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Irritable Bowel Syndrome: a Population Based Study

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Abstract

Background: The prevalence of irritable bowel syndrome (IBS) is relatively high, but up to now, no population based study in Iran has used the ROME III criteria. The aim of the present study was to determine the prevalence of IBS by using the ROME III criteria in the adult population of Iran. Methods: A face to face survey was conducted in a large area of the Tehran province. IBS was diagnosed by using a validated questionnaire based on the ROME III criteria. Results: The study population comprised 18,180 participants, with a female to male ratio of 1.15.3% of participants complained of gastrointestinal (GI) symptoms, while the prevalence of IBS was estimated to be 1.1% (139 women, 59 men, p=0.000). IBS patients were more likely to be married, and older. The most common presenting symptoms of IBS were abdominal pain that was relieved by defecation (94%), change in fecal consistency (78%), and change in bowel frequency (70%). Constipation was predominant in 52% of IBS cases, diarrhea was predominant in 18%, and 8% experienced intermittent diarrhea and constipation. Conclusion: The prevalence of IBS is relatively low in the Iranian adult population according to the ROME III criteria. The most probable reasons are the specificity of ROME III criteria and the characteristic low prevalence of GI symptoms in the study population.

Key words

Epidemiology – irritable bowel syndrome – prevalence – Iran – ROME III.

Introduction

Functional bowel disorders, and among them irritable bowel syndrome (IBS), are now recognized as common chronic bowel disorders that influence 5 to 25 per cent of populations [1-5]. Because of the absence of any certain diagnostic clinical or paraclinical tests for this category of disease [6], the diagnosis mainly relies on criteria on which there is an almost unanimous consensus [6-9].

But the fact is that diagnostic criteria for IBS have not been fully established yet, and new sets of criteria are in the process of being proposed facing the shortcomings of previous ones [8, 10, 11]. In addition, each set of these criteria is mainly designed to meet the cultural characteristics and diagnostic needs of its population of origin, mainly the western world, and may not be accurately applicable otherwise [10, 12]. However, concordance among different IBS criteria is a matter of uncertainty even in the western world [13, 14].

Up till now, non-western countries have used western criteria for diagnosing IBS [7, 15] which are not validated for the culture and language of destination country. Different studies in South Asia and the Middle East have addressed the lack of standardized and validated criteria as the biggest limitation and cause of controversy of IBS studies in these countries [10, 16-18].

It is worth noting that the few pioneer epidemiologic studies regarding IBS in South Asia [10, 19-26] and the Middle East [16, 17, 27] have yielded controversial results which is more prominent in terms of prevalence and gender distribution [19, 28, 29]. The diagnostic overlap of IBS with other functional bowel disorders [30], use of different sets of criteria [10, 13, 20, 21, 29, 31], small target population size [17] and racial differences [29] are deemed to be other important causes of these controversies.

Aiming to address the emergent need for large scale epidemiologic studies on IBS in Iran, this study was designed and directed at a target population of about one-seventh of the Iranian population. We also aspired to develop a validated version of ROME III criteria in the Persian language in order to provide an available diagnostic tool for the country’s health system and to make a reference point for comparison in future studies.
Material and Methods

In order to conduct an overview of the IBS in Iran, this community-based study was carried out in the Tehran province from May 2006 to December 2007. The area in which this study was carried out contains about 10 million people. The irony is that being small in surface area, this part of Iran is the residence area of about one seventh of the Iranian population. Four cities plus a small part of Tehran (including country sides and rural areas) were included. Collecting data regarding the population of this area, and random selection were carried out in the “National Registry System” of Iran and recruitment of participants were totally based upon national postal codes, and national ID numbers. 19,200 adult persons out of 10,000 000 residents of this area were randomly selected, of whom 18,180 persons gave their consent to be finally interviewed (response rate 94%); this equals to 0.18% of the study population and 0.0259% of the Iranian population. It merits mentioning that in the study area, the limit of childhood is assigned by legal, social and health services to be 15 years. So the same cutoff point is used in this study and the adult population is defined as persons with the age of 16 or above.

The sampled population was interviewed by trained health care workers in their own residences. Informed consent was taken from all participants, and anonymity was guaranteed. The research protocol was approved by the Ethics Committee of the Research Institute for Gastroenterology and Liver Diseases, Shaheed Beheshti University M.C.

Data regarding the gender, age, weight, height, and level of education were recorded from every participant in the first place. In addition, participants were informed and asked about 11 gastrointestinal (GI) symptoms including abdominal pain/discomfort, constipation, diarrhea, bloating, heartburn/acid regurgitation, proctalgia, nausea/vomiting, fecal incontinence, bloody or black stool (melena), anorexia/weight loss, and difficulty of swallowing.

Adult participants who reported any of the above symptoms were referred to assigned physicians in the vicinity to be questioned about symptoms of IBS according to the ROME III criteria. The assigned physicians used a standardized Persian questionnaire that contained questions about GI symptoms on the basis of ROME III criteria. This questionnaire was translated into Persian from the official ROME III questionnaire. The accuracy of translation was controlled by several courses of translation to Persian, and reverse translation to English procedures.

The validity and reliability of the Persian questionnaire was tested in advance in a pilot study on 400 participants from city of Damavand. For validity study, the language, content, concurrence, and construct validities were examined. The test–retest reliability was good and the Cronbach alpha coefficient values were above 0.7 for all of the major symptoms included in the tool. Minor translational corrections, however, were made regarding some symptoms. During these corrections, some formal Persian expressions were replaced by informal expressions to preserve the intelligibility of the questionnaire especially in rural areas.

Associated two or more of the following symptoms with recurrent abdominal pain or discomfort in at least 3 days/month in last 3 months were considered IBS (criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis): 1) improvement with defecation; 2) onset associated with a change in frequency of stool; 3) onset associated with a change in form (consistency) of stool.

Statistical analysis comprised X² test for univariate analysis and independent sample t-test for normally distributed continuous variables. Odds ratios (OR) with 95% confidence intervals were computed by using Statistical Package for Social Sciences (SPSS Inc. Ver.15).

Results

A total of 18,180 representative individuals were interviewed, of whom half were male and half were female. The majority of the study population were married and an overwhelming majority were educated less than high school diploma (Table I). The mean age was 38.7±17.1 years and the median was 36 years. 2,790 persons (15.3%) complained of GI symptoms and were questioned according to the ROME III criteria.

One hundred and ninety-eight persons (1.1%) were found to have IBS, of which 139 were female and 59 were male. The prevalence of IBS was higher in women than men. The age and gender distribution of the study population and IBS patients are shown in Table I.

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Table I. Demographic characteristics of the study population and IBS patients

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Number in study population</th>
<th>Number in IBS patients</th>
<th>OR*</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9108</td>
<td>59</td>
<td>0.65</td>
<td>0.5</td>
</tr>
<tr>
<td>Female</td>
<td>9072</td>
<td>139</td>
<td>1.53</td>
<td>1.3</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>7389</td>
<td>44</td>
<td>0.6</td>
<td>0.45</td>
</tr>
<tr>
<td>30-45</td>
<td>5038</td>
<td>65</td>
<td>1.29</td>
<td>1.01</td>
</tr>
<tr>
<td>&gt;45</td>
<td>5753</td>
<td>89</td>
<td>1.55</td>
<td>1.26</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single + widowed + divorced</td>
<td>6418</td>
<td>31</td>
<td>0.48</td>
<td>0.34</td>
</tr>
<tr>
<td>Married</td>
<td>11762</td>
<td>166</td>
<td>1.41</td>
<td>1.21</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary or lower diploma</td>
<td>3910</td>
<td>50</td>
<td>1.28</td>
<td>0.97</td>
</tr>
<tr>
<td>Lower diploma</td>
<td>5950</td>
<td>65</td>
<td>1.09</td>
<td>0.86</td>
</tr>
<tr>
<td>Diploma</td>
<td>5040</td>
<td>52</td>
<td>1.03</td>
<td>0.79</td>
</tr>
<tr>
<td>Upper diploma</td>
<td>2840</td>
<td>27</td>
<td>0.95</td>
<td>0.65</td>
</tr>
<tr>
<td>University</td>
<td>440</td>
<td>6</td>
<td>0.91</td>
<td>0.35</td>
</tr>
</tbody>
</table>

*OR: odds ratio
men (1.5% Vs. 0.6%, p=0.000). Data also indicated that, in comparison to male IBS patients, a larger proportion of female patients had a body mass index score above 25 (64% Vs. 48%, p=0.049).

Forty-four IBS patients (22%) were younger than 30 years, 65 were aged between 30 and 45, and 89 more than 45 years (p=0.000). Currently married people were more likely to have IBS than single, widowed, or divorced ones (1.4% Vs. 0.5%, p=0.000). We could find no relationship between the prevalence of IBS and the education level. In comparison to the rest of symptomatic participants, IBS patients were more likely to have experienced a catastrophic event in their past (Table II).

Table II. Positive history of catastrophic events in IBS patients versus non IBS symptomatic patients

<table>
<thead>
<tr>
<th>Event</th>
<th>IBS Symptomatic</th>
<th>Non IBS Symptomatic</th>
<th>OR*</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death of a close relative</td>
<td>27.7%</td>
<td>18.1%</td>
<td>1.738</td>
<td>1.220 - 2.477</td>
</tr>
<tr>
<td>Car accident</td>
<td>10.8%</td>
<td>4.7%</td>
<td>2.482</td>
<td>1.472 - 4.183</td>
</tr>
<tr>
<td>Bankruptcy</td>
<td>12.7%</td>
<td>6.9%</td>
<td>1.951</td>
<td>1.204 - 3.159</td>
</tr>
<tr>
<td>Severe disease</td>
<td>10.2%</td>
<td>7.1%</td>
<td>1.501</td>
<td>0.889 - 2.534</td>
</tr>
</tbody>
</table>

*OR: odds ratio

One hundred and eighty-six IBS patients (94%) had abdominal discomfort or pain that was relieved by defecation. The pain was periumbilical in about half of the IBS patients: 79 patients had epigastric and 37 had hypogastric pain. The least likely sites of pain were left upper (6%) and right upper quadrants (3%), respectively. Only 7% of IBS patients had experienced generalized abdominal pain.

The next most frequent presenting symptom, after the abdominal pain, was changes in the fecal consistency (78%), followed by changes in the bowel frequency (70%). Constipation was predominant in 52% of IBS cases, diarrhea was predominant in 18%, and 8% experienced intermittent diarrhea and constipation. Sixty-one per cent of IBS patients also experienced bloating, 55% had heartburn, anal pain occurred in 25%, weight loss in 17%, nausea/vomiting in 15%, bloody stools in 10%, and dysphagia in 8%.

Prevalence of different symptoms showed diversities according to the patients’ gender. For example, both diarrhea and constipation were more prevalent in male patients, and females were more likely to complain about abdominal pain that was relieved by defecation and anal pain (Table III). Data also indicated that 78% of IBS patients also fulfilled the criteria of functional dyspepsia, while functional dyspepsia comprised 58% of non-IBS symptomatic patients (p=0.000, OR=2.605, 95% CI: 1.784-3.804).

Discussion

Using a translated and validated version of ROME III criteria and being undertaken on a large scale, this population based study was unique in taking measures to depict a reliable picture of IBS in Iran and making a comparison point for future studies. But, like many other studies that tackle functional GI disorders, this study faced a major obstacle: the bias generated by the ambiguous nature of the disease.

In this study, as in other studies on IBS, the estimation of IBS prevalence was highly dependent on the diagnostic criteria employed [18] and the study population [17, 32]. The minimum required time for diagnosis is decreased to 3 months in the ROME III criteria (in comparison to 12 months in ROME II) [30]. This can facilitate the diagnosis of IBS according to this set of criteria; but controversially, it can also rule out IBS in a large number of patients who experience the waxing and waning of symptoms [14, 32]. So, there is the possibility that strict adherence to the ROME III criteria might have led to the low estimation of IBS in this study.

On the contrary, there is an almost unanimous consensus, that the ROME III criteria have provided more sensitivity and less restrictiveness in comparison to previous sets of criteria [33]. The fact is that the evolution of IBS criteria from Manning’s to the ROME I, II has yielded more restrictiveness and less restrictiveness in comparison to previous sets of criteria [11-14, 18], but this does not hold true for ROME III [33]. Therefore, we think that the source of low estimation, or prevalence, of IBS in this study should be sought somewhere other than the criteria employed.

In the present study, the data collection tool was translated carefully from its English version and was standardized during a pilot study. However, difficulties in the employment of ROME III criteria were observed especially in suburban areas and rural primary care centers; because, symptoms could be underestimated by patients and complicated questions were still confusing and prone to misinterpretation. In addition, it was difficult for anyone to
recall certain patterns of symptoms exactly. So, except for very severe or frequent symptoms, others were likely to be missed by recall bias.

The demographic characteristics of the Iranian population should have influenced the results of this study to a large extent. As mentioned earlier, 2,790 persons out of the total of 18,180 participants in this study (15.3%) reported GI symptoms, which was very close to the prevalence of 14.3% of GI symptoms reported by a recent population based study in Iran [34]. The general prevalence of GI symptoms in these two Iranian studies is comparable to the prevalence of IBS in some other countries [1, 23, 29, 36]. So, given the low rate of GI symptoms, a low prevalence of IBS was expected in this study, regardless of the diagnostic criteria employed. However, according to the subjective nature of GI symptoms and abdominal pain, the lower self report of these symptoms evokes the notion of a higher pain threshold in the study area, but does not exclude the high prevalence of organic GI diseases. Yet IBS can be excluded to a large extent because the diagnosis relies completely on self reported symptoms [1].

In addition, the sampled population was on average quite young, which given the higher prevalence of IBS in the elderly, might have led to a low prevalence in the general population. Moreover, it is worth noting that our study population mainly comprised small cities in which, as in rural areas, the economy is still dependent on agriculture and animal husbandry instead of clerical and social services. So, lifestyle characteristics including high fiber intake [38] and a minimum of everyday physical activity [39] were other probable causes of the low prevalence of IBS in these areas.

The female predominance in IBS patients, which was found in this study, is in accordance with previous studies on IBS [34]. Few studies however, have documented a higher prevalence in male patients [40]. Moreover, there is a growing body of evidence that indicates a large overlap between IBS and functional dyspepsia [42, 43]. In the present study more than 80% of patients who fulfilled the criteria of IBS also fulfilled the functional dyspepsia criteria.

The previous population based studies regarding IBS in Iran [27], Turkey [44] and the Middle East [19] have used ROME II or earlier versions of IBS criteria. Results of these studies show similarities and differences with the present study. The most prominent difference is the prevalence, which is much lower according to our study. The other marked difference is the age distribution of IBS, which was inclined to higher ages in our study while it was lower [45] or not different in other studies [19]. On the other hand, the gender distribution of IBS in the present study was similar to other studies in the vicinity, except one report from Pakistan that indicated a higher prevalence in males [19].

Evaluating the studies carried out in the population of Iran, it is implied that these studies have tried generally to describe the profile of IBS in certain groups of people and not the general population. For example, Roshandel et al reported a prevalence of 27% among patients attending an outpatient clinic [17], and Ghannadi et al estimated the prevalence of IBS to be about 18% among medical students [16]. Hoseini-Asl et al, however, conducted a population based study that included participants over the age of 20 in the west of Iran. By using the ROME II criteria they reported a prevalence of 5.9% [27]. Given the young population of Iran, the exclusion of the age group between 16 and 20 years old might have increased the estimation of IBS prevalence in the latter study.

Different estimates of the prevalence of IBS by various studies enhance the opportunity to investigate the underlying causes of differences including psychological factors and conditions such as IBS following infectious diarrhea. Nonetheless, few measures have been taken to integrate such matters into the population based studies especially in non-western countries, where infectious diarrhea, for example, might be of greater health significance. So, actions should be taken in future studies to undertake the large scale population based studies with respect to the determination of risk factors contributing to the causes of IBS and other functional GI disorders.

To conclude, our estimation of the prevalence of IBS was lower than expected. Our experience indicated that the demographic characteristics of the study population, the ROME III criteria themselves, and the problems with the interpretation of the data collection tool might have contributed to the underestimating of the burden of IBS in this study. However, according to this experiment, the newly introduced ROME III criteria can be regarded more as a diagnostic tool rather than a screening tool. Despite the ROME III, more sensitive previous generations of ROME criteria were actually designed for research and screening purposes. Thus, we think that the present estimation is a more realistic estimation of IBS prevalence.

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Conflicts of interest

None to declare.

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