The prevalence of irritable bowel symptoms in a population of shopping mall visitors in Santiago de Chile


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Abstract
Background: Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder characterized by abdominal pain or discomfort that is associated with altered bowel habit. Both its prevalence and clinical characteristics vary throughout Latin America. A percentage of patients does not seek medical attention, therefore a reliable prevalence figure can only be established by interviewing non-selected populations.

Aims: To study the prevalence and clinical characteristics of IBS symptoms in non-selected subjects in Santiago, Chile.

Methods: A total of 437 shopping mall visitors above the age of 15 years (246 women) participated in the study by answering the Rome II validated questionnaire for IBS. The demographic and socioeconomic backgrounds, comorbidities, and a family history of IBS were registered.

Results: A total of 64.1% subjects reported having gastrointestinal symptoms and 28.6% had symptoms suggestive of IBS. When the subjects with IBS symptoms were compared with the asymptomatic individuals, a predominance of women (65.6 vs 42.9, p < 0.001) and a greater cholecystectomy frequency (33.6 vs 12.9% p < 0.05) were observed in the former. The age of symptom onset was 30.4 years. An equal percentage of subjects (42.4%) presented with diarrhea and constipation and 15.2% presented with alternating IBS. Participants with a higher educational level reported a lower percentage of IBS (p < 0.05). A family history of the disease was present in 40% of the subjects with IBS, compared with 14.9% in the asymptomatic individuals (p < 0.05). Only 39.2% of the subjects had seen a physician for their symptoms and the treatment and tests ordered were inappropriate.
Introduction

Irritable bowel syndrome (IBS) is part of a subgroup of the so-called functional gastrointestinal disorders, characterized by abdominal pain and discomfort associated with changes in the bowel habit and bowel movement disorders. The Rome criteria have established definitions relative to both the characteristics and duration of these alterations.1-3

Studies conducted on this group of patients have revealed different pathophysiologic disorders such as: visceral hyperalgesia,4,5 altered motility and bowel transit,2,6,7 changes in the microbiota,8 and others associated with disorders related to the psychosocial sphere.9

Its impact on the health of the population is important, given that it constitutes a high percentage of the gastroenterologic consultations in the United States and is a significant cause of absenteeism in the workplace.2,10 Its economic impact is great due to the requirements of a larger number of medical consultations, tests, and medicines, compared with the population that does not present with IBS.11-13

Conclusions: The prevalence of IBS symptoms in the population studied is one of the highest described. Therefore, health teams should have the necessary knowledge and skill required for its management.

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Methods

A cross-sectional study was conducted through surveys carried out on weekends by medical interns from the Universidad de Chile that were previously instructed in the application of the survey. This analysis was carried out within the time frame of June to July of 2005 in 5 large shopping centers located in the eastern (n = 88), central (n = 88), northern (n = 87), western (n = 85), and southern (n = 89) areas of the city of Santiago.

The interns applying the surveys set up at the entrances to the shopping malls and personally invited men and women above the age of 15 years to directly and voluntarily answer a questionnaire, without receiving any type of compensation or additional benefit.

Epidemiologic characteristics: information on demographic characteristics were collected that included sex, age, the area of residence in Santiago (residents of other cities were not included), educational level, and current occupation. The areas of residence were arranged into 5 geographic zones that resulted in general groupings of populations of different socioeconomic levels; zone 1 represented the highest level and zone 5 the lowest level. The educational level and occupation were grouped into 5 categories: 1) a completed university education and/or university degree, 2) a completed high school education or incomplete university studies, 3) housewives and domestic workers, 4) employed with completed technical studies, and 5) non-specialized workers (with partial or completed studies).

For the purpose of determining the prevalence of IBS symptoms, a Spanish language version of the Rome II modular questionnaire for functional gastrointestinal disorders was used (Fig. 1). An affirmative answer to the question (Q) associated with 2 or more affirmative answers to Q2, Q3, or Q4 and a negative answer to Q11, Q13, Q14, Q15, and Q16 were used as the criteria for diagnosing IBS. Diarrhea-predominant IBS (IBS-D) diagnosis: IBS criteria and 2 or more affirmative answers to Q4A, Q 5, Q 6B, Q 7A-D, Q 9-C, and Q 10C. Constipation-predominant IBS (IBS-C) diagnosis: IBS criteria and 2 or more affirmative answers to Q 4B, Q 8C, Q 9-D-F, Q 10 A-D.

For the diagnosis of alternating IBS (IBS-A), the criteria for IBS and an affirmative answer to Q 4A and B and Q 9A and F were used.

The questions referred to the presence of comorbidity (high blood pressure, diabetes mellitus, chronic liver damage, nephropathy), past surgical history, use of medication at the time of the survey, a family history of IBS diagnosis (parents, brothers or sisters, grandparents, aunts or uncles), and F were used.

| 1 | Have you had pain or discomfort centered in the abdomen within the past 12 months lasting 12 weeks? yes no | 9 | What are your stools usually like? Soft and formed A fluffy B watery C hard D | | 2 | Does your pain disappear after a bowel movement? yes no | 10 | When having a bowel movement do you experience any of the following characteristics? yes nodifficulty in having the bowel movement A pain during the bowel movement B urgency to defecate C the sensation that your bowel movement was not complete D | | 3 | When your abdominal pain or discomfort begins, is it associated with a change in the number of bowel movements? yes no | 11 | Do you often have nausea or an upset stomach? yes no if your answer is yes, how often? every day A sometimes B with long periods between episodes C | | 4 | When your abdominal pain or discomfort begins, is it associated with the consistency of your stools? yes no if your answer is yes: Are they softer? A Are they harder? B | 12 | Do you have bloating? yes no if your answer is yes, how often? sometimes A every day B all day long C after eating D | | 5 | Do you often have diarrhea? yes no | 13 | Do you have a heavy or full feeling after eating? yes no | | 6 | Only if your answer is yes, how often? once a week A more than twice a week B once a month C twice a month D | 14 | Do you vomit frequently? yes no if your answer is yes, how often? every day A less than 3 times a week B less than once a month C | | 7 | And in this case what are your stools like? watery A fluffy B soft blobs C containing mucus D containing blood E | 15 | Do you have a burning sensation in the pit of your stomach? yes no | | 8 | What is your normal or customary bowel movement frequency? every day A more than 3 times a week B less than 3 times a week C | 16 | Do you have a burning sensation in your chest? yes no if your answer is yes, does acid or a small amount of liquid come up into your mouth? yes no if your answer is yes, how often? every day A 3 times a week B once a week C |
Sample size

Because there were no previous studies reporting IBS prevalence in Chile, the estimate presented at the Latin American Consensus on Irritable Bowel Syndrome, corresponding to a maximum prevalence of 18%, was used to calculate sample size. According to the formula used for this calculation, we established a minimum sample size of 391 surveys to reach 80% power and an alpha level of 0.05.

Statistical analysis

All the eligible surveys were given a correlated code number, keeping the identity of the subjects confidential. The STATA 9.0 software was used for the data analysis. Age and IBS presence (with and without the variable of sex) were compared using the Student’s t test. The Pearson chi-square test or the Fisher exact test were used to compare the categorical variables. Possible risk factors, such as female sex, a family history of IBS, and occupational level were determined through the logistic regression analysis. Odds ratio was calculated with a 95% confidence interval.

Data were presented as mean ± standard deviation. All the calculations were two-tailed p values and statistical significance was considered with a p < 0.05.

Ethics committee

This study was approved by the Scientific Ethics Committee of the Hospital Clínico Universidad de Chile.

Results

A total of 437 surveys were taken, corresponding to 191 men and 246 women, with a mean age of 42.8 ± 14.9 and 42.9 ± 14.4 years, respectively, and a range of 15-82 years. One hundred fifty-four subjects (35.2%) stated they had no gastrointestinal symptoms during the time period managed in the survey (Table 1).

Two hundred eighty-three subjects (64.8%) said they had gastrointestinal symptoms. One hundred twenty-five subjects (28.6%) reported symptoms consistent with IBS without IBS symptoms in the different areas of residence (Table 1).

The sex distribution percentage of the different patient ages in the IBS group is shown in Figure 2: the percentage of women patients with IBS symptoms progressively increased with age, reaching a maximum 46-60 years; there were significant differences with men from the same age group and with older or younger women (p < 0.05). In contrast, there were no age-related variations in men.

Regarding the educational level (Table 1), the majority of the surveyed subjects, whether presenting IBS symptoms or asymptomatic, were in level 4 (technical studies). When comparing the percentage distribution of the subjects with IBS symptoms and the asymptomatic ones, a lower IBS percentage was seen in the group with a higher level of education; there were no differences in the other groups. In relation to the area of residence, the majority of the subjects lived in areas 1 and 5; there were no differences in the distribution percentage between the subjects with and without IBS symptoms in the different areas of residence (Table 1).

Risk factors for irritable bowel syndrome

A family history of IBS was present in 40% of the IBS subjects, whereas only 14.9% of the asymptomatic subjects stated having such a history (p < 0.001 (Table 1).

The univariate analysis of the evaluated factors showed that women had a greater risk for IBS, but it was not statistically significant (p = 0.057). The presence of family history was significant (p < 0.01). Having a university education was associated with a lower presence of IBS symptoms and was statistically significant (p < 0.02).

A past history of surgery was found in 107 subjects and the number of surgeries was 108 (38.7%). The most frequent procedures were cholecystectomy, appendectomy, and gynecologic interventions. Table 2 shows that more than twice the number of subjects with IBS underwent cholecystectomy compared with the asymptomatic subjects (p < 0.05). This difference was maintained when only women were taken into account. In contrast, appendectomy presented with a similar frequency in both groups.

A very low proportion of other surgical procedures was observed in the two groups.
Table 1  Epidemiologic background of the surveyed subjects.

<table>
<thead>
<tr>
<th>Total</th>
<th>Asymptomatic</th>
<th>IBS</th>
<th>Other symptoms</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%)</td>
<td>437 100</td>
<td>154 35.2</td>
<td>125 28.6</td>
<td>158 36.15</td>
</tr>
<tr>
<td>Years: mean ± SD</td>
<td>42.7 ± 14.6</td>
<td>41.1 ± 15.5</td>
<td>45.2 ± 15.2</td>
<td>42.5 ± 13.0</td>
</tr>
<tr>
<td>Age range</td>
<td>15-82</td>
<td>15-71</td>
<td>17-82</td>
<td>18-81</td>
</tr>
<tr>
<td>Sex M/W (%)</td>
<td>191/246</td>
<td>43.7</td>
<td>56.3</td>
<td>88/66</td>
</tr>
<tr>
<td>Place of residence</td>
<td>122 (100)</td>
<td>60 (49.2)</td>
<td>35 (28.6)</td>
<td>27 (22.1)</td>
</tr>
<tr>
<td>Educational level</td>
<td>48 (100)</td>
<td>12 (25.0)</td>
<td>9 (18.7)</td>
<td>27 (56.3)</td>
</tr>
<tr>
<td>Family history of IBS</td>
<td>53 (100)</td>
<td>10 (18.9)</td>
<td>14 (26.4)</td>
<td>29 (54.7)</td>
</tr>
<tr>
<td>4</td>
<td>87 (100)</td>
<td>34 (39.0)</td>
<td>23 (26.5)</td>
<td>30 (34.5)</td>
</tr>
<tr>
<td>5</td>
<td>127 (100)</td>
<td>38 (30.0)</td>
<td>44 (34.6)</td>
<td>45 (35.4)</td>
</tr>
</tbody>
</table>

* Upon comparing the group presenting with IBS symptoms and the asymptomatic group.

<sup>a</sup> Upon comparing the group presenting with other gastrointestinal symptoms and the asymptomatic group.

<sup>b</sup> Upon comparing the group 1 subjects presenting with IBS symptoms and the other groups.

<sup>c</sup> Upon comparing the group presenting with IBS symptoms and the asymptomatic group.

Table 2  Clinical data of the subjects with symptoms of irritable bowel syndrome and the asymptomatic subjects.

<table>
<thead>
<tr>
<th>Irritable bowel syndrome</th>
<th>Asymptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeries</td>
<td></td>
</tr>
<tr>
<td>Cholecystectomy</td>
<td>42 (33.6%)&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Appendectomy</td>
<td>13 (10.4%)</td>
</tr>
<tr>
<td>Gynecologic surgery</td>
<td>7 (5.6%)</td>
</tr>
<tr>
<td>Others</td>
<td>4 (3.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>66 (52.8%)&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Concomitant Pathologies</td>
<td></td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td>28 (22.4%)&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>14 (11.2%)&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Others</td>
<td>20 (16%)&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Total</td>
<td>62 (49.6%)&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

* p < 0.05 upon comparing the subjects presenting with IBS symptoms and the asymptomatic subjects.

In the concomitant pathology analysis (Table 2), high blood pressure and diabetes mellitus stood out and their frequency was significantly greater in the patients with IBS symptoms (p < 0.05).

The mean age for IBS symptom onset was 30.4 years, with a range of 11 to 69 years.

Forty-nine (39.2%) of the subjects with IBS had seen a physician. Of those subjects, tests were ordered for 28 of them; the most frequent was endoscopy, performed in 13 of the subjects, blood tests in 8, abdominal ultrasound in 4, and abdominal ultrasound plus endoscopy in 3 subjects.

Of the 49 subjects with IBS that had a medical consultation, 37 (75.5%) reported having received some kind of treatment for their symptoms (Table 3) and the most frequently used drug was a proton pump inhibitor in 35.1% of the cases.

Discussion

Our results showed a high frequency of gastrointestinal symptoms in a population visiting large shopping malls in different areas of Santiago (64.8%). Of those subjects, 28% presented with symptoms that were consistent with IBS...
according to the Rome II criteria. The remaining clinical manifestations could not be adequately evaluated due to the fact that the survey only included questions from the Rome II criteria for defining IBS.

**General characteristics**

In Latin America, a prevalence of IBS between 9 and 18% has been described, which is similar to that reported for the Hispanic population in the United States.

In Europe, a telephone survey encompassing a large number of participants, revealed an overall prevalence of 11.5%; it was higher in Italy and in the United Kingdom. A survey of 5,000 patients in the United States reported a 14.1% prevalence. Two recent studies in Mexico showed an IBS prevalence of close to 16% in Colombia a somewhat higher figure of 19.9% was reported, and in Uruguay this prevalence was 10.9.

In Chile, a survey was applied to Chilean gastroenterologists in which they were asked if they thought they presented with IBS. There was an affirmative response in 22% of those surveyed.

From the data obtained in the present study, we can say that the population visiting shopping malls in different areas of Santiago has a high prevalence of IBS symptoms at 28.6%, one of the highest in the world, similar to that observed in Nigeria.

It is difficult to establish the factors that could be related to this greater IBS prevalence in Chile. Unlike other pathologies, such as cholelithiasis, the ethnic factor does not seem to be relevant, given that a recent communication reported a prevalence of 22% in a rural mapuche population, only slightly lower than the figure observed in the present study. Taking into account that there are no previous studies that would enable variability over periods of time to be established in relation to IBS prevalence, it can only be speculated that the very relevant socioeconomic changes have been the main variant in the last decades in the Chilean environment.

Age at the time of onset is within the ranges that have been established in other studies, even though this variable is not clearly defined in the main studies. A mean of 42 years has been estimated in Latin America.

Regarding the IBS-D and IBS-C subgroups, the low prevalence in our study of the alternating group in which both symptoms are present is striking, compared with that observed in a European study in which this presentation form was observed in 63% of the cases. Nevertheless, the results observed in different reviews indicate much variability in this respect in the different populations studied, a fact that is partially dependent on the methodology employed for establishing the diagnosis.

**Risk factors**

As reported in other studies, a higher prevalence of IBS symptoms was associated with women and with the age group of 46-60 years in the present study; statistical significance was not reached in relation to the total group participating in the survey.

It was interesting that the group with the highest educational level presented with a significantly lower percentage of IBS symptoms; there are no articles in the literature that directly analyze this factor. One study suggests that a lower socioeconomic level and a higher level of anxiety are associated with a greater IBS prevalence. However, the socioeconomic factor did not seem to have a direct relation in our study, given that the distribution in relation to areas of residence that could have very different populations, was similar in this aspect. It is possible that the educational level per se could be conducive to a better adaptation to the symptoms.

A total of 40% of the subjects with IBS symptoms had a family history of the same pathology, compared with 14.9% of the asymptomatic subjects. This was an important distinctive factor between the two groups, and similar observations have been made in other studies.

The interpretation of these data is complex. Some studies strongly suggest a familial influence; children whose parents present with IBS have been shown to have a higher number of medical consultations. Evidence supporting a genetic factor is based on studies that show a greater concordance in monozygotic twins, compared with dizygotic twins, but this finding has not been confirmed in all the studies.

Different investigations have associated IBS with the polymorphism of the serotonin transporter, IL-10, the cholecystokinin receptor, and others.

**Medical impact**

When analyzing the characteristics of the group of patients with IBS, it should be taken into account that a percentage of them probably are organic pathology carriers, especially those of the IBS-D group. Their evaluation could lead to establishing other diagnoses such as: microscopic colitis, celiac disease, and inflammatory bowel disease. The percentage of organic pathology with these characteristics that could be present in this group of patients was not analyzed in the present study.

Some studies have reported a greater number of surgeries in IBS patients, especially cholecystectomy, but also appendectomy and gynecologic surgery, and this phenomenon was also observed in our survey.

It is interesting that 33.6% of the subjects with IBS had undergone cholecystectomy, compared with 13% of the asymptomatic subjects. This proportion was maintained only in the analysis of the female patients. It is possible that the presence of gastrointestinal symptoms in patients with IBS is a determining factor in a more frequent diagnosis of cholelithiasis that results in cholecystectomy, even as a prophylactic measure.

### Table 3 Drug use in the patients with IBS symptoms.

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Irritable bowel syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPI</td>
<td>13 (35.1%)</td>
</tr>
<tr>
<td>Antispasmodics</td>
<td>12 (29.7%)</td>
</tr>
<tr>
<td>Prokinetics</td>
<td>1 (2.7%)</td>
</tr>
<tr>
<td>Others</td>
<td>12 (32.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
</tr>
</tbody>
</table>

PPI: Proton pump inhibitors.
in the Chilean medical environment. The association with organic pathologies such as high blood pressure that do not compromise the gastrointestinal tract is not clear.

The percentage of patients that visited a physician was similar to that described in another study. It is conspicuous that the majority of the tests done (upper gastrointestinal endoscopy) and the therapy administered (proton pump inhibitors) had little relation to the symptoms the patients most likely described to their attending physicians; this can have an important economic impact on local health organizations.

It is possible that, depending on the respective speciality of the attending physician, fewer diagnostic criteria of functional gastrointestinal disorders, in accordance with the symptoms reported by the patient, are employed. As a result, a greater difference between the question asked by the attending physician and the interpretation of the patient’s response would be observed.

In conclusion, according to the results of our survey, the group being studied presented with one of the highest frequencies of IBS-type symptoms. Even if only some of these patients seek medical attention for their symptoms, the required information and orientation in relation to their adequate management should be reflected in the undergraduate study programs in general medicine and in the postgraduate courses for specialists.

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Conflict of interest
The authors declare that there was no conflict of interest.

References