

# Quality of life measures in irritable bowel syndrome

*Expert Rev. Gastroenterol. Hepatol.* 4(3), 277–284 (2010)

Reuben KM Wong<sup>1,2</sup>  
and Douglas A  
Drossman<sup>1</sup>

<sup>1</sup>University of North Carolina Chapel Hill, NC, USA

<sup>2</sup>National University Hospital, Singapore

<sup>\*</sup>Author for correspondence:  
4150 Bi informatics Building,  
CB7080 School of Medicine, University  
of North Carolina at Chapel Hill,  
Chapel Hill, NC 27599-7080, USA  
[drossman@med.unc.edu](mailto:drossman@med.unc.edu)

Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder with significant morbidity, resulting from the interaction of physiologic, psychological, social, cultural and behavioral factors. In view of this complex interaction, and in the absence of a measurable biological index of disease, health-related quality of life (HRQoL) has emerged as an ideal measure for use in clinical trials and outcome studies. This article discusses the relevance of HRQoL measurement in IBS and its definition. It then explores the research methodology in HRQoL and describes how global measures and generic HRQoL instruments have been used in IBS. Finally, the IBS-specific HRQoL measures are described in detail, with an emphasis on their development, content and validation.

**KEYWORDS:** irritable bowel syndrome • outcome measures • quality of life

## What is health-related quality of life?

Health-related quality of life (HRQoL) is a broad concept that incorporates the patient's perceptions, illness experience and functional status as related to a medical condition. It is influenced by social, cultural, psychological and disease-related factors. **FIGURE 1** displays the associations of these factors with HRQoL. It can be seen that disease activity is only a component of HRQoL, and that there is a reciprocating relationship between HRQoL and its determinants. Therefore, measurement of HRQoL differs from standard disease measurements in two ways: evaluation must be understood as a composite of interacting biological and psychosocial influences, and the 'gold standard' of validation rests with the patient, since the contributing psychosocial determinants are not accessible through laboratory tests. In effect, HRQoL assessment quantifies the multiple factors producing illness (the patients' perception of ill-health), much like laboratory or disease activity assessment quantifies disease (the type and extent of inflammation or pathology).

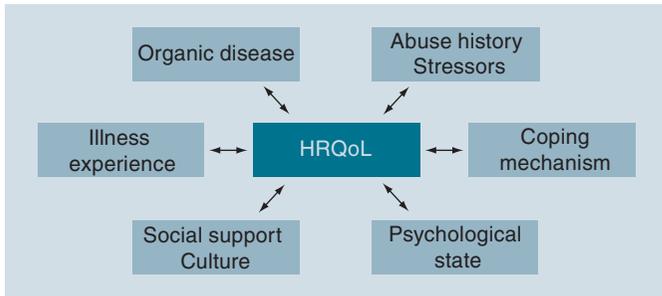
## Why measure HRQoL in irritable bowel syndrome?

Biological measures of disease activity, such as the stage of a cancerous lesion, have been used by physicians to describe severity, prognosticate and guide treatment in organic pathology. However, there is increasing recognition within gastroenterology that these 'objective' biological indices do not capture the patient's experience

of illness. In other words there is a wide variation in how individuals respond to disease. For example, despite having a peptic ulcer of equal size and depth in the stomach, one person may be relatively asymptomatic, while the other is incapacitated by pain. Patients respond differently to the disease elements of a medical disorder based on their previous experiences, socio-cultural environment and psychological state [1]. Additional information relating to quality of life and psychosocial factors must, therefore, be obtained to better understand and care for patients [2,3].

This dilemma is even more evident with irritable bowel syndrome (IBS) and other functional gastrointestinal disorders, where there is no objective component (e.g., structural pathology) that can be measured. One must rely on the patient's reporting of their illness experience (subjective health status) and HRQoL becomes a very important measure of health status in these patients.

Having an objective measure of HRQoL benefits several stakeholders involved in the management of patients with IBS. The patient can communicate how the illness has made an impact in his or her life. The physician can assess the patient's HRQoL as a tool in describing their level of functioning, and objectively track this function to gauge response to treatment. Investigators use HRQoL assessment as a uniform measure that can compare the data across subject cohorts and also to measure the efficacy of a response to



**Figure 1. Contributory factors to health-related quality of life.**

HRQoL: Health-related quality of life.

an intervention [4]. Finally, healthcare administrators and policy-makers can use HRQoL as a tool to make policy decisions and health-resource allocations for IBS patients [3].

### What defines HRQoL in IBS?

The manifestations of IBS depend upon a variety of factors. These include 'organic' elements, such as intestinal inflammation and previous enteric infections, and also multiple psychosocial components, such as psychological state, previous abuse history, coping mechanisms and social support [5]. Previous illness experience or 'illness behavior' also plays an important role [5]. These components contribute as illustrated in **FIGURE 1**. A HRQoL measure must take into account the influence of these elements on individual experiences and perceptions and synthesize them into a validated score, a measure of 'illness' that is meaningful and representative of the patient's health status.

It is important to make a distinction between HRQoL and other outcome measures. The emphasis in HRQoL is on the impact of the illness for the patient and its functional and behavioral consequences [6]. As such, the evaluation should reflect the patients' role limitations and impairment of daily functioning caused by the physical health problems. Therefore, while the pathophysiology of IBS is the main component affecting HRQoL, the disorder should be viewed and understood in a biopsychosocial context [7].

### Research methodology in HRQoL

There are different ways of measuring and quantifying HRQoL, and the choice of one instrument over another would depend on the research or clinical question being asked, the detail of information required and the resources available (e.g., a lengthy questionnaire may provide a great deal of information, but would not be practical for use during a short clinical consult session).

When evaluating an instrument, one should consider its qualities. First, is it discriminative? This means is it able to differentiate between individuals or groups of individuals at a point in time. Such an instrument would be good for performing interindividual comparisons, for example, how the HRQoL of IBS patients compares with a control group. A discriminative instrument should have reproducibility (the ability to duplicate results over a period), as well as reliability (the ability to consistently measure the variability between patients with a low intrasubject variability – a high signal-to-noise ratio) [8,9].

The other type of instrument is one with evaluative capabilities that is able to determine how a subject's HRQoL has changed over time or following an intervention (intraindividual). An evaluative scale is responsive – it can detect clinically important changes, even small ones, over a period of time. Both types of measures need to be valid, that is, to measure what they are supposed or designed to – the 'truth'. In the realm of HRQoL measurement, there is no 'gold standard', so true validity is measured using alternative means – criterion, construct and content validity. It is useful to consider these concepts as we continue our discussion and evaluate the various instruments available in the measure of HRQoL in IBS [9].

There is no perfect measure that can be used in all scenarios, and it is incumbent on the clinician/researcher to understand the different methods and tools available, before making an individualized decision on what best suits his/her needs. This article aims to do so, by laying out the different ways of evaluating HRQoL in IBS, discussing the different types of measures available and highlighting the salient characteristics of the individual instruments that are currently available.

### Global measure

A global measure is usually a single question that incorporates the different components contributing to HRQoL into a single response. The general and overarching question that clinicians use at every clinic session – 'how are you today?' or perhaps more specifically 'how has your illness affected you?' is actually a concise single measure of their HRQoL, and the patient's spontaneous response of 'bad', 'so-so' or 'good' can be considered as a rudimentary grading scale [10]. In inflammatory bowel disease (IBD), the generic question on overall wellbeing was found to correlate well with the Crohn's Disease Activity Index score itself, and was a strong predictor of physician visits for patients with IBD [11]. This concept of a single global response measure has been used in clinical trials of IBS remedies as a primary end point. Notably, the studies using cilansetron [12], alosetron [13] and tegaserod [14] all showed statistically significant results when the intervention was compared against placebo using the single end point of 'adequate relief'. More importantly, it was found to be responsive, reproducible and moved in the same direction as other more comprehensive measures [15]. The Rome Foundation Committee have now recognized this single response as a validated outcome measure [16,17]. However, it must be recognized that this easily obtainable single question about a patient's overall health status provides no insight into the components that drive this response.

### Generic HRQoL instruments

Generic measures assess HRQoL in ways that are independent of the specific aspects of the disease. A major advantage to using a generic measure is that it can cut across health conditions (e.g., social function, work ability, home management and pain). In addition, these instruments have been used and validated on a variety of medical disorders, their extensive use often leads to a variety of linguistic and cultural translations and they allow for comparison between medical conditions. The disadvantage of a generic measure is that it is not condition specific. In other words, the findings address overarching

concepts, for example, ability to engage in social activities, rather than more specific concepts unique to the IBS condition, such as the need to be near a bathroom. The two basic types of health surveys are the health profile (health surveys) and utility measures [8,18].

### Health profile

Health profiles are multi-item instruments, incorporating several dimensions of the patient's illness experience and behavior into domains, such as physical and psychosocial functioning or perceptions of disease impact. Responses to individual questions create a score, which are summated to generate component scores and finally an overall sum score.

An example of such an instrument is the Short Form (SF)-36. It encompasses 36 items that cover eight domains, namely general perception, physical functioning, social functioning, vitality, social functioning, mental health, role limitations from physical health and role limitations from emotional problems. There are summary scores for physical health (the physical component summary) and mental health (the mental component summary) in addition to the subscores for each of the eight domains measured [19].

Using the ability of generic HRQoL measures to compare between studies, Gralnek *et al.* demonstrated that IBS patients had a poorer health status compared with the general population and patients with other chronic diseases. By using a well-validated and widely used generic instrument, they were able to compare a cohort of 877 IBS patients against published results of the total scores and subscale scores of other subjects without having to resurvey these groups. In comparing against the US general population data, IBS patients scored significantly lower on each of the eight SF-36 scales and both the mental and physical component scores (all  $p$ -values  $< 0.001$ ) [20].

Compared with moderate-to-severe symptomatic gastro-esophageal reflux disease patients, the IBS subjects displayed significantly lower scores on all eight scales, except physical functioning, and on both the mental and physical scores. When pegged against diabetes patients, the IBS patients scored lower overall, except for physical functioning. This was significant in that nearly half of the diabetes patients had disease-related complications, highlighting the fact that IBS can be even more debilitating than an organic disease. There were similar striking findings when compared against end-stage renal disease patients, where IBS patients scored more poorly on energy, bodily pain and social functioning – significant because end-stage renal disease is a disease with a heavy morbidity and mortality. Finally, when compared against a mental illness, namely depression, IBS patients had a worse physical functioning score, but depressed patients had a more severe mental composite rating [20].

Another health-profile measure that has been used in studying IBS is the Sickness Impact Profile (SIP) [21]. It consists of 136 items encompassing 12 discrete areas of daily functioning (ambulation, mobility, body care, social interaction, communication, alertness, emotional behavior, eating, work, rest, home management and recreation). There is an overall score, a physical domain with three subscales, a psychosocial domain with four subscales and five independent domains. Using the SIP on patients seen in a gastroenterology clinic, Drossman *et al.* showed that functional gastrointestinal disorders, including IBS, produced greater levels of

impairment compared with other organic gastrointestinal disorders. Significantly, IBS patients fared worse in the areas of daily function, days in bed, psychological distress and pain severity [22]. The performance of the SIP has also been compared against disease-specific instruments in assessing treatment effects in IBS patients. In evaluating the Irritable Bowel Syndrome – Quality of Life (IBS-QoL; an IBS disease-specific HRQoL questionnaire) against the SIP to assess response to treatment, Drossman *et al.* demonstrated moderately significant correlations in the SIP total score ( $r = 0.28$ ;  $p = 0.0004$ ) and psychosocial score ( $r = 0.29$ ;  $p = 0.0002$ ), with more moderate correlations in the other SIP subscales [23]. A recent study has shown that the clinically meaningful improvement for IBS would be an increase of 2.8 points [24].

### Utility measures

Utility measures are specific applications derived from clinical decision making. One measure is the time trade-off technique, which evaluates the patient's perception of existing health compared with death [25]. A score ranging from 0 (equal to death) to 1.0 (equal to full health) is calculated by having patients choose between living in their current state of health versus trading-off years of their life to live in perfect health. For example, a female with an actuarial life-expectancy of 80 years may feel her health is so poor she is willing to trade off 40 years to attain perfect health, translating into a utility score of 40 out of 80 = 0.50. Compare this with her counterpart who has a relatively good health status and is only willing to trade off 10 years to achieve perfect health; her utility score is 70 out of 80 = 0.88.

In describing the years of life IBS patients were willing to trade-off to achieve perfect health, Drossman *et al.* surveyed 1966 subjects who had moderate-to-severe impairment in their health status. To lead a life free of all their symptoms, they would be willing to give up a quarter of their remaining years of life (averaging 15 years). This translates into a willingness to 'trade-off' 25% of their lifespan for a disease-free existence, and is a powerful and tangible indicator of the extent these IBS patients had suffered from their symptoms [26].

Another utility index of HRQoL would be the measured risk a patient was willing to accept from a treatment in order to achieve perfect health. In the same survey previously described, 14% of the IBS patients were willing to risk a treatment with a one out of 1000 chance of death to make them symptom-free [26].

While a utility measure remains a crude marker that provides no information on the domains within which deterioration or improvement occurs, it is an index patients can easily identify with, and represents a measurable marker of their health status and HRQoL.

Ultimately, the major disadvantage of a generic HRQoL measure is that gastrointestinal symptoms are not specifically questioned, and overall they may be insensitive to changes that are specific to IBS, resulting in a failure to fully capture the subjective evaluation of HRQoL associated with the symptoms of IBS and its treatment [8].

### IBS-specific HRQoL instruments

Compared with generic measures, disease-specific HRQoL instruments evaluate specific symptoms and areas of a disease that have an impact on a subject's HRQoL. Advantages are that they are

more responsive to clinical changes over time and they are more closely related to areas commonly evaluated by physicians [27]. For example, a disease-specific measure for IBS would contain questions relating to abdominal pain, bowel habits and how these affect a subject's HRQoL.

There are a large number of digestive disease questionnaires available, including generic digestive system instruments, such as the Digestive Health Status Instrument [28], Gastrointestinal Quality of Life Index [29] and Gastrointestinal Symptom Rating Scale [30]. Some of these, such as the Gastrointestinal Symptom Rating Scale and Digestive Health Status Instrument, have been used for functional gastrointestinal diseases, but will not be considered in the subsequent discussion as they remain generic in nature and were not primarily designed upon an IBS patient population. There are five IBS-specific questionnaires in use. TABLE 1 summarizes the characteristics of the instruments, and each are individually discussed next, with an emphasis on development, validation and questionnaire component.

### IBS-QoL

One of the first IBS-specific questionnaires to be developed was the IBS-QoL by Patrick *et al.* in 1998 [31]. Following a literature and instruments review, the original items were devised from a conceptual model and qualitative interviews with clinicians and a group of 40 IBS patients. This was followed by a cognitive debriefing phase and cultural adaptation process that reduced the questionnaire to a 41-item instrument anchored on a five-point Likert scale. This was tested on a group of 156 patients from two study sites who fulfilled the Rome criteria. They were divided across the three IBS subtypes and were predominantly Caucasian females. Seven items were eliminated because of redundancy, ceiling effect and low item-scale correlation. Principal component analysis identified eight substructure domains – namely dysphoria, activity interference, body image, health worry, food avoidance, social reaction, sexual and relationships. Each of these provides a subscale score and summates to give an overall score. The final 34-item IBS-QoL showed a high internal consistency reliability and reproducibility. The overall Cronbach's  $\alpha$  was 0.95, with excellent scores in nearly all the domains (body image 0.75, dysphoria 0.92, food avoidance 0.76, health worry 0.70, interference with activity 0.84, sexual 0.83, social reaction 0.74) except relationships, with a lower score of 0.65. Similarly, the interclass correlation coefficient scores, over an average retest period of 1 week, were comparably good (overall score 0.86, body image 0.85, dysphoria 0.89, food avoidance 0.76, health worry 0.86, interference with activity 0.88, sexual 0.77, social reaction 0.84), once again with a lower score on relationships (0.69). Convergent and discriminant validity results were strong between the IBS-QoL and the SF-36 and Symptom Checklist-90-Revised [31]. A later study showed that the instrument was responsive to treatment changes over time [23].

It has since been validated again in a multicenter trial on females with IBS who were undergoing treatment. It showed significant correlation between change in scores on the IBS-QoL and other measures of treatment effect [24]. The study also demonstrated responsiveness of the instrument, with the IBS-QoL able to differentiate responders from nonresponders and also determined that

the clinically meaningful difference ranges from 10 to 14 points on this measure [24]. More recently, in a randomized double-blinded clinical trial assessing the efficacy of lubiprostone in constipation-predominant IBS patients, the IBS-QoL demonstrated a clinically meaningful difference in the domains of social reaction, food avoidance, health worry, body image and dysphoria [32].

A consensus review panel found that the IBS-QoL showed both accurate psychometric and methodological qualities, and was valid, responsive and reliable [33]; the major shortcoming, as with most of the other IBS-specific instruments, was that it had never been tested in a primary-care population. It recommended this as the instrument of choice in assessing IBS-related HRQoL.

### IBS-36

This is another IBS-specific HRQoL instrument, developed by Groll *et al.* in 2002 [34]. Conception of the questionnaire was through a literature review, followed by interviews with eight IBS patients and nine healthcare professionals. The original questionnaire had 70 items and covered eight domains – daily activities, emotional impact, family relations, food, sleep and fatigue, social impact, sexual relations and symptoms. This original version was tested on a cohort of 107 IBS sufferers, and through consensus and following evaluation it was reduced to a 36-question questionnaire. Scoring is on a 7-point Likert scale ranging from 0 through to 6, giving a maximal total score of 216. This instrument is negatively scored (i.e., a lower score equates to a better QoL) and assesses patients' symptoms over a 2-month period.

The IBS-36 was reported to have high internal consistency with an overall Cronbach's  $\alpha$  of 0.95. When it was readministered to the same group of 107 IBS patients after 2 weeks, it returned a good test-retest reliability with a Spearman's score of 0.92. It was also tested and shown to correlate with the McGill pain scores, Medical Outcome Study short form questionnaire and IBS patient-reported sleep, symptom and pain scores. In testing for construct validity, reliability, reproducibility and responsiveness, Groll *et al.* used structured interviews by three gastroenterologists; this differed from the IBS-QoL, whose development was based on self-administered questionnaires [34].

### Functional Digestive Disorders Quality of Life

The Functional Digestive Disorders Quality of Life (FDD-QoL) was one of the first functional digestive disease-specific QoL instruments to be developed. Created by Chassany *et al.* to provide a disease-specific measure of QoL for functional dyspepsia and IBS in 1997, it started as a 74-item survey generated by three French clinicians, based on literature reviews and patient surveys [35]. The questionnaire was tested on 31 functional digestive disease patients and 11 healthy volunteers, and then reduced to 59 items. It was tested for reproducibility on 58 patients over a period of approximately 1 month, yielding a good interclass correlation coefficient of 0.98.

The questionnaire was tested in two randomized pharmacotreatment trials using acetorphan and fedotazine, where the data generated allowed factor analysis and item aggregation into 12 scales [36]. An expert panel and 65 patients verified the contents of the questionnaire, and this resulted in a further reduction of nine

**Table 1. Irritable bowel syndrome-specific health-related quality of life instruments.**

Questionnaire	Authors	Questions	Dimensions	Response format	Scales/scoring	Recall period	Ref.
IBS-QoL	Patrick <i>et al.</i>	34-item	Dysphoria Activity interference Body image Health worry Food avoidance Social reaction Sexual Relationships	5-point Likert scale (positively scored)	Overall score (often transformed to a 100-point scale: range 0–100) Eight subscale scores	2 weeks	[23,24,31]
IBS-36	Groll <i>et al.</i>	36-item	Daily activities Emotional impact Family relations Food Sleep and fatigue Social impact Sexual relations Symptoms	7-point Likert scale (negatively scored)	Global score (range 0–216)	2 months	[34]
FDD-QoL	Chassany <i>et al.</i>	43-item	Activities Anxiety Diet Sleep Discomfort Health perception Disease coping Stress	6-point Likert scale	Global score (transformed into a 100-point scale: range 0–100)	2 weeks	[35]
IBSQoL	Hahn <i>et al.</i>	30-item	Emotional health Mental health Sleep Energy Physical functioning Diet Social role Physical role Sexual relations	5–6-point Likert scale	Global score (often transformed to a 100-point scale: range 0–100)	4 weeks	[37,40]
IBS-HRQoL	Wong <i>et al.</i>	26-item	Bowel symptoms Fatigue Activity impairment Emotional dysfunction	7-point scale	Domain average scores (calculated by dividing the domain sum score by the number of items: range 1–7)	2 weeks	[41]

FDD-QoL: Functional Digestive Disorders Quality of Life; IBS-HRQoL: Irritable Bowel Syndrome Health Related Quality of Life; IBSQoL: Irritable Bowel Syndrome Quality of Life Questionnaire; IBS-QoL: Irritable Bowel Syndrome – Quality of Life.

items. Finally, the questionnaire was translated before being tested in a multinational European trial, following which there was a further reduction of the instrument to the final form of 43 items over eight domains – activities, anxiety, diet, sleep, discomfort, health perception, disease coping and stress. Scoring is on a 6-point Likert scale with an overall score and individual scale scores, based on the patient's assessment of their condition over the past fortnight [35].

In the final multinational psychometric validation study, the instrument showed good reliability with an overall Cronbach's coefficient of 0.94 (scale coefficients 0.69–0.89). The instrument showed discriminant validity with a correlation between more severe disease and a worse QoL measure. Concurrent validity was demonstrated between the FDD-QoL and a generic QoL

instrument, the SF-36 [35]. When scored by the consensus panel, the FDD-QoL had good psychometric quality but insufficient methodological quality and practical utility.

#### **Irritable Bowel Syndrome Quality of Life Questionnaire**

Hahn *et al.* devised and reported the use of the Irritable Bowel Syndrome Quality of Life Questionnaire (IBSQoL) in 1997 [37]. As with the previously discussed instruments, the development began with a literature review, examination of existing questionnaires and physician discussions. Questions were drawn and modified from two other validated instruments – the Heartburn Quality of Life and the Bowel Symptom Checklist questionnaires [38,39]. A review by a group of gastroenterologists resulted

in a 46-item questionnaire over ten scales – emotional health, mental health, health belief, sleep, energy, physical functioning, diet, social role, physical role and sexual relations. Scores were recorded on a 5–6-point Likert scale and transformed to a 100-point score, where a higher score represented a better QoL. The questions were asked in a recall period over the previous 4 weeks.

The questionnaire was tested on two tertiary care groups of IBS patients at two separate sites (126 patients in California, USA and 122 in Tennessee, USA), as well as three focus groups [40]. This resulted in a reduction of the items by 16, and the elimination of the health-belief scale, which had shown poor validity. The resultant 30-item, nine-scale instrument was tested on subjects from an IBS support group and showed overall acceptable reliability, with Cronbach's  $\alpha$  scores in the domains ranging from 0.66–0.93. There was good internal construct validity, as evidenced by good scale–scale correlations. When tested on patients with and without IBS, the IBSQoL reflected similar scores in patients with IBS across two groups, and differing scores when comparing subjects with versus without the disease, suggesting the ability to discriminate [37].

While the instrument seems relatively easy to score by patients, it has yet to be assessed for responsiveness, that is, if it is able to determine changes in QoL in the same individual following a therapeutic intervention.

#### **Irritable Bowel Syndrome Health-Related Quality of Life**

The Irritable Bowel Syndrome Health Related Quality of Life was developed by Wong *et al.* [41]. Through literature reviews, clinician and physician interviews, the authors identified 182 items over seven domains (symptoms, activities, work/school-related problems, leisure/social, emotional function, sexual/marital problems and relationships) that represented potential problem areas for IBS sufferers. The instrument was tested on 100 patients, and through factor analysis and reduction was pared down to 26 items covering four domains – namely bowel symptoms, fatigue, activity impairment and emotional function. Scoring is on a 7-point scale (score range 1–7), with a higher score indicating a better HRQoL. An average score is then calculated for each domain by summing the scores for all the questions within that domain, then dividing it by the number of questions within.

The final questionnaire was tested on 16 patients, with the authors reporting that the subjects had found it clear and satisfactory. There was no further testing of the measurement properties of this instrument. While it has potential for use as a concise outcome measure in clinical trials, it has yet to be satisfactorily validated [41].

#### **Expert commentary & five-year view**

The evidence highlighting the significantly diminished HRQoL among IBS patients could not be clearer. From the patient's perspective, an International Foundation for Gastrointestinal Disorders survey revealed that two-thirds of sufferers found their symptoms to be at least 'very bothersome' in relation to daily comfort, work, school and activities with family and friends [42]. In a more recent survey of nearly 2000 IBS patients in the USA and Canada, respondents had to restrict their activities on average

73 days per annum (20% of the calendar year) owing to their disease symptoms [26]. The two studies by Gralnek and Drossman using the SF-36 and SIP, respectively, show that the detriment to HRQoL by IBS is equivalent to, if not often worse than, that experienced by patients with organic pathology [20,23].

As a disorder that cannot be measured by objective means, we rely on the symptoms patients present with, their perceived severity, impact on daily function and reported health behavior. As such, the assessment of HRQoL is pivotal in understanding the experience of the illness for the patient, to guide treatment decisions by clinicians and to help health policy decisions be made.

As we move more toward an emphasis on patient-centered care, we need valuable methods to assess symptoms (e.g., Rome criteria [43]), severity (via standard instruments such as Irritable Bowel Syndrome Severity Scoring System or Functional Bowel Disorder Severity Index [44,45]) daily function (via function measures such as SIP), generic measures of HRQoL (e.g., SF-36 and SIP) and more specific measures of health perceptions and attitudes, namely condition-specific HRQoL measures. It is important to be aware of these distinctions in being able to understand the full impact of illness on the person with IBS.

The use of condition-specific measures that are well validated also allows for their use as secondary end points in clinical trials, as recommended by the Rome Foundation and regulatory agencies. A consensus panel of experts evaluated five of the IBS-specific HRQoL instruments available and surmized that the IBS-QoL was the most extensively validated measure and showed both accurate psychometric and methodological properties [33]. This speaks to a need for further validity assessment of the existing HRQoL instruments.

Future interest is needed in understanding HRQoL from a crosscultural context. A study by Levenstein *et al.* evaluated the Rating Form of Inflammatory Bowel Disease Patient Concerns across countries and cultures, and found that there were large variations in the responses between IBD patients in different countries, with agreement on some concerns and wide divergence on others [46]. Among the IBS-specific measures, the IBS-QoL has had international harmonization and has been translated into over two dozen languages. More work is needed to do the same for other HRQoL instruments and to then look at cross-cultural comparisons with regard to differences in HRQoL.

Finally, we believe that the impact posed by IBS has an effect not only on the patient, but also has considerable impact on the spouse and family members. Preliminary data from a study by the authors have shown that the spouses or partners of patients carry a significant burden and consequently suffer a poor HRQoL themselves [47].

#### **Financial & competing interests disclosure**

*The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.*

*No writing assistance was utilized in the production of this manuscript.*

## Key issues

- Health-related quality of life (HRQoL) is an ideal outcome measure in irritable bowel syndrome (IBS), a multifactorial functional disorder with no quantifiable biological index.
- A HRQoL measure should be understood in a biopsychosocial context, reflecting the impact of IBS for the patient and its functional and behavioral consequences.
- HRQoL measures used in IBS include global measures (single-question measure), generic instruments (health profiles, utility measures) and IBS-specific measures.
- The global measure of 'adequate relief' was found to be responsive, reproducible and recognized as a validated outcome measure in IBS treatment; however, it provides no insight into the components that drive the response.
- Generic measures, such as the sickness impact profile and short form-36, have been well used and validated in IBS and allow inter-disease comparisons, but are less sensitive to the IBS-specific effects on HRQoL.
- Five IBS-specific HRQoL measures are described. Differences in development, questionnaire construction and validation are discussed, and one should consider these factors when selecting an appropriate measure to use.
- Future developments should include further validation of existing IBS-specific measures and cross-cultural harmonization.

## References

- Drossman DA. Psychosocial considerations in gastroenterology. In: *Gastrointestinal Disease: Pathophysiology, Diagnosis, Management (5th Edition)*. Sleisenger MH, Fordtran JS (Eds). Saunders, PA, USA 3–17 (1993).
- Garrett JW, Drossman DA. Health status in inflammatory bowel disease: biological and behavioral considerations. *Gastroenterology* 99, 90–96 (1990).
- Drossman DA. Psychosocial factors in ulcerative colitis and Crohn's disease. In: *Inflammatory Bowel Disease (4th Edition)*. Kirsner JB, Shorter RG (Eds). Williams & Wilkins, MD, USA, 492–513 (1995).
- Patrick DL, Erickson P. *Health Status and Health Policy: Quality of Life in Health Care Evaluation and Resource Allocation*. Oxford University Press, NY, USA (1993).
- Drossman DA, Creed FH, Fava GA *et al.* Psychosocial aspects of the functional gastrointestinal disorders. *Gastroenterol. Int.* 8, 47–90 (1995).
- Drossman DA, Patrick D. Re: Groll *et al.* – Comparison of IBS-36 and IBS-QoL instruments. *Am. J. Gastroenterol.* 97(12), 3204 (2002).
- Drossman DA. Presidential address: gastrointestinal illness and biopsychosocial model. *Psychosom. Med.* 60, 258–267 (1998).
- Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. *Ann. Intern. Med.* 118, 622–629 (1993).
- Kirshner B, Guyatt G. A methodologic framework for assessing health indices. *J. Chronic Dis.* 38, 27–36 (1985).
- Torrance GW. Utility approach to measuring health-related quality of life. *J. Chronic Dis.* 40, 593–600 (1987).
- Drossman DA, Leserman J, Mitchell CM, Li Z, Zagami EA, Patrick DL. Health status and health care use in persons with inflammatory bowel disease: a national sample. *Dig. Dis. Sci.* 36, 1746–1755 (1991).
- Caras S, Krause G, Biesheuvel E, Steinborn C. Cilansetron shows efficacy in non-constipated irritable bowel syndrome patients independent of the definition of the patient population by Rome I or Rome II. *Gastroenterology* 120(Suppl. 1), A217 (2001) (Abstract 1138).
- Camilleri M, Mayer EA, Drossman DA *et al.* Improvement in pain and bowel function in female irritable bowel patients with Alosetron, a 5HT<sub>3</sub>-receptor antagonist. *Aliment. Pharmacol. Ther.* 13, 1149–1159 (1999).
- Kellow J, Lee OY, Chang FY *et al.* An Asia-Pacific, double blind, placebo controlled, randomised study to evaluate the efficacy, safety, and tolerability of tegaserod in patients with irritable bowel syndrome. *Gut* 52, 671–676 (2003).
- Mangel AW, Hahn BA, Heath AC *et al.* Adequate relief as an endpoint in clinical trials in irritable bowel syndrome. *J. Int. Med. Res.* 26, 76–81 (1998).
- Irvine EJ, Whitehead WE, Chey WD *et al.* Design of treatment trials for functional gastrointestinal disorders. *Gastroenterology* 130, 1538–1551 (2006).
- Spiegel B, Camilleri M, Bolus R *et al.* Psychometric evaluation of patient reported outcomes in IBS randomized controlled trials: a Rome foundation working group report. *Gastroenterology* 137, 1944–1953 (2009).
- Patrick DL, Deyo RA. Generic and disease-specific measures in assessing health status and quality of life. *Med. Care* 27, S217–S232 (1989).
- Ware JE, Sherbourne CD. The MOS 36-item short form Health Survey (SF-36): I. Conceptual framework and item selection. *Med. Care* 30, 473–483 (1992).
- Gralnek IM, Hays RD, Kilbourne A, Naliboff B, Mayer E. The impact of irritable bowel syndrome on health-related quality of life. *Gastroenterology* 119, 655–660 (2000).
- Bergner M, Bobbitt RA, Carter WB. The Sickness Impact Profile: development and final revision of a health status measure. *Med. Care* 19, 787–805 (1981).
- Drossman DA, Li Z, Leserman J, Toomey TC, Hu Y. Health status by gastrointestinal diagnosis and abuse history. *Gastroenterology* 110, 999–1007 (1996).
- Drossman DA, Patrick DL, Whitehead WE *et al.* Further validation of the IBS-QoL: a disease specific quality of life questionnaire. *Am. J. Gastroenterol.* 95, 999–1007 (2000).
- Drossman D, Morris CB, Hu Y *et al.* Characterization of health related quality of life (HRQoL) for patients with functional bowel disorder (FBD) and its response to treatment. *Am. J. Gastroenterol.* 102, 1442–1453 (2007).
- Torrance GW, Thomas WH, Sackett DL. A utility maximization model for evaluation of health care program. *Health Serv. Res.* 7, 118–133 (1972).
- Drossman DA, Morris C, Schneck S *et al.* International survey of patients with IBS: symptom features and their severity, health status, treatments, and risk taking to achieve clinical benefit. *J. Clin. Gastroenterol.* 43, 541–550 (2009).
- Guyatt G, Walter S, Norman G. Measuring change over time: assessing the usefulness of evaluative instruments. *J. Chronic Dis.* 40, 171–178 (1987).

- 28 Shaw M, Talley NJ, Adlis S, Beebe T, Tomshine P, Healey M. Development of a digestive health status instrument: tests of scaling assumptions, structure and reliability in a primary care population. *Aliment. Pharmacol. Ther.* 12, 1067–1078 (1998).
- 29 Eypasch E, Wood-Dauphinee S, Williams JL, Ure B, Neugebauer E, Troidl H. Der gastrointestinale lebensqualitätsindex (GLQI). *Chirurg* 4, 264–274 (1993).
- 30 Svedlund J, Sjodin I, Dotevall G. GSRS – a clinical rating scale for gastrointestinal symptoms in patients with irritable bowel syndrome and peptic ulcer disease. *Dig. Dis. Sci.* 33, 129–134 (1988).
- 31 Patrick DL, Drossman DA, Frederick IO, DiCesare J, Puder KL. Quality of life in persons with irritable bowel syndrome: development of a new measure. *Dig. Dis. Sci.* 43, 400–411 (1998).
- 32 Drossman DA, Chey WD, Johanson JF *et al.* Clinical trials: Lubiprostone in patients with constipation-associated irritable bowel syndrome – results of two randomized, placebo-controlled trials. *Aliment. Pharmacol. Ther.* 29, 329–341 (2009).
- 33 Bijkerk CJ, de Wit NJ, Muris JW, Jones RH, Knottnerus JA, Hoes AW. Outcome measures in irritable bowel syndrome: comparison of psychometric and methodological characteristics. *Am. J. Gastroenterol.* 98, 122–127 (2003).
- 34 Groll D, Vanner SJ, Depew WT *et al.* The IBS-36: a new quality of life measure for irritable bowel syndrome. *Am. J. Gastroenterol.* 97, 962–971 (2002).
- 35 Chassany O, Marquis P, Scherrer B *et al.* Validation of a specific quality of life questionnaire for functional digestive disorders. *Gut* 44, 527–533 (1999).
- 36 Chassany O, Geneve J, Abitol JL *et al.* Specific quality of life questionnaire in irritable bowel syndrome. Effect of fetoizidine. *Gastroenterology* 108, A581 (1995).
- 37 Hahn BA, Kirchdoerfer LJ, Fullerton S, Mayer E. Evaluation of a new quality of life questionnaire for patients with irritable bowel syndrome. *Aliment. Pharmacol. Ther.* 11, 547–552 (1997).
- 38 Talley NJ, Phillips SF, Melton LJ, Wiltgen C, Zinsmeister AR. A patient questionnaire to identify bowel disease. *Ann. Intern. Med.* 111, 671–674 (1989).
- 39 Drossman DA. A questionnaire for functional bowel disorders. *Ann. Intern. Med.* 111, 627–629 (1989).
- 40 Hahn BA, Kirchdoerfer LJ, Fullerton S, Mayer E. Patient-perceived severity of irritable bowel syndrome in relation to symptoms, health resource utilization and quality of life. *Aliment. Pharmacol. Ther.* 11, 553–559 (1997).
- 41 Wong E, Guyatt GH, Cook DJ, Griffith LE, Irvine EJ. Development of a questionnaire to measure quality of life in patients with irritable bowel syndrome. *Eur. J. Surg. Suppl.* 583, 50–56 (1998).
- 42 International Foundation for Functional Gastrointestinal Disorders. *IBS in the Real World Survey*. International Foundation for Functional Gastrointestinal Disorders, WI, USA, 1–20 (2002).
- 43 Drossman DA, Corazziari E, Delvaux M *et al.* *Rome III: the functional gastrointestinal disorders (3rd Edition)*. Rome Foundation, VA, USA, 1377–1556 (2006).
- 44 Francis CY, Morris J, Whorwell PJ. The irritable bowel severity scoring system: a simple method of monitoring irritable bowel syndrome and its progress. *Aliment. Pharmacol. Ther.* 11, 395–402 (1997).
- 45 Drossman DA, Li Z, Toner BB *et al.* Functional bowel disorders: a multicenter comparison of health status, and development of illness severity index. *Dig. Dis. Sci.* 40, 986–995 (1995).
- 46 Levenstein S, Li Z, Almer S *et al.* Cross-cultural variation in disease-related concerns among patients with inflammatory bowel disease. *Am. J. Gastroenterol.* 96, 1822–1830 (2001).
- 47 Wong RK, Drossman DA, Morris CB *et al.* Partner burden in irritable bowel syndrome. *Gastroenterology* 138(Suppl. 1), S128, A904 (2010).