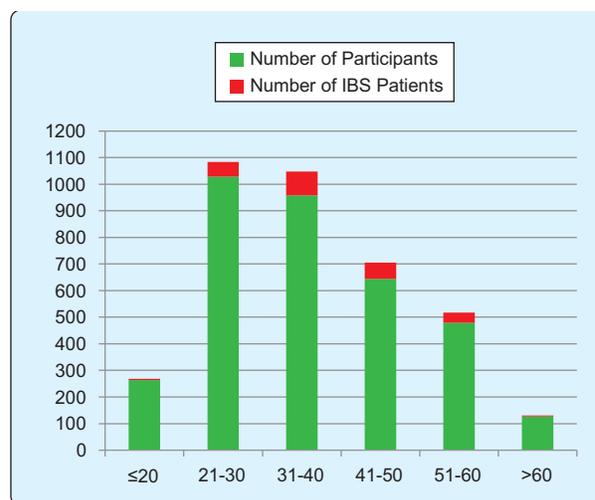
Figure 1: Age stratification of Irritable Bowel Syndrome Patients
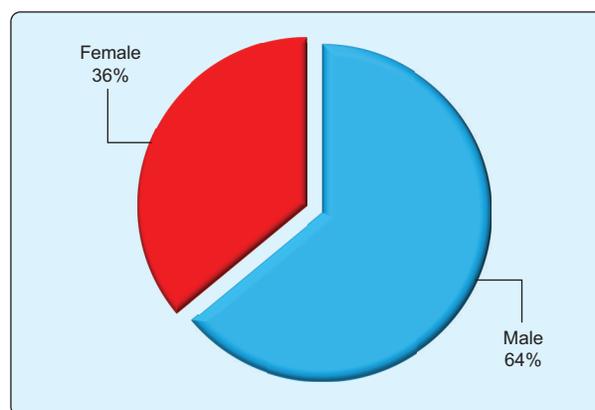
Figure 2: Sex Distribution of Demographic of Irritable Bowel Syndrome Patients

Prevalence of Sub type of Irritable Bowel Syndrome

Out of 252 IBS positive, patients were further sub-classified into IBS-D, IBS-C, IBS-M, IBS-U according to Rome III criteria. Prevalence of IBS-C was 0.48%,

(95% CI, 0.3-0.78), IBS-D 1.31%, (95% CI, 0.99-1.75), IBS-M 4.6%, (95% CI, 3.95-5.35), IBS-U 0.80% (95% CI, 0.55-1.15) (table I).

Table-I: Prevalence of IBS Subtype

Disease	Prevalence	95% CI	
IBS	7.20	6.39	8.10
Constipation	0.48	0.30	0.78
Diarrhea	1.31	0.99	1.75
Mixed	4.60	3.95	5.35
Un sub type	0.80	0.55	1.15

Prevalence of Irritable Bowel Syndrome in Urban Setting

Out of 1752 individuals screened for IBS using Rome III criteria in urban community, 138 cases were found to be IBS positive, thus giving a prevalence of 7.88%

(95% CI, 6.71-9.23). Age-wise distribution showed that majority of individuals associated with IBS belongs to age group 31-40 years (n= 32.60%) followed by age group 41-50 years (n=26.80%) (table II).

Prevalence of Irritable Bowel Syndrome in Rural Setting

Out of 1748 individuals screened for IBS using Rome III criteria in rural community 114 cases were found to be positive, thus giving a prevalence of 6.52% (95% CI, 5.46-7.78). Age-wise distribution showed that majority of individuals associated with IBS belongs to age group 31-40 years (n= 39.4%) followed by age group 21-30 years (n=22.8%) (table III).

Observations: Out of 252 IBS positive patients in this study, it was observed that highly educated and economically solvent patients are prone to develop IBS. Drinking water has no impact on IBS. Logistic regression analysis shows that highly educated persons are more prone to develop IBS. (p=.000) (table IV).

Table II: Demographic details of Irritable Bowel Syndrome Patients (Urban)

	Number of participants	Number of IBS patients	Prevalence of IBS (95% CI)
Total	1752	138	7.88 (6.71 – 9.23)
Age stratification			
≤20	125 (7.1)	2	1.60 (0.44 – 5.65)
21 - 30	546 (31.2)	28	5.13 (3.57 – 7.31)
31 - 40	480 (27.4)	45(32.6)	9.38 (7.08 – 12.31)
41 - 50	326 (18.6)	37(26.8)	11.35 (8.35 – 15.25)
51 - 60	192 (11.0)	24	12.50 (8.55 – 17.93)
>60	83 (4.7)	2	2.41 (0.66 – 8.37)
Gender (p=0.003)			
Male	927 (52.9%)	90	9.71 (7.97 – 11.78)
Female	825 (47.1%)	48	5.82 (4.42 – 7.63)

Table-III: Demographic details of Irritable Bowel Syndrome Patients (Rural)

	Number of participants	Number of IBS patients	Prevalence of IBS (95% CI)
Total	1748	114	6.52 (5.46 – 7.78)
Age stratification			
≤20	138 (7.9)	3	2.17 (0.74 – 6.20)
21 - 30	483 (27.6)	26(22.80%)	5.38 (3.70 – 7.77)
31 - 40	478 (27.3)	45(39.47%)	9.41 (7.11 – 12.37)
41 - 50	318 (18.2)	24	7.55 (5.12 – 10.98)
51 - 60	287 (16.4)	14	4.88 (2.93 – 8.02)
>60	44 (2.5)	2	4.55 (1.26 – 15.13)
Gender (p=0.258)			
Male	1000 (57.2%)	71	7.10 (5.67 – 8.86)
Female	748 (42.8%)	43	5.75 (4.30 – 7.65)

Table-IV: Risk factors of Irritable Bowel Syndrome Patients

Risk factors	Number of participants	Number of IBS patients	Prevalence of IBS (95% CI)
Economic condition (p=0.031)			
Poor	2059 (58.8%)	132	6.40 (5.43 – 7.55)
Rich	1441 (41.2%)	120	8.30 (7.01 – 9.87)
Educational status (p=0.001)			
Poorly educated	2939 (84.0%)	175	6.00 (5.15 – 6.87)
Highly educated	561 (16.0%)	77	13.70 (11.12 – 16.82)
Drinking water (p = 0.993)			
Safe	3486 (99.6%)	251	7.20 (8.97 – 11.34)
Unsafe	14 (0.4%)	1	7.10 (1.27 – 31.47)

Discussion

The global pooled prevalence of IBS has been estimated to be 11.2%[18], IBS has a significant impact on patients' quality of life due to physical suffering, psychological co-morbidity, social disability and economic non-productivity.[19,20]

It is not always easy to conduct prevalence studies in developing countries including Bangladesh. Due to the high cost, we strive to prospectively estimate the prevalence of irritable bowel syndrome in rural and urban environments in Bangladesh. In this study, 3,500 people were screened for irritable bowel syndrome using the Rome III criteria. Among them, 252 cases were positive for IBS. The overall prevalence of IBS was 7.2%. Most of the individuals related to IBS belonged to the age group of 3140 years and, followed by the age group of 2130 years, with an average age of 39.9%. The study has shown that the prevalence of IBS in rural and urban communities is 6.52% and 7.88%, respectively. Masud et al. using the Rome II criteria, the prevalence rate in rural communities in Bangladesh was reported to be 8.5%, While Irin Perveen et al. reported prevalence rate is 7.7%[15-16].

Govind K Makharia et al reported the prevalence of IBS was found to be 4% in Northern Indian rural community with the Rome III criteria while Shah et al.[21] reported a prevalence of 7.6% from Mumbai using Manning criteria; Ghoshal et al. reported a prevalence of 4.2% in their prospective multi-center study using clinical criteria.[22] Unlike previous studies, this study was conducted in a local city and rural community in Bangladesh. This study was conducted by random sampling door-to-door survey. The prevalence of IBS in the community mentioned above in is not only much

lower than that reported in Western countries, but it is also much lower than that of community studies in other Asian countries like Taiwan (22.1% by Rome II criteria), China (11.5% by Manning criteria), Singapore (8.6% by Rome II criteria), Malaysia (15.6% by Rome II criteria), Bangladesh (8.5% by Rome II criteria), Pakistan (14% by Rome II criteria), Turkey (10.2% by Rome II criteria), Korea (6.6% by Rome II criteria) and Japan (9.8% by Rome II criteria).[9,23-30]

It is difficult to estimate the true prevalence of IBS because it is known to change according to the criteria used for diagnosis. The revision of the diagnostic criteria for IBS resulted in different prevalence estimates in the same population.[15,47,48] For IBS, the Rome III criteria are less restrictive and require a lower frequency of symptoms than the Rome II criteria. Likewise, the Manning and Rome I criteria have been reported to have a higher prevalence of IBS compared to the Rome II criteria.[47]

In a study involving 2,000 people from Spain, Mearin et al reported that the use of Rome II criteria (3.3%) was significantly lower than the use of Manning criteria (10.3%) and Rome I (12.1%).[47] In another study, the Rome II and Rome III comprehensive questionnaire was used to assess the prevalence of IBS in a representative sample of 1,000 adults; according to Rome II criteria, the prevalence of IBS was 2.9%, according to Rome III Standard, the prevalence of IBS is 11.4% Xiong et al. from Southern part of China reported a prevalence of IBS as 11.5% with Manning criteria and 5.6% with Rome II criteria in a population based study including 4,178 subjects.[24,49]

Recently, Park et al. from South Korea reported good agreement on the prevalence of IBS using the Rome II (8%) and Rome III (9%) criteria.[48] Some people criticized the Rome II and Rome III standards for not being suitable for Asian countries because they underestimated the prevalence of IBS that is correctly displayed in the Tehran study.[31,32] In a study involving 18,180 participants from Tehran Province, Iran, although the prevalence of functional bowel disease was 10.1%, the prevalence of IBS using Rome III criteria was only 1.1%, and the expected prevalence of IBS.[32] The disease rate is the highest. Our estimate of 4% prevalence may underestimate the prevalence of IBS.

In this prospective both urban and rural community-based study, IBS-M with alternating features of diarrhea and constipation was the most common form of IBS in Bangladesh with prevalence of 4.6% followed by IBS-D with prevalence of 1.31%. Predominance of IBS-M among IBS patients has also been reported from the United State.[34] In this study, the prevalence of IBS due to constipation was 0.49%, which may be due to higher fiber intake and faster intestinal transit time in the Indian population.[33]

In this study, the prevalence of IBS in men was higher than in women. Although in many Western countries, IBS is more common in women than men; however, no consistent differences have been observed in Asia[11,34,35] Although studies from many Asian countries such as Hong Kong, Taiwan and Singapore did not show gender differences in the prevalence of IBS. Vietnam, Malaysia and Japan report female dominance[23,26 , 36-41]. In the two previous hospital based studies from India, IBS was reported to be more common in males.[21,22] On the other hand, in a community study of non-health seekers in India, the prevalence of IBS among women and men was almost the same.[21] Since India is a male-dominated society, in research conducted in hospital settings and communities, male health-seeking behavior may be the best explanation for the difference in the prevalence of IBS.[42, 43-46]

Considering the current prevalence of IBS in our community, IBS remains an underdiagnosed gastrointestinal disorder. This may be due to poor health-seeking behavior in the community or due to the limited ability of primary health care to diagnose the condition. There are no available studies linking the severity of the illness to the health care seeking pattern of these patients. Therefore, more research is needed to study the health care seeking pattern of IBS patients in our population and assess the severity of IBS. In addition, there are no population studies on the impact of IBS on the health-related quality of life (HRQOL) in Bangladesh. The HRQL assessment of these patients can not only understand the severity of the disease, but also help optimize the treatment of IBS. The advantage of this study is that it is a large sample study based on the community. The prevalence of IBS may vary slightly between rural and urban populations.

Conclusion

The prevalence of IBS in the Bangladeshi population is 7.88% in urban areas and 6.52% in rural areas. It may be concluded that the IBS is a major health problem in Bangladesh and IBS-M is the most frequent subtype followed by IBS-D.

Acknowledgements

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