Irritable bowel syndrome consulters in Zhejiang province: The symptoms pattern, predominant bowel habit subgroups and quality of life

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METHODS: From January 2001 to January 2002, 662 Roma II criteria-positive IBS patients were enrolled by gastroenterologists in 10 hospitals from Digestive Disease Center of Zhejiang (DDCZ). Patients were classified into constipation predominant IBS (IBS-C), diarrhea predominant IBS (IBS-D) and alternating constipation and diarrhea IBS (IBS-A) according to the predominant bowel habits. All patients were evaluated for the demographic checklists, IBS bowel symptoms, extra-colonic symptoms, and QOL by Chinese version of the SF-36 questionnaire.

RESULTS: (1) Besides abdominal pain, the predominant colonic symptoms were in order of altered stool form, abnormalities of stool passage, abdominal distension and passage of mucus in IBS patients. Also, IBS subjects reported dyspeptic symptoms, poor appetite, heartburn, headache, back pain, difficulty with urination, fatigue, anxiety and depression. (2) IBS-C and IBS-A are more common among female patients, whereas male patients experienced more cases of IBS-D. In regards to the IBS symptoms, there were significant differences among IBS subgroups. Abdominal pain (frequency ≥2 days per week and duration ≥1 hour per day) was frequent in IBS-A patients (P=0.010 and 0.027, respectively), IBS-D patients more frequently experienced the passage of mucus, dyspeptic symptoms and anxiety (P=0.000, 0.014 and 0.015, respectively). (3) IBS patients experienced significant impairment in QOL, decrements in QOL were more pronounced in vitality, general health, mental health, and bodily pain. Compared with the general population (adjusted for gender and age), IBS patients scored significantly lower on all SF-scales (P<0.001), except for physical function scale (P=0.149). (4) QOL was impaired in all subgroups, particularly in scales of vitality, general health and mental health. Compared with IBS-D, QOL in IBS-C scored significantly lower on physical function, role physical, general health, role emotional, and mental health scales (P=0.037, 0.040, 0.039, 0.005 and 0.026, respectively).

CONCLUSION: Besides colonic symptoms, IBS could cause generalized body discomfort and psychosocial problems. The IBS subgroups based on predominant bowel habits are helpful to identify clinical distinction of the IBS. QOL is significantly impaired in IBS patients. The Chinese version of the SF-36 health survey scales may be a useful measurement of IBS patients.

INTRODUCTION

Irritable bowel syndrome (IBS) comprises a group of functional bowel disorders, in which abdominal pain or discomfort is associated with defecation or a change in bowel habits, and features of disordered defecation[1]. In developed countries, IBS is the most frequent reason for referrals to gastroenterologists, and the diagnosis of IBS has been noted in up to 4-30% of the general population in Western Europe and North America[2-4]. A stratified randomized study in China reported that the prevalence of IBS in Beijing is 7.26% according to Manning criteria[5]. However, there were no large-scale studies to evaluate IBS patients who consulted physicians in China.

On clinical grounds, it has been proposed that patients with IBS can be further subdivided into those who have either predominant constipation or diarrhea or an alternating bowel pattern. Differences between these subgroups have been observed regarding viscerosensory processing[6,9] and autonomic function[10-12]. But clinical relevance of IBS subgroups by predominant bowel habits was not so well covered in the literature.

IBS patients could manifest gastrointestinal disorders and be accompanied with psychosocial problems. The QOL consists of all aspects of patients’ disorders and can evaluate the health status in detail. Although IBS is not a life-threatening condition, for most patients it is a chronic recurrent illness that is often accompanied by severe impairment in QOL. Generic QOL measures, such as SF-36 health survey, are designed to evaluate aspects of function status and well-being applicable to a population in general, which is also a well–standardized questionnaire for assessing the QOL of IBS[6,13]. As we known, there were no prior studies that evaluated the QOL by the Chinese version of SF-36 in IBS patients.

In the present study, we aimed at evaluating the pattern of symptoms and QOL of the IBS-consulters in Zhejiang, in particular with respect to different IBS subgroups.

MATERIALS AND METHODS

Subjects

From January 2001 to January 2002, 662 consecutive Roma II criteria-positive IBS patients were enrolled by gastroenterologists in 10 hospitals from Digestive Disease Center of Zhejiang (DDCZ). Patients were classified into constipation predominant IBS (IBS-C), diarrhea predominant IBS (IBS-D) and alternating constipation and diarrhea IBS (IBS-A) according to the predominant bowel habits. All patients were evaluated for the demographic checklists, IBS bowel symptoms, extra-colonic symptoms, and QOL by Chinese version of the SF-36 questionnaire.
criteria positive IBS patients were enrolled by gastroenterologists from 10 hospitals in urban, suburban, island, and rural areas of Digestive Disease Center in Zhejiang (DDCZ). Patients were classified into three subgroups according to the following criteria[6,17,18]: (1) Constipation- predominant IBS (IBS-C) indicated of patients who had at least two of the four symptoms 3 months, such as straining, hard or lumpy stools, incomplete evacuation 25% of the time, and/or two or less bowel movements per week, and no concurrent diarrhea symptoms as defined below; (2) Diarrhea-predominant IBS (IBS-D) was diagnosed by the presence of loose/watery stools >75% of the time, three or more diarrhea in a week, in the absence of constipation symptoms; and (3) Patients with mixed patterns of both constipation and diarrhea were classified as alternating-IBS (IBS-A). Patients with organic diseases related to IBS bowel symptoms were excluded. All patients completed the demographic checklists, symptom questionnaire, and SF-36 questionnaire.

**Demographic checklists**

Patients completed 5 demographic questions regarding their age, gender, profession, marital status and the level of education. The demographic data of general population in Zhejiang province were provided by Demographic Center of Zhejiang Province.

**Symptom Questionnaire (SQ)**

The SQ was divided into symptoms compatible with IBS and extra-colonic symptoms.

**Symptoms compatible with IBS** This symptom category included the following symptoms in the prior year (referred to Roma II symptom criteria): (1) the duration of abdominal pain per day (none, <1 h, 1-8 h, >8 h); (2) the frequency of abdominal pain per week (none, <2 d, 2-5 d, >5 d); (3) the frequency of altered stool forms including lumpy/hard or loose/watery stool (none, <25%, 25-75%, >75%); (4) the frequency of altered stool passage pattern including staining, urgency, and feeling of incomplete evacuation (none, <25%, 25-75%, >75%); (5) the frequency of passage of mucus (none, <25%, 25-75%, >75%); and (6) the frequency of bloating or abdominal distension (none, <25%, 25-75%, >75%).

**Extra-colonic symptoms** Patients were asked if they experienced dyspeptic symptoms, poor appetite, or heartburn. In addition, patients were asked if they had any back pain, headache, difficulty in urination, fatigue, depression, or anxiety.

**Health status SF-36 questionnaire**

The validated SF-36 in Chinese version was provided by professor Li Lu in Social and Demographic Department in Zhejiang University. The SF-36 included 8 multi-item dimensions: physical function, role-physical (functional limitations due to physical health problem), bodily pain (limitation due to body pain), general health, vitality (energy/fatigue), social function, role emotional (functional limitations due to emotional problems), and mental health (psychological distress and psychological well-being). The SF-36 scored from 0 to 100, with higher scores indicating better QOL.

We compared the QOL of patients with IBS with previously published SF-36 data of Zhejiang general population (n=1 972).

All subjects were evaluated after giving informed consent by Zhejiang University School of medicine.

**Statistical analysis**

All of the statistical analyses were conducted using the SPSS 10.0 statistical software passage. Prevalence of symptoms was expressed in percentages. Comparisons between different IBS subgroups patients were performed using $\chi^2$ test for categorical data and $t$ test or ANOVA test for continuous data. $P<0.05$ was considered significant.

**RESULTS**

**Demographic characteristics**

The mean age of 662 subjects was 44.78±13.71 years, with 52.9% of the sample being woman. The majority of the subjects were in the age of 25-50 years (68.4%). Further information detailing the marital status, education level, and profession are provided in Table 1. Compared with the general population in Zhejiang, IBS were more common in the intellectuals and cadres ($P<0.001$), the young adulthood (25-50 years, $P<0.001$), and in females ($P<0.05$).

**Table 1** The basic characteristics of IBS consulters

| Characteristics       | IBS sample (n=662) |
|-----------------------|--------------------|
| Age (yr, %)           | 44.78±13.71        |
| <20                   | 1.5                |
| 20-29                 | 9.5                |
| 30-39                 | 30.4               |
| 40-49                 | 25.8               |
| 50-59                 | 17                 |
| 60-69                 | 10.5               |
| 70-79                 | 5                  |
| >80                   | 0.3                |
| Gender (n, %)         |                    |
| Male                  | 312 (47.1)         |
| Female                | 350 (52.9)         |
| Marital status (n, %) |                    |
| Never married         | 53 (7.7)           |
| Married               | 585 (88.4)         |
| Widow                 | 19 (2.8)           |
| Divorced or separated | 7 (1.1)            |
| Education level (n, %)|                    |
| Illiterate            | 87 (13.1)          |
| Primary school        | 129 (19.5)         |
| Junior middle school  | 184 (27.7)         |
| Senior middle school  | 155 (23.5)         |
| College or graduated  | 107 (16.2)         |
| Profession (n, %)     |                    |
| Peasants              | 211 (31.8)         |
| Workers               | 75 (11.3)          |
| Cadres                | 62 (9.4)           |
| Intellectuals         | 58 (8.7)           |
| Merchants             | 105 (15.9)         |
| Soldiers              | 57 (8.6)           |
| Student               | 20 (3.0)           |
| Retired and jobless   | 74 (11.3)          |

**Prevalence of symptoms**

The frequency of symptoms were in order of altered stool form (79.1%), abnormalities of stool passage (67.9%), abdominal pain duration $\geq$1 h/d (67.7%), abdominal distension (63.2%), abdominal pain frequency $\geq$2 d/wk (57.5%) and passage of mucus (49.8%) in IBS patients. A few IBS subjects reported having extra-colonic symptoms including fatigue (72.7%), dyspeptic symptoms (64.1%), anxiety (54.2%), depression (44.1%), poor appetite (38.2%), headache (29.0%), back pain (26.1%), heartburn (25.0%), and difficulty with urination (11.0%).
Abdominal pain duration $\geq 1$ h/d was reported more common among female IBS than male patients (61.1% vs 53.7%, $P<0.05$). Women also more frequently reported headache and poor appetite (both $P<0.05$). More male patients reported difficulty in urination ($P<0.05$). The data are shown in Table 2.

**Table 2** Symptoms characteristics of IBS by gender

| Symptoms (%) | Male (n=305) | Female (n=311) | P   |
|--------------|--------------|----------------|-----|
| Abdominal pain $\geq 1$ hour/day | 53.7 | 61.1 | 0.039 |
| Abdominal pain $\geq 2$ days/week | 67.2 | 68.2 | 0.434 |
| Altered stool form | 80.0 | 78.1 | 0.312 |
| Altered stool passage | 66.8 | 68.8 | 0.325 |
| Abdominal distension | 60.7 | 65.6 | 0.118 |
| Passage of mucus | 51.1 | 48.2 | 0.260 |
| Dyspeptic symptoms | 63.1 | 65.3 | 0.319 |
| Poor appetite | 33.6 | 43.0 | 0.011 |
| Heartburn | 28.4 | 21.3 | 0.066 |
| Headache | 24.1 | 33.6 | 0.024 |
| Back pain | 24.4 | 27.5 | 0.426 |
| Difficulty in urination | 15.6 | 6.2 | 0.000 |
| Anxiety | 51.0 | 57.1 | 0.200 |
| Depression | 40.2 | 47.7 | 0.114 |
| Fatigue | 72.0 | 73.7 | 0.897 |

**Prevalence of IBS subgroups**

Patients consisted of IBS-C (20.0%), IBS-D (47.7%), and IBS-A (32.3%) according to the predominant bowel habits. The IBS-C and IBS-A patients were composed mainly of women, which were 64.2% and 56.9%, respectively. But in the IBS-D, more subjects (56.8%) were male. The distribution of IBS compatible symptoms and extra-colonic symptoms among the IBS subgroups are summarized in Table 3. Abdominal pain (frequency $\geq 2$ days per week and duration $\geq 1$ hour per day) consisted of 64.9% and 75.9% respectively in IBS-A patients ($P<0.05$), while there was 58.1% of IBS-D patients with the passage of mucus ($P<0.05$). Compared with other two subgroups of IBS, IBS-D patients more frequently experienced of dyspeptic symptoms (70.2%) and anxiety (62.0%) ($P<0.05$).

**Table 3** Symptoms in the IBS subgroups

| Symptoms (%) | IBS-C (n=108) | IBS-D (n=258) | IBS-A (n=174) |
|--------------|---------------|---------------|---------------|
| Abdominal pain frequency $\geq 2$ d/wk | 51 (47.2) | 152 (58.9) | 113 (64.9) |
| Abdominal pain duration $\geq 1$ h/d | 62 (57.4) | 171 (66.3) | 132 (75.9) |
| Abdominal distension | 65 (60.2) | 157 (60.9) | 118 (67.8) |
| Passage stool mucus | 34 (31.5) | 150 (58.1) | 87 (50.0) |
| Dyspeptic symptoms | 181 (70.2) | 108 (62.0) | |
| Heartburn | 25 (23.1) | 99 (22.9) | 45 (25.9) |
| Difficulty in urination | 16 (14.8) | 23 (8.9) | 15 (8.6) |
| Depression | 50 (46.3) | 107 (41.5) | 77 (44.3) |
| Fatigue | 68 (62.9) | 202 (78.3) | 125 (71.8) |
| Anxiety | 51 (47.2) | 160 (62.0) | 88 (50.6) |

**Table 4** The SF-36 scales score in IBS versus general population (Normative) by gender

| Scale (mean±SD) | Male | Female | P |
|-----------------|------|--------|---|
| PF 83.6 (20.1) | 84.4 (18.6) | 0.478 | 78.3 (19.2) | 79.9 (20.7) | 0.179 | 81.1 (19.8) |
| RF 60.9 (51.8) | 82.4 (32.6) | 0.000 | 50.0 (51.3) | 79.9 (34.5) | 0.000 | 55.7 (51.7) |
| BP 53.5 (18.6) | 83.0 (19.0) | 0.000 | 47.6 (20.4) | 79.9 (21.8) | 0.000 | 50.9 (19.8) |
| GH 43.4 (17.3) | 58.0 (19.9) | 0.000 | 38.2 (19.7) | 55.2 (20.4) | 0.000 | 41.0 (18.6) |
| VT 40.9 (19.8) | 53.3 (20.9) | 0.000 | 34.4 (18.5) | 50.1 (20.7) | 0.000 | 37.9 (19.5) |
| SF 67.2 (18.2) | 83.1 (17.5) | 0.000 | 62.9 (18.7) | 82.9 (18.1) | 0.000 | 65.3 (18.6) |
| RE 65.5 (56.1) | 84.3 (32.3) | 0.000 | 53.2 (43.8) | 84.5 (32.5) | 0.000 | 59.7 (50.9) |
| MH 50.4 (20.6) | 60.3 (23.0) | 0.000 | 44.0 (23.9) | 59.1 (22.4) | 0.000 | 47.4 (22.4) |

**Table 5** The SF-36 scales score in IBS versus general population (Normative) by age

| Scale (mean±SD) | <44 yr | 45-64 yr | $\geq$65 yr | P |
|-----------------|--------|----------|-------------|---|
| PF 85.5 (18.3) | 86.0 (18.0) | 0.599 | 81.2 (19.5) | 82.0 (17.4) | 0.359 | 67.6 (20.7) | 68.5 (24.5) | 0.747 |
| RF 64.1 (57.7) | 85.3 (29.0) | 0.000 | 55.9 (51.8) | 80.4 (34.3) | 0.000 | 30.5 (37.4) | 68.3 (42.8) | 0.000 |
| BP 53.4 (19.7) | 85.0 (17.8) | 0.000 | 51.1 (19.7) | 78.4 (21.3) | 0.000 | 46.0 (16.3) | 75.3 (23.6) | 0.000 |
| GH 44.5 (18.0) | 60.0 (19.8) | 0.000 | 41.1 (18.6) | 54.0 (19.4) | 0.000 | 34.6 (14.9) | 50.3 (20.9) | 0.000 |
| VT 40.6 (19.5) | 53.3 (20.3) | 0.000 | 37.9 (19.3) | 51.2 (21.1) | 0.000 | 25.8 (16.2) | 48.4 (22.1) | 0.000 |
| SF 68.0 (18.1) | 84.2 (16.9) | 0.000 | 65.4 (18.5) | 82.8 (17.6) | 0.000 | 59.8 (18.0) | 79.3 (20.9) | 0.000 |
| RE 61.7 (40.8) | 85.3 (30.5) | 0.000 | 59.7 (51.0) | 85.1 (32.2) | 0.000 | 55.0 (45.7) | 79.5 (38.8) | 0.059 |
| MH 49.2 (18.0) | 57.9 (21.4) | 0.000 | 47.5 (22.4) | 61.3 (23.5) | 0.000 | 47.8 (18.2) | 62.4 (25.1) | 0.000 |
The SF-36 questionnaires

For IBS patients, the lowest mean scale scores were 37.9 in vitality and 41.0 in general health. The bodily pain and role emotional scales scores were also quite low (47.4 and 50.9, respectively). Compared with the general population (adjusted for gender), the IBS patients scored significantly lower on 7 SF-scales (P<0.001), with the exception of physical function scale. Adjusting for age, the decrement of scale score in IBS compared with general population.

Table 6

The different prevalence may be due to the bias of sample of population or diagnostic criteria. We postulate that subjects with different bowel habits have different pathophysiologic conditions and therefore will differ with respect to their clinical characteristics, and designed to evaluate the gender distribution and symptoms as well as QOL among all subgroups. Results demonstrated that females had higher proportion of IBS-C and IBS-A, while there was a trend towards a higher proportion of being IBS-D in male patients. The data was continent with recent studies of IBS in Europe and U.S.A.[8,17]. Several physiological factors may play a role in these gender-related differences in self-reported bowel habits, including difference in central autonomic control, enteric nervous system physiology, and smooth muscle physiology[29]. The subgroups had significant difference in IBS predominant bowel symptoms according to Roma-II criteria and extra-colonic symptoms. Abdominal pain (frequency ≥2 days per week and duration ≥1 hours per day) consisted of 64.9% and 75.9%, respectively in IBS-A patients, which was discriminates among the subgroups. It is of note that IBS-A patients were affected more by abdominal pain than were those with other subgroups. Mearin et al.[27] also reported that abdominal discomfort/pain were greater in the IBS-A subgroup than in the other two IBS subgroups, whereas IBS-D patients more frequently experienced of passage of mucus (58.1%), dyspeptic symptoms and anxiety (P<0.05). Conversely, another study showed that IBS-C patients accompanied with more higher severity of upper gastrointestinal symptoms and higher severity of lower gastrointestinal bloating than IBS-D patients, suggested that it may be related to different gastrointestinal transit or central processing of vagal-mediatedafferent signals[30]. We found that all three subgroups had impaired QOL. QOL scale score was similar in IBS-D and IBS-A, but lower in IBS-C. Compared with IBS-D patients, QOL in IBS-C scored significantly lower on physical function, role physical, general health, role emotional and mental health scales (P<0.05). There was a trend of decreasing of these 6 scales of QOL, but no
significant difference between IBS-C and IBS-A (P>0.05). Schmulson et al[6] also observed that IBS-C more commonly reported impairment in sleep, appetite and sexual function, but there were no difference in SF-36 scores in different subgroups. Another investigation by Mearin et al[27] indicated that QOL was affected similarly in all IBS subtypes. These results were contradicted with each other. So it was critically necessary to apply for universal criteria for the subgroups of IBS. In our present study, there were different gender distribution, clinical symptoms and QOL among the three IBS subgroups. This suggests that subdividing IBS in three groups based on bowel habits may identify clinically distinct entities, but needs to be evaluated in a more detailed study.

There is increasing recognition that what matters to most patients with chronic illness is how well they are able to function and how they feel about their daily life. Therefore, it is essential to understand the impact of IBS on patients’ ability to function and well-being. The medical Outcome Study Short Form (SF-36) is a well-standardized questionnaire for assessing quality of life. The Chinese version of the SF-36 health survey scale has achieved conceptual equivalence and satisfied the psychometric scaling assumptions well enough to warrant as a standardized survey in China[28]. As we have known, this is the first study to compare the QOL of patients with IBS and the general population in China by Chinese version of the SF-36. The present study showed that IBS patients have significantly impaired QOL, with the most pronounced decrements in vitality (energy/fatigue), general health, mental health, and bodily pain, furthermore, when compared with the general population in Zhejiang (adjusting for the age and gender distribution), IBS patients also scored significantly lower QOL on 7 SF-scales (P<0.001), with the exception of physical function scale. It is continent with the study[16,30] that QOL is low in patients with IBS, dimensions affected are particularly energy/fatigue, role limitation, physical pain and health perception. Granek et al[16] reported that as compared with the U.S. general population (adjusted to the age and gender characteristics of IBS sample), the IBS patients scored significantly lower on each of the 8 SF-36 scales. Another study in European also showed that all aspects of QOL were adversely affected in IBS patients living in the UK and the United States[31]. On the other hand, recent studies in Hong Kong[19,23] showed that only vitality score was lower in men with IBS, and the mental health score was significantly lower in women with IBS, compared with normal control. Our results confirm the findings that IBS had a profound and significant impact on a person’s QOL, in addition to the disease activity and symptoms impacts. We postulate that the different results of QOL in studies are due to the cultural or health status perception on a person’s QOL, in addition to the disease activity and symptoms impacts. We postulate that the different results of QOL in studies are due to the cultural or health status perception on a person’s QOL, in addition to the disease activity and symptoms impacts. We postulate that the different results of QOL in studies are due to the cultural or health status perception on a person’s QOL, in addition to the disease activity and symptoms impacts.

In conclusion, the present study offers insight into IBS-questionnaire will allow a clear understanding of link between QOL questionnaire SF-36, combined with IBS-specific QOL questionnaire will allow a clear understanding of link between IBS and QOL.

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