

# Prevalence and Characteristics of Irritable Bowel Syndrome (IBS) amongst Medical Students of Gilan Northern Province of Iran

F Mansour-Ghanaei\*, MS Fallah, A Heidarzadeh, R Jafarshad, F Joukar, Rezvan-Ghasemipour, M Arami, S Keyhanian, M Keyhanian

Gastrointestinal and Liver Diseases  
Research Center (GLDRC), Gilan University  
of Medical Sciences, Rasht, Iran

## ABSTRACT

### BACKGROUND

Irritable bowel syndrome (IBS) is one of the most prevalent gastrointestinal disorders characterized by non-specific symptoms such as abdominal pain and altered bowel habits with no known organic pathology. Its prevalence varies in different communities. We performed this study to determine the prevalence of IBS in medical students who attended Gilan University of Medical Sciences (GUMS).

### METHODS

Medical students of GUMS were studying during 2002 academic year were enrolled in this cross-sectional study. Within a specifically designed schedule, trained general practitioners performed student interviews. The interviewers used a structured questionnaire based on the Rome II criteria. Data were analyzed using SPSS-10 software. Results were presented as percentages and the mean±SD and level of significance was denoted as a *p*-value <0.05.

### RESULTS

This study included 422 students, 148 (35.1%) males and 274 (64.9%) females, trained in various educational levels at GUMS whose mean age was 23.7±2.9 years. The prevalence of IBS was 12.6% (53 of 422). IBS was more prevalent in females than males [15% (41 of 274) vs. 8.1% (12 of 148); *p*<0.05]. Reported a Physician 37.7% of cases visit in comparison to 17.6% of non IBS case (*p*<0.05).

### CONCLUSION

This study shows a higher prevalence of IBS in medical students than in other sections of the Iranian population. A prevalence of 12.6% in medical students, who are in an active phase of life, requires careful planning to provide alleviation.

### KEYWORDS

IBS; Prevalence; Medical; Student; Iran

### \* Corresponding Author:

Fariborz Mansour-Ghanaei, MD  
Professor of Medicine and Gastroenterology,  
Gastrointestinal and Liver Diseases Research  
Center (GLDRC), Gilan University of  
Medical Sciences, Razi Hospital, Sardar-  
Jangle Ave.,  
PO Box 41448-95655, Rasht, Iran.  
E-mail: ghanaei@gums.ac.ir  
Tel: +98 131 5535116  
Fax: +98 131 5534951  
Received: 24 November 2009  
Accepted: 1 April 2009

## INTRODUCTION

Irritable Bowel Syndrome (IBS), characterized by abdominal pain and altered bowel habits without any organic pathology.<sup>1,2</sup>

Its prevalence varies in human communities and in the majority of all studies, it is more prevalent

in females than males.<sup>3</sup>

IBS prevalence in the USA,<sup>4</sup> New Zealand<sup>4</sup> and Bangladesh<sup>5</sup> has been reported as 15%, 15% and 8.5%, respectively. IBS is a disorder of the youth with most new cases appearing prior to the age of 45.<sup>1</sup>

In the USA, one third of the patients are under the care of general practitioners and 10-15% are referred to gastroenterologists.<sup>6</sup>

Since a considerable part of the population suffers from IBS, health care costs for the management of IBS are high. In the USA, approximately 3.5 million medical visits and 2.2 million prescriptions are written as a result of IBS.<sup>3</sup> Also, in many cases, sufferers have undergone unnecessary appendectomies, hysterectomies, cholecystectomies as well as other surgical procedures due to misdiagnosis.<sup>6</sup>

It is estimated that 8 billion dollars in medical costs and 25 billion dollars for other annual expenditures are related to IBS.<sup>3</sup>

In one survey, with work loss due to IBS cases was 13.4 days vs. 4 days in the control group.<sup>6</sup>

After the common cold, IBS is the second largest cause of absenteeism in Canada.<sup>7</sup> Since there is no exact method for IBS diagnosis, Manning, Rome I, Rome II and Rome III criteria have been defined (Table 1). In one study, these three criteria were compared with each other; the results showed that the Rome II criteria are the most appropriate for research.<sup>8,9</sup>

In Iran, only two similar studies have been out in Shiraz<sup>10</sup> and Tehran<sup>11</sup> Universities of Medical Sciences. So This study was performed to determine IBS frequency in medical students of Gilan University of Medical Sciences (GUMS).

**Table 1: Comparison of irritable bowel syndrome diagnostic criteria.<sup>8,9</sup>**

<b>Manning Criteria</b>	<ul style="list-style-type: none"> <li>• Abdominal pain that is relieved after a bowel movement</li> <li>• looser stool at Pain onset</li> <li>• More frequent stools at pain onset</li> <li>• Abdominal distention (visible)</li> <li>• Sensation of incomplete rectal evacuation</li> <li>• Passage of mucus</li> </ul>
<b>Rome I Criteria</b>	<ul style="list-style-type: none"> <li>• ≥3mo of continuous or recurrent symptoms of abdominal pain or discomfort relieved with defecation or associated with change in frequency or consistency of stool and</li> <li>• Disturbed defecation (≥2 of the following):                             <ul style="list-style-type: none"> <li>- Altered stool frequency</li> <li>- Altered stool from (hard or loose/watery)</li> <li>- Altered stool passage (straining or urgency, feeling of incomplete evacuation)</li> <li>- Passage of mucus</li> <li>- Bloating or feeling of abdominal distention</li> </ul> </li> </ul>
<b>Rome II Criteria</b>	<ul style="list-style-type: none"> <li>• At least 12 weeks, which need not be consecutive, in the preceding 12 months, of abdominal discomfort or pain that has 2 of 3 of the following:                             <ul style="list-style-type: none"> <li>• Relieved with defecation</li> <li>• Onset associated with a change in frequency of stool</li> <li>• Onset associated with a change in form (appearance) of stool</li> </ul> </li> </ul>
<b>Rome III Criteria</b>	<ul style="list-style-type: none"> <li>• Recurrent abdominal pain or discomfort at least 3 days per month in the last 3 months associated with 2 or more of the following:                             <ol style="list-style-type: none"> <li>(1) Improvement with defecation</li> <li>(2) Onset associated with a change in frequency of stool</li> <li>(3) Onset associated with a change in form (appearance) of stool</li> </ol> </li> </ul>

## MATERIALS AND METHODS

In this cross-sectional study, which was approved by the Research Ethics Committee of Gilan University, all medical students of GUMS were enrolled after signing an approved informed consent.

The objectives of the study were explained to the students in details. Students were interviewed by trained general practitioners using a questionnaire based on the Rome II criteria. The questionnaire included two parts that pertained to demographics

questions, as well as their symptoms and the presence of co-existent diseases.

The IBS diagnosis was determined based on positive Rome II criteria with the exclusion of warning symptoms such as: rectal bleeding, weight loss, continual diarrhea, constant and recent distension, anemia and fever. In this study, defecation greater than three times per day was considered as diarrhea and defecation less than three times weekly was considered as constipation.<sup>4</sup>

Data were analyzed by Chi-Square and independent t-tests using SPSS-10 software (Version 11.5, Chicago, IL, USA). Results were presented as percentages and means±SD. Level of significance was denoted as a *p*-value < 0.05.

## RESULTS

422 of the 485 medical students (87%) studying at various levels in GUMS took part in the study. 274 (64.9%) were female. Their mean age was 23.7 ± 2.9 year. 224 (53.1%) of them lived with their family, 157 (37.2%) in student dormitories and 40 (9.5%) in rented houses. 39 (9.2%) of the students were mar-

ried, the remainder (383; 90.8%) were single.

The prevalence of IBS in medical students attending GUMS was 12.6% (53 of 422). It was 15% (41 of 274) and 8.1% (12 of 148) in females and males respectively.

The difference was statistically significant (*p*<0.05). The mean age of the observed IBS cases was 23±3 years, which was not statistically significant when compared to non-IBS cases. The mean academic educational period for IBS cases was 3.9±2.3 years vs. 4.7±2.2 years in non-IBS cases (*p*<0.05). Further data relevant to IBS is presented in Tables 2 and 3.

**Table 2: Features of abdominal symptoms in IBS cases.**

Features	Frequency (n=53)
<b>1. Abdominal pain</b>	<b>53 (100%)</b>
Epigastric pain	10 (18.9 %)
Periumbilical pain	14 (26.4%)
Suprapubic pain	9 (17%)
Left lower quadrant pain	8 (15.1%)
Left upper quadrant pain	7 (13.2%)
Pain in alternative areas	5 (9.4%)
<b>2. Change in bowel habit</b>	<b>53 (100%)</b>
Constipation predominant	5 (9.4%)
Diarrhea predominant	6 (11.3%)
Alternating constipation and diarrhea	4 (7.5%)
Change in stool form	38 (71.7%)
<b>3. Visiting a physician</b>	<b>20 (37.7%)</b>

## DISCUSSION

IBS is the most prevalent chronic gastrointestinal disorder.<sup>12,13</sup> Different epidemiologic studies have estimated IBS prevalence in a wide range. IBS is more prevalent in western than eastern communities.<sup>14-18</sup> The prevalence is 4.7% in France,<sup>17</sup> 10-20% in New Zealand<sup>16</sup> and Denmark<sup>16</sup> and 3-20% in the north of America.<sup>18</sup> It's prevalence in Singapore,<sup>19</sup> Bangladesh,<sup>5</sup> Thailand,<sup>20</sup> and Hong Kong<sup>21,22</sup> was 3.2%, 8.5%, 4.4% and 6.6%, respectively.

Also, in Iran, some studies have been carried out in this regard. Pourshams et al. have studied two different communities: blood donors and Tehran University students. The IBS prevalence based on the Rome I criteria was 5.8% and 4.2%, respectively.<sup>11</sup>

**Table 3: Comparison of characteristics and abdominal symptoms between IBS and non-IBS cases.**

	IBS (n=53)	Non-IBS (n=369)	<i>p</i> -value
Age (mean years)	23±3	23.8±2.9	N.S
Academic educational years	3.9±2.3	4.7±2.2	<0.05
Distance from family (Not living with family)	32 (60.4%)	166 (45%)	<0.05
Married	5 (9.4 %)	34 (9.2 %)	N.S
Visiting a physician	20 (37.7%)	65 (17.6%)	<0.05
Abdominal pain	53 (100%)	211 (58%)	<0.05
Abdominal pain in the past 12 months	53 (100%)	172 (46.6%)	<0.05
Abdominal pain for more than 3 months	53 (100%)	41 (11.1%)	<0.05
Awakening from sleep with abdominal pain	11 (20.8%)	33 (8.9%)	<0.05
Nausea with abdominal pain	16 (30.2%)	40 (10.8%)	<0.05
Vomiting with abdominal pain	6 (11.3%)	11 (3%)	<0.05
Feeling of incomplete evacuation	40 (75.5%)	79 (21.4 %)	<0.05
Relieved abdominal pain after defecation	40 (75.5%)	75 (20.3%)	<0.05
Gastroenteritis in the recent 6 months	15 (28.3%)	42 (11.4%)	<0.05
Abdominal pain related to stressful conditions	46 (86.8%)	146 (39.6%)	<0.05
Abdominal pain related to eating	24 (45.3%)	96 (26%)	<0.05
Increased pain with eating	21 (39.6%)	61 (16.5 %)	<0.05

Massarrat et al. studied the prevalence of IBS in two Iranian communities with different lifestyles: industrial workers and pastoral nomads. The figures were 3.1% and 3.6%, respectively.<sup>23</sup> In one study by Bagheri-Lankarani et al., 16.4% of the medical students at Shiraz University of Medical Sciences had IBS as determined by the Manning criteria.<sup>10</sup>

In our study, the prevalence of IBS in medical students of GUMS was 12.6%. In Iran, like other eastern and western communities, IBS prevalence apparently has a wide range probably because of the various criteria (Manning, Rome I, Rome II) used in diagnosis.<sup>24,25</sup> There is no gold standard for IBS diagnosis.<sup>18</sup>

In one New Zealand study, IBS prevalence was measured based on four different criteria which included Manning 2 (two or more Manning criteria), Manning 3 (three or more Manning criteria), Rome I and Rome II. Frequencies of 16.2%, 9.7%, 5.5% and 5.1%, respectively were reported.<sup>26</sup>

Of course, the structure of the target population (healthy individuals, gastrointestinal-involved or non-gastrointestinal-involved patients) impact the results.<sup>16</sup> Overall surveys show that reported IBS prevalence in Iran, as in other eastern countries, is lower than western countries.<sup>27</sup>

Of note, IBS prevalence in our study was higher than in other Asian and Iranian studies (12.6% vs. 3-5%). Only the Bagheri-Lankarani et al. study<sup>10</sup>, which used the Manning criteria which detects more patients than the Rome II criteria, have reported a higher frequency. The difference between our results and others can be explained, at least partially, by two reasons.

Firstly, our target population was young (mean age, 23.7±2.9 years) which IBS is a disorder of youth that often occurs prior to age 45 years.<sup>1</sup>

The second may be due to the enormous stress of medical student life. It has been known for some time that difficult and stressful situations can develop and progress IBS symptoms.<sup>6</sup> Many surveys have shown that IBS cases or patients with other gastrointestinal disorders have experienced stressful situations before the development or acceleration of intestinal symptoms. These stresses include divorce, severe disease, interpersonal and occupational problems,

loss of a parent, long wakefulness, etc.<sup>28</sup> Medical students are under more constant stress than the general population. The length of time it takes to complete their studies, numerous exams, difficult shifts, and the responsibility of patient management on the other hand many students also live far from their families. The role of stress can partly justify the high prevalence of IBS seen in medical students.

In our study, IBS was more prevalent in junior than in senior students. Initial surveys had suggested that IBS symptoms reduce or disappear after the relief of major stresses, whereas new studies suggest that continuous improvement will be only gained after the acquisition of effective skills to combat stress.<sup>28,29</sup> Accordingly, the lower IBS prevalence in higher grades can be due to the students' adaptation to difficult conditions.

Therefore, it is important for junior students to learn how to manage stress. The addition of medical treatment to psychotherapy will be more effective in combating both the psychiatric and intestinal symptoms of IBS cases.<sup>29,30</sup> In most studies, IBS prevalence in females is higher than in males.<sup>15,21</sup> In one study on 31-40 year-old subjects, IBS prevalence in males and females was 5-6.6% and 10.5-12.9%, respectively.<sup>31</sup> It was believed to be an artifact of the epidemiologic study design since females consult physicians more frequently than males.<sup>3</sup> In our study which was conducted on apparently healthy subjects, a higher prevalence in females was also seen.

In comparison with the Pourshams et al. study,<sup>11</sup> we also found no significant relationship between age and IBS prevalence. However, in both studies there was a limited age range, thus comparison of IBS prevalence amongst different age groups was not possible. In our study, which was similar to a study performed in Bangladesh,<sup>5</sup> there were no significant differences among IBS sub-groups (diarrhea-predominant, constipation-predominant or intermittent constipation and diarrhea) which may be due to the effect of the small sample size, but in other studies, the diarrhea-predominant subgroup was more prevalent.<sup>10,32</sup> Only a small proportion of IBS cases consulted physicians.

We found that approximately 37.7% of our IBS cases had previously visited their physicians. This was similar to Masud's study in Bangladesh.<sup>5</sup>

Many studies have shown no significant difference between male and female physician referrals<sup>5,33,34</sup> but in some studies in India and Sierra Leone, men had consulted physicians more frequently than women. Certainly, people approach BS in various ways, which is dependent upon gender and culture, to name a few.<sup>4,35</sup> This study shows a higher IBS prevalence in medical students than other sections of the Iranian population.

The Prevalence of IBS symptoms in this study is more than the figures reported in previous Iranian

studies. A prevalence of 12.6% in students in this active educational phase of their lives necessitates more planning to alleviate this distressing condition.

## ACKNOWLEDGMENTS

This research was carried out with a grant from the Vice-Chancellor of Research Affairs at GUMS. We express our sincere thanks to Soheila Nematdoost, Nasim Masoud Nia, Raheleh Ziaratban, Aida Ale-Esmail and Maryam Hoseinzadeh for their help in performing the study and preparing the manuscript.

## CONFLICT OF INTEREST

None declared.

## REFERENCES

- Drossman DA, Camilleri M, Mayer EA, Whitehead WE. AGA technical review on irritable bowel syndrome. *Gastroenterology* 2002;**123**(6):2108-31.
- Portincasa P, Moschetta A, Baldassarre G, Altomare DF, Palasciano G. Pan-enteric dysmotility, impaired quality of life and alexithymia in a large group of patients meeting ROME (Rome?) II criteria for irritable bowel syndrome. *World J Gastroenterol* 2003;**9**(10):2293-9.
- Horwitz BJ, Fisher RS. The irritable bowel syndrome. *N Engl J Med* 2001;**344**(24):1846-50.
- Porcelli P. Psychological abnormalities in patients with irritable bowel syndrome. *Indian J Gastroenterol* 2004;**23**(2):63-9.
- Masud MA, Hasan M, Khan AK. Irritable bowel syndrome in a rural community in Bangladesh: prevalence, symptoms pattern, and health care seeking behavior. *Am J Gastroenterol* 2001;**96**(5):1547-52.
- Rothstein RD. Irritable bowel syndrome. *Med Clin North Am* 2000;**84**(5):1247-57.
- Vanner SJ, Depew WT, Paterson WG, DaCosta LR, Groll AG, Simon JB, et al. Predictive value of the Rome criteria for diagnosing the irritable bowel syndrome. *Am J Gastroenterol* 1999;**94**(10):2912-7.
- Boyce PM, Koloski NA, Talley NJ. Irritable bowel syndrome according to varying diagnostic criteria: are the new Rome II criteria unnecessarily restrictive for research and practice?. *Am J Gastroenterol* 2000;**95**(11):3176-83.
- Saito YA, Locke GR, Talley NJ, Zinsmeister AR, Fett SL, Melton LJ 3rd. A comparison of the Rome and Manning criteria for case identification in epidemiological investigations of irritable bowel syndrome. *Am J Gastroenterol* 2000;**95**(10):2816-24.
- Bagheri-Lankarani K, Kodjori J, Agah S, Taghavi SA, Rodgari A, Afrokhteh S. Irritable bowel syndrome: clinical manifestations and relation to lactase deficiency. *Iran J Med Sci* 1997;**22**(1):20-5.
- Purshams A. Evaluation of IBS frequency and gastrointestinal reflux in two Iranian populations. *J GUMS* [in press].
- Wilson S, Roberts L, Roalfe A, Bridge P, Singh S. Prevalence of irritable bowel syndrome: a community survey. *Br J Gen Pract* 2004;**54**(504):495-502.
- Yuan YZ, Tao RJ, Xu B, Sun J, Chen KM, Miao F, et al. Functional brain imaging in irritable bowel syndrome with rectal balloon-distention by using fMRI. *World J Gastroenterol* 2003;**9**(6):1356-60.
- Longstreth GF, Hawkey CJ, Mayer EA, Jones RH, Naesdal J, Wilson IK, et al. Characteristics of patients with irritable bowel syndrome recruited from three sources: implications for clinical trials. *Aliment Pharmacol Ther* 2001;**15**(7):959-64.
- Mearin F, Badia X, Balboa A, Baro E, Caldwell E, Cucala M, et al. Irritable bowel syndrome prevalence varies enormously depending on the employed diagnostic criteria: comparison of Rome II versus previous criteria in a general population. *Scand J Gastroenterol* 2001;**36**(11):1155-61.
- Murphy PA. Prevalence and characteristics of irritable bowel syndrome among women with chronic pelvic pain. *J Midwifery Women's Health* 2005;**50**(1):58-9.
- Dapoigny M, Bellanger J, Bonaz B, Bruley des Varannes S, Bueno L, Coffin B, et al. Irritable bowel syndrome in France: a common, debilitating and costly disorder. *Eur J Gastroenterol Hepatol* 2004;**16**(10):995-1001.
- Saito YA, Schoenfeld P, Locke GR. The epidemiology of irritable bowel syndrome in North America: a systematic review. *Am J Gastroenterol* 2002;**97**(8):1910-5.
- Chen LY, Ho KY, Phua KH. Normal bowel habits and prevalence of functional bowel disorders in Singaporean adults-findings from a community-based study in Bishan. Community Medicine GI Study Group. *Singapore Med J* 2000;**41**(6):255-8.



105 **IBS Prevalence and Characteristics in Medical Students**

20. Danivat D, Tankeyoon M, Sriratanaban A. Prevalence of irritable bowel syndrome in a non-Western population. *Br Med J (Clin Res Ed)* 1988;**296(6638)**:1710.
21. Kwan AC, Hu WH, Chan YK, Yeung YW, Lai TS, Yuen H. Prevalence of irritable bowel syndrome in Hong Kong. *J Gastroenterol Hepatol* 2002;**17(11)**:1180-6.
22. Lau EM, Chan FK, Ziea ET, Chan CS, Wu JC, Sung JJ. Epidemiology of irritable bowel syndrome in Chinese. *Dig Dis Sci* 2002;**47(11)**:2621-4.
23. Massarrat S, Saberi-Firoozi M, Soleimani A, Himmelmann GW, Hitzges M, Keshavarz H. Peptic ulcer disease, irritable bowel syndrome and constipation in two populations in Iran. *Eur J Gastroenterol Hepatol* 1995;**7(5)**:427-33.
24. Bommelaer G, Poynard T, Le Pen C, Gaudin AF, Maurel F, Priol G, et al. Prevalence of irritable bowel syndrome (IBS) and variability of diagnostic criteria. *Gastroenterol Clin Biol* 2004;**28(6-7 Pt 1)**:554-61.
25. Hoseini-Asl MK, Amra B. Prevalence of irritable bowel syndrome in Shahrekord, Iran. *Indian J Gastroenterol* 2003;**22(6)**:215-6.
26. Hillia MT, Farkkila MA. Prevalence of irritable bowel syndrome according to different diagnostic criteria in non selected adult population. *Aliment Pharmacol Ther* 2004;**20(3)**:339-45.
27. Celebi S, Acik Y, Deveci SE, Bahcecioglu IH, Ayar A, Demir A, et al. Epidemiological features of irritable bowel syndrome in a Turkish urban society. *J Gastroenterol Hepatol* 2004;**19(7)**:738-43.
28. Tan YM, Goh KL, Muhidayah R, Ooi CL, Salem O. Prevalence of irritable bowel syndrome in young adult Malaysians: a survey among medical students. *J Gastroenterol Hepatol* 2003;**18(12)**:1412-6.
29. Heymann-Monnikes I, Arnold R, Florin I, Herda C, Melfsen S, Monnikes H. The combination of medical treatment plus multicomponent behavioral therapy in superior to medical treatment alone in the therapy of irritable bowel syndrome. *Am J Gastroenterol* 2000;**95(4)**:981-94.
30. Torii A, Toda G. Management of irritable bowel syndrome. *Intern Med* 2004;**43(5)**:353-9.
31. Ehlin AG, Montgomery SM, Ekblom A, Pounder RE, Wakefield AJ. Prevalence of gastrointestinal diseases in two British national birth cohorts. *Gut* 2003;**52(8)**:1117-21.
32. Si JM, Wang LJ, Chen SJ, Sun LM, Dai N. Irritable bowel syndrome consulters in Zhejiang province: the symptoms pattern, predominant bowel habit subgroups and quality of life. *World J Gastroenterol* 2004;**10(7)**:1059-64.
33. Van der Horst HE, Van Dulmen AM, Schellevis FG, Van Eijk JT, Fennis JF, Bleijenberg G. Do patients with irritable bowel syndrome in primary care really differ from outpatients with irritable bowel syndrome?. *Gut* 1997;**41(5)**:669-74.
34. Ghannadi K, Emami R, Bashashati M, Tarrahi MJ, Attarian S. Irritable bowel syndrome: an epidemiological study from the west of Iran. *Indian J Gastroenterol* 2005;**24(5)**:225-6.
35. Jain AP, Gupta OP, Jajoo UN, Sidhwa HK. Clinical profile of irritable bowel syndrome at a rural based teaching hospital in central India. *J Assoc Physicians India* 1991;**39(5)**:385-6.