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

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## Abstract

**AIM:** To investigate the pattern of symptoms, predominant bowel habits and quality of life (QOL) by the Chinese version of the SF-36 in irritable bowel syndrome (IBS) consultants in Zhejiang province.

**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 generalized body discomfort and psychosocial problems including 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  $\geq 2$  days per week and duration  $\geq 1$  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 most 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.

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## 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 with features of disordered defecation<sup>[1]</sup>. 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<sup>[2-6]</sup>. A stratified randomized study in China reported that the prevalence of IBS in Beijing is 7.26% according to Manning criteria<sup>[7]</sup>. 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<sup>[8,9]</sup> and autonomic function<sup>[10-12]</sup>. 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<sup>[6,13-16]</sup>. 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 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<sup>[6,17,18]</sup>: (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  $44.78\pm13.71$  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              | 51 (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<br>(n=305) | Female<br>(n=311) | P     |
|-----------------------------------|-----------------|-------------------|-------|
| IBS compatible symptoms           |                 |                   |       |
| 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 |
| Extra-colonic symptoms            |                 |                   |       |
| 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<br>(%, n)                                   | IBS-C<br>(n=108) | IBS-D<br>(n=258) | IBS-A<br>(n=174) |
|--|------------------|------------------|------------------|
| Gender <sup>b</sup>                                  |                  |                  |                  |
| Male   | 38 (35.8)        | 147 (56.8)       | 75 (43.1)        |
| Female   | 69 (64.2)        | 111 (43.2)       | 99 (56.9)        |
| Age (yr)   | 44.2 $\pm$ 13.1  | 45.8 $\pm$ 13.7  | 44.6 $\pm$ 14.2  |
| Abdominal pain<br>frequency $\geq 2$ d/wk            | 51 (47.2)        | 152 (58.9)       | 113 (64.9)       |
| Abdominal pain<br>duration $\geq 1$ h/d <sup>a</sup> | 62 (57.4)        | 171 (66.3)       | 132 (75.9)       |
| Abnormal stool form                                  | 84 (77.8)        | 218 (84.5)       | 133 (76.4)       |
| Abnormal stool passage                               | 75 (69.4)        | 179 (69.4)       | 121 (69.5)       |
| Abdominal distension                                 | 65 (60.2)        | 157 (60.9)       | 118 (67.8)       |
| Passage stool mucus <sup>a</sup>                     | 34 (31.5)        | 150 (58.1)       | 87 (50.0)        |
| Dyspeptic symptoms <sup>b</sup>                      | 181 (70.2)       | 108 (62.0)       |                  |
| Heartburn  | 25 (23.1)        | 59 (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 <sup>b</sup>                                 | 51 (47.2)        | 160 (62.0)       | 88 (50.6)        |

<sup>a</sup> $P < 0.05$ , <sup>b</sup> $P < 0.01$  between the three subgroups.

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

| Scale<br>(mean $\pm$ SD) | Male        |             |       | Female      |             |       | IBS sample  |
|--------------------------|-------------|-------------|-------|-------------|-------------|-------|-------------|
|                          | IBS         | Norm        | P     | IBS         | Norm        | 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) |
| RP                       | 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) |

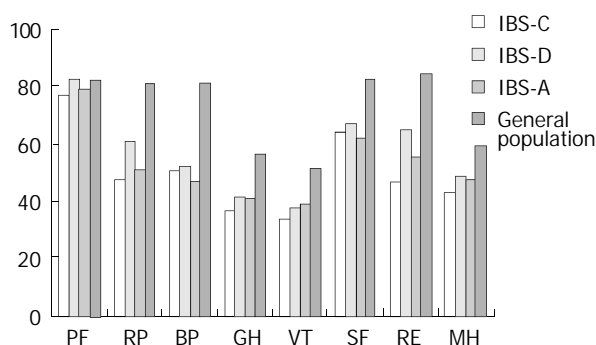
**Table 5** The SF-36 scales score in IBS versus general population (Normative) by age

| Scale<br>(mean $\pm$ SD) | <44 yr      |             |       | 45-64 yr    |             |       | $\geq 65$ yr |             |       |
|--------------------------|-------------|-------------|-------|-------------|-------------|-------|--------------|-------------|-------|
|                          | IBS         | Norm        | P     | IBS         | Norm        | P     | IBS          | Norm        | 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 |
| RP                       | 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 patients ( $\leq 65$  years) are most pronounced in 7 categories of SF-36 except the physical function scale, while patients  $>65$  years scored significantly lower on vitality, general health, bodily pain, social function and role emotional scales ( $P<0.001$ ), as shown in Table 4 and Table 5.

QOL was impaired in all subgroups. The QOL in three subgroups are pronounced impaired in vitality, general health and mental health. Among different subgroups, IBS-C had poor QOL. Compared with IBS-D, QOL in IBS-C scored significantly lower on physical function, role physical, general health, role emotional and mental health scales ( $P<0.05$ ). Compared with IBS-A, the 6 scales of QOL in IBS-C were more impaired, but there was no significant difference ( $P>0.05$ ). As shown in Figure 1 and Table 6.



**Figure 1** SF-36 scale score in different IBS subgroups compared with general population.

**Table 6** SF-36 scale scores (mean±SD) among different IBS subgroups

| SF-36 | IBS-C       | IBS-D       | IBS-A       | General population | P     |
|-------|-------------|-------------|-------------|--------------------|-------|
| PF    | 77.4 (22.1) | 82.2 (17.6) | 79.7 (20.7) | 82.2 (19.8)        | 0.104 |
| RP    | 47.1 (39.2) | 61.3 (41.6) | 50.9 (43.4) | 81.2 (33.6)        | 0.043 |
| BP    | 50.7 (20.9) | 52.3 (19.8) | 47.2 (19.8) | 81.5 (20.5)        | 0.048 |
| GH    | 36.9 (17.6) | 41.7 (19.6) | 40.5 (17.9) | 56.7 (20.2)        | 0.110 |
| VT    | 33.8 (19.0) | 37.8 (19.3) | 39.0 (20.0) | 52.0 (20.9)        | 0.127 |
| SF    | 63.9 (20.5) | 66.9 (17.5) | 62.0 (18.8) | 83.0 (17.8)        | 0.032 |
| RE    | 46.6 (44.4) | 65.3 (38.7) | 55.6 (43.1) | 84.4 (32.4)        | 0.080 |
| MH    | 42.6 (30.9) | 48.7 (18.0) | 47.9 (18.7) | 59.7 (22.7)        | 0.061 |

### DISCUSSION

IBS is important because it is associated with considerable morbidity, cost and poor QOL. IBS patients who consulted physicians (IBS-consulters) got more severe IBS symptoms<sup>[19]</sup> and higher psychological discomfort<sup>[20]</sup> compared to the non-consulters. Studies have reported that IBS-consulters had poor QOL than the non-consulters<sup>[21]</sup>. Therefore, more and more studies were focused on evaluating the IBS-consulters patients. The data obtained in our study represents the reality of IBS-consulters in general population in Zhejiang province.

We demonstrated that male to female ratio was 1:1.21. Compared with the general population, IBS are more common among people between the age of 25 to 50 years (68.4% vs 51.9%,

$P<0.01$ ), and between the intellectuals and cadres ( $P<0.001$ ). A few studies have shown IBS is more prevalent in women than in men<sup>[3,6,7]</sup>. The majority of the subjects being the intellectuals and in the age of 18-40 years (51.6%) was also observed in recent study in Beijing<sup>[7]</sup>. In the present study, we found that the most frequent symptom was altered stool form (79.1%), in order of abnormalities of stool passage (67.9%), abdominal pain (67.7%), abdominal distension (63.2%) and passage of mucus (49.8%) in IBS patients. IBS could reflect a wide range of symptoms, and abdominal pain was not the essential symptom. Although only colonic symptoms are used in the Manning or Rome criteria for the diagnosis of IBS, noncolonic symptoms arising elsewhere in the gastrointestinal tract or viscerosensory symptoms are common in IBS. It was considered that a large proportion of IBS patients complain of functional disorders of obscure origin, such as headache, low back pain, dysuria, depression, sleeping disorders, anxiety, and attention fatigue<sup>[22-25]</sup>. Our study showed that IBS patients commonly presented with fatigue (72.7%), dyspeptic symptoms (64.1%), anxiety (54.2%), depression (44.1%), headache (29.0%), back pain (26.1%), heartburn (25.0%), and difficulty in urination (11.0%). In addition, an increased prevalence of extra-colonic symptoms, including headache and poor appetite were seen in female IBS patients.

IBS could be subdivided into IBS-C, IBS-D and IBS-A according to the predominant bowel habits. We found IBS-D (48.3%) to be the predominant habits, in order of IBS-A (32.7%) and IBS-C (19.0%). Lembo *et al*<sup>[26]</sup> using Rome I diagnostic criteria, who suggested the IBS-A in 49%, IBS-D in 33%, and IBS-C in 18%. Another study found that the IBS-A in 38%, IBS-C in 37%, and IBS-D in 25% by Rome II criteria<sup>[27]</sup>. 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 consistent with recent studies of IBS in Europe and U.S.A.<sup>[8,17]</sup>. 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<sup>[28]</sup>. The subgroups had significant difference in IBS predominant bowel symptoms according to Roma-II criteria and extra-colonic symptoms. Abdominal pain (frequency  $\geq 2$  days per week and duration  $\geq 1$  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*<sup>[27]</sup> 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-mediated afferent signals<sup>[8]</sup>. 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*<sup>[8]</sup> 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*<sup>[27]</sup> 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<sup>[29]</sup>. 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 consistent with the study<sup>[16,30]</sup> that QOL is low in patients with IBS, dimensions affected are particularly energy/fatigue, role limitation, physical pain and health perception. Gralnek *et al*<sup>[30]</sup> 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<sup>[31]</sup>. On the other hand, recent studies in Hong Kong<sup>[32,33]</sup> 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 abroad 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 differences between Eastern and Western countries. Generic QOL questionnaire SF-36, combined with IBS-specific QOL questionnaire will allow a clear understanding of link between IBS and QOL.

In conclusion, the present study offers insight into IBS-consulters patients in Zhejiang. Measurement of QOL in IBS can potentially help both medical decisions makers and policy planners allocated medical resources for treatment of patients.

## REFERENCES

- 1 **Thompson WG**, Longstreth G, Drossman DA, Heaten K, Irvine EJ, Mulfer Lissner S. Functional bowel disorders and functional abdominal pain. WE (editors). Rome II. The Functional Gastrointestinal Disorders, 2nd edition. Mclean, Virginia: Degnon Associates 2000: 361-432
- 2 **Barbezat G**, Poulton R, Milne B, Howell S, Fawcett JP, Talley N. Prevalence and correlates of irritable bowel symptoms in a New Zealand birth cohort. *N Z Med J* 2002; **115**: U220
- 3 **Bommelaer G**, Dorval E, Denis P, Czernichow P, Frexinos J, Pelc A, Slama A, El Hasnaoui A. Prevalence of irritable bowel syndrome in the French population according to the Rome I criteria. *Gastroenterol Clin Biol* 2002; **26**: 1118-1123
- 4 **Saito YA**, Schoenfeld P, Locke GR 3rd. The epidemiology of irritable bowel syndrome in North America: a systematic review. *Am J Gastroenterol* 2002; **97**: 1910-1915
- 5 **Jones R**, Lydeard S. Irritable bowel syndrome in the general population. *BMJ* 1992; **304**: 87-90
- 6 **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**: 1547-1552
- 7 **Pan G**, Lu S, Ke M, Han S, Guo H, Fang X. Epidemiologic study of the irritable bowel syndrome in Beijing: stratified randomized study by cluster sampling. *Chin Med J* 2000; **113**: 35-39
- 8 **Schmulson M**, Lee OY, Chang L, Naliboff B, Mayer EA. Symptom differences in moderate to severe IBS patients based on predominant bowel habit. *Am J Gastroenterol* 1999; **94**: 2929-2935
- 9 **Simren M**, Abrahamsson H, Bjornsson ES. An exaggerated sensory component of the gastrocolonic response in patients with irritable bowel syndrome. *Gut* 2001; **48**: 20-27
- 10 **Aggarwal A**, Cutts TF, Abell TL, Cardoso S, Familoni B, Bremer J, Karas J. Predominant symptoms in irritable bowel syndrome correlate with specific autonomic nervous system abnormalities. *Gastroenterology* 1994; **106**: 945-950
- 11 **Cole SJ**, Duncan HD, Claydon AH, Austin D, Bowling TE, Silk DB. Distal colonic motor activity in four subgroups of patients with irritable bowel syndrome. *Dig Dis Sci* 2002; **47**: 345-355
- 12 **Heitkemper M**, Jarrett M, Cain KC, Burr R, Levy RL, Feld A, Hertig V. Autonomic nervous system function in women with irritable bowel syndrome. *Dig Dis Sci* 2001; **46**: 1276-1284
- 13 **Weinryb RM**, Osterberg E, Blomquist L, Hultcrantz R, Krakau I, Asberg M. Psychological factors in irritable bowel syndrome: a population-based study of patients, non-patients and controls. *Scand J Gastroenterol* 2003; **38**: 503-510
- 14 **Creed F**, Ratcliffe J, Fernandez L, Tomenson B, Palmer S, Rigby C, Guthrie E, Read N, Thompson D. Health-related quality of life and health care costs in severe, refractory irritable bowel syndrome. *Ann Intern Med* 2001; **134**(9 Pt 2): 860-868
- 15 **Frank L**, Kleinman L, Rentz A, Ciesla G, Kim JJ, Zacker C. Health-related quality of life associated with irritable bowel syndrome: comparison with other chronic diseases. *Clin Ther* 2002; **24**: 675-689
- 16 **Whitehead WE**, Burnett CK, Cook EW 3rd, Taub E. Impact of irritable bowel syndrome on quality of life. *Dig Dis Sci* 1996; **41**: 2248-2253
- 17 **Simren M**, Abrahamsson H, Svedlund J, Bjornsson ES. Quality of life in patients with irritable bowel syndrome seen in referral centers versus primary care: the impact of gender and predominant bowel pattern. *Scand J Gastroenterol* 2001; **36**: 545-552
- 18 **Guthrie E**, Creed F, Fernandes L, Ratcliffe J, Van Der Jagt J, Martin J, Howlett S, Read N, Barlow J, Thompson D, Tomenson B. Cluster analysis of symptoms and health seeking behaviour differentiates subgroups of patients with severe irritable bowel syndrome. *Gut* 2003; **52**: 1616-1622
- 19 **Osterberg E**, Blomquist L, Krakau I, Weinryb RM, Asberg M, Hultcrantz R. A population study on irritable bowel syndrome and mental health. *Scand J Gastroenterol* 2000; **35**: 264-268
- 20 **Herschbach P**, Henrich G, von Rad M. Psychological factors in functional gastrointestinal disorders: characteristics of the disorder or of the illness behavior? *Psychosom Med* 1999; **61**: 148-153
- 21 **Li FX**, Patten SB, Hilsden RJ, Sutherland LR. Irritable bowel syndrome and health-related quality of life: a population-based study in Calgary, Alberta. *Can J Gastroenterol* 2003; **17**: 259-263
- 22 **Maxton DG**, Morris J, Whorwell PJ. More accurate diagnosis of irritable bowel syndrome by the use of 'non-colonic' symptomatology. *Gut* 1991; **32**: 784-786
- 23 **Huerta I**, Bonder A, Lopez L, Ocampo MA, Schmulson M. Differences in the stress symptoms rating scale in Spanish between

- patients with irritable bowel syndrome (IBS) and healthy controls. *Rev Gastroenterol Mex* 2002; **67**: 161-165
- 24 **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 II criteria for irritable bowel syndrome. *World J Gastroenterol* 2003; **9**: 2293-2299
- 25 **Wiklund IK**, Fullerton S, Hawkey CJ, Jones RH, Longstreth GF, Mayer EA, Peacock RA, Wilson IK, Naesdal J. An irritable bowel syndrome-specific symptom questionnaire: development and validation. *Scand J Gastroenterol* 2003; **38**: 947-954
- 26 **Lembo T**, Naliboff B, Munakata J, Fullerton S, Saba L, Tung S, Schmulson M, Mayer EA. Symptoms and visceral perception in patients with pain-predominant irritable bowel syndrome. *Am J Gastroenterol* 1999; **94**: 1320-1326
- 27 **Mearin F**, Balboa A, Badia X, Baro E, Caldwell E, Cucala M, Diaz-Rubio M, Fueyo A, Ponce J, Roset M, Talley NJ. Irritable bowel syndrome subtypes according to bowel habit: revisiting the alternating subtype. *Eur J Gastroenterol Hepatol* 2003; **15**: 165-172
- 28 **Lee OY**, Mayer EA, Schmulson M, Chang L, Naliboff B. Gender-related differences in IBS symptoms. *Am J Gastroenterol* 2001; **96**: 2184-2193
- 29 **Li L**, Wang HM, Shen Y. Development and psychometrics test of a Chinese version of the SF-36 health survey scales. *Zhonghua Yufang Yixue Zazhi* 2002; **36**: 109-113
- 30 **Gralnek IM**, Hays RD, Kilbourne A, Naliboff B, Mayer EA. The impact of irritable bowel syndrome on health-related quality of life. *Gastroenterology* 2000; **119**: 654-660
- 31 **Hahn BA**, Yan S, Strassels S. Impact of irritable bowel syndrome on quality of life and resource use in the United States and United Kingdom. *Digestion* 1999; **60**: 77-81
- 32 **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**: 1180-1186
- 33 **Lau EM**, Chan FK, Ziea ET, Chan CS, Wu JC, Sung JJ. Epidemiology of irritable bowel syndrome in Chinese. *Dig Dis Sci* 2002; **47**: 2621-2624

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