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An international study of irritable bowel syndrome: Family relationships and mind-body attributions

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Abstract

Irritable bowel syndrome (IBS) is a functional gastrointestinal illness, characterized by potentially debilitating symptoms without pathologic findings, often associated with psychological conditions. Little is known about the psychosocial aspects of this condition on an international scale. A total of 239 patients in eight countries were given a series of psychological and medical questionnaires, including IBS activity, relationships with significant others, beliefs regarding the etiology of symptoms, and assessment of quality of life. There were highly significant associations between IBS severity and all other measures. Symptoms were worse if relationship conflict was high and if attributions about illness were physiological rather than psychological. Symptoms were less severe if relationship depth and support were high, and illness was viewed as psychological. Implications for treatment are discussed.

Keywords: Irritable bowel syndrome; Family dynamics; Cross-cultural; Mind-body

Introduction

This is the first international study of psychosocial aspects of irritable bowel syndrome (IBS), a highly prevalent gastroenterological illness. Patients were surveyed in eight countries located in Asia, Europe and the Americas. IBS is often associated with psychopathology and is described as a biopsychosocial condition, wherein patients suffer from a disordered bowel pattern and abdominal pain in the absence of observable pathology (Drossman, 1996). We were interested in: (1) how beliefs about the relationship of mind and body were related to symptomatology; (2) whether quality of personal relationships had an effect on symptom reporting and (3) how symptom intensity affected quality of

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life. Our primary focus was on the universality versus variability of these correlates across national boundaries.

Health research has recently begun to focus on the beliefs and expectations that accompany illness. A basic divide in beliefs about illness is the degree to which psychological versus somatic beliefs and attributions are salient. (Robbins & Kirmayer, 1991). Beliefs about illness are necessarily embedded in cultural world views. For example, anthropologists have identified Asian cultures as more collectively rather than individually oriented. Describing such cultures, Schweder (1991) notes: ''Linked to each other in an interdependent system, members of organic cultures take an active interest in one another's affairs and feel at ease in regulating and being regulated. Indeed, others are the means to one's functioning and vice versa'' (p. 154). As Kleinman, Eisenberg, and Good (1978) note, ''Illness behavior is a normative experience governed by cultural rules: we learn ''approved'' ways of being ill. It is not surprising then, that there can be marked cross-cultural and historical variation in how disorders are defined'' (p. 252).

IBS is often associated with stress and anxiety. Indeed research regarding the psychological correlates of IBS reveals increased anxiety and depression compared to a normal population (Blanchard, Scharff, Schwarz, Suls, & Barlow, 1990) as well as impaired quality of life (Gralnek, Hays, Kilbourne, Naliboff, & Mayer, 2000). Consequently IBS has been more recently and officially been viewed in the medical community as psychosomatic in nature. IBS patients frequently report multiple symptoms that have supported a somaticizing perspective (Whitehead, Palsson, & Jones, 2002). There is a clinically documented 30% overlap of patients suffering from IBS and fibromyalgia (Sperber, Atzmon, & Neumann, 1999). It is believed that patients more readily seek specialist gastrointestinal care because they are psychologically distressed (Drossman et al., 1988). However, recent data indicates that pain is also a major determinant of physician visits (Talley, Boyce, & Jones 1997).

The concepts of somatization, and of psychosomatics in general can be expanded through a family systemic perspective, reflected in the recently evolved approach of medical family therapy. As identified by McDaniel, Hepworth, and Doherty (1992), ''This approach assumes that no biomedical event occurs without psychosocial repercussions, and that no psychosocial event occurs without some biological feature.... Close attention is paid to medical illness and the role that illness plays in the emotional life of the patient and the interpersonal dynamics of the family'' (pp. 349–350).

Recently, significant empirical findings have underlined the effect of relationship functioning on illness. Kielcolt-Glazer and Newton (2001) cite several important findings, for example: criticism from spouse is associated with increased symptomatology in rheumatoid arthritis. The findings of Coyne et al. (2001) indicate that marital quality predicts survival following congestive heart failure. In a recent overview of family dynamics and structure with regard to health, Weihs, Fisher, and Baird (2002) note that family conflict and criticism are among the most important risk factors for a variety of health outcomes. Gerson and Gerson (2005) incorporated a family systems perspective in a group treatment program for IBS patients.

The literature on pain and quality of perceived support in intimate relationships is evolving, with disparate findings noted (Kielcolt-Glazer & Newton, 2001). For example, Sullivan et al. (2001) hypothesize that individuals may catastrophize pain in order to solicit empathy from significant others, to insure that ''distress will be managed within a social/interpersonal context rather than an individualistic context.''(p. 60).

The defining symptoms of IBS have been codified as the Rome criteria (Thompson, Creed, Drossman, Heaton, & Mazzacca, 1994), which make it possible to make reliable comparisons between IBS patients. Reports comparing IBS across countries or among different ethnic groups in one country have been largely confined to IBS prevalence and symptom patterns. Talley and Holtmann (2000) found similar symptom patterns in Australia, Germany, Sweden and the US. A recent Japanese study showed a prevalence similar to that of Europe and the US (Kurano et al., 2004). Gwee (2005) has recently described the rising prevalence of IBS in developing countries.

The relationship of psychological factors to the qualitative reporting of symptomatology has not been investigated from a global perspective. We were interested in three aspects of psychological life in relation to IBS. Our first interest was the attribution of IBS symptoms to physical or emotional phenomena, representing belief systems likely to be affected by local customs and cultural beliefs. Second, we were interested in the quality of intimate

relationships with regard to symptomatology, because of the importance of family relationships with regard to chronic illness. Our third focus was health-related quality of life, which has been shown to be frequently impaired in this illness (Gralnek et al., 2000) but has not been systematically studied from a cross-cultural perspective.

Participants and procedures

We surveyed 239 IBS patients in eight different countries spanning the globe. Patient accrual occurred in the US (New York City), Mexico (Mexico City), Canada (Montreal), United Kingdom (London), Italy (Bari), Israel (Beersheva), India (Calcutta) and China (Beijing). To be included in this study, patients had to meet Rome I symptom criteria for the diagnosis of IBS (Thompson et al., 1994), which was the internationally accepted diagnostic and research illness profile.

All centers provided tertiary gastroenterology specialty care with the exception of England. The initial design specified the recruitment of consecutive new patients seen at each center. This was the procedure followed in the US, China, Mexico, India and Italy. However, we felt it was more important to have an adequate sample than to insist on this protocol in the investigation. Thus we agreed to the approach chosen by our collaborators in Canada, which involved patient recruitment at an IBS patient meeting held at a tertiary center, and England where patients were recruited by mail from an IBS patient network, and included the data from Israel which combined consecutive new and returned patients. English patients had all been diagnosed by gastroenterologists. Refusal rate to participate in this study was zero in China, Mexico and India, 9% in Italy, Israel and the US. In England, the response rate to mailed questionnaires was 70%.

Questionnaires were translated into local languages as follows. In Israel, all questionnaire translations were validated by a published method (Sperber, Devellis, & Boehlecke, 1994). The SF-36 quality of life scale had already been translated into Chinese, Hebrew, Spanish, French and Italian and was available to the investigators. The remaining questionnaires were translated by the co-investigators and were reviewed for accuracy by their bi-lingual colleagues, with back translation and revision as necessary. Questionnaire data was forwarded to New York via the Internet.

Measures

All patients were given the following five questionnaires to fill out:

1. *Basic data*. Information was obtained regarding age, gender, marital status, number of years of education and number of years with IBS.
2. *Bowel symptom score* (*BSS*). This is a visual analog scale of four IBS symptoms, pain/discomfort, bloating, constipation and diarrhea, on the day the questionnaire was filled out. The result was derived by adding the scores. The total BSS had been validated with high reliability ($R = .7$) and high consistency of credibility (Cronbach $\alpha = .87$) (Bensoussan et al., 1998).
3. *Quality of relationship inventory* (*QRI*). This is a validated self-report measure of three different aspects of relationships, support, depth and conflict. (Pierce, Sarason, & Sarason, 1991). Support and depth are positive attributes of relationship style while conflict represents a negative attribute. The QRI consists of 25 questions, 7 regarding support, 12 regarding conflict and 6 regarding depth. Subjects select their closest relationship and answer the questions on a 4-point scale, from 1 = not at all to 4 = very much. The subscales had good internal reliability (for support subscale, Cronbach coefficient $\alpha = .87$; for conflict subscale, $\alpha = .91$; for depth subscale, $\alpha = .86$).
4. *Mind-Body IBS* (*MB/IBS*) *questionnaire*. A new questionnaire was developed for this study with 20 questions designed to indicate whether a patient attributes his or her symptoms to physical (body) or emotional (mind) factors (available from the authors). Body questions included issues such as diet and infection (e.g. I think my intestinal problem is caused by infection) while mind questions included issues such as shame, personal responsibility and family dysfunction (e.g. I believe that because I am too nervous my stomach and colon are upset). For each question, scores ranged from 1 = agree very much to 4 = disagree very much. The subscales had adequate internal reliability (for mind subscale, Cronbach coefficient, $\alpha = .76$; for body subscale, $\alpha = .78$).
5. *Quality of life*. The SF-36 is a validated scale measuring 8 health issues, (1) physical functioning; (2) role limitations due to physical problems; (3) social functioning; (4) bodily pain; (5) general

mental health (psychological distress and well-being); (6) role limitations due to emotional problems; (7) vitality (energy and fatigue); (8) general health perceptions. Four each have been aggregated as SF-36 physical and mental health summary scores and results are represented as such (Ware, Kosinski, Bayliss, McHorney, & Raczek, 1995).

Results

Overall, the sample was 68% female, typical of other surveys, with an average age of 40.78. The majority of participants (63%) were married. On an average, participants had 13.58 years of education, and their symptoms began 12.30 years ago. Table 1 presents these statistics by country.

The major deviations from the norms were the low female: male ratio in India, documented in prior reports (Jain & Gupta, 1991), and the low number of years of education and of symptoms in Italy. Most subjects were middle class, in the context of local economic situation, and most were urban, with the exception of Italy where there was a 50/50 split between urban and rural. Italy was an outlier on many of the measures, possibly related to the rural population, fewer years of education and of symptom duration.

Scale analyses

Bowel symptom scale

On the overall BSS score, England was significantly lower than Mexico, Italy, Israel, and China, $p<.05$. It should be noted that England was the only country whose patients were not recruited at a tertiary center. Italy and China were significantly higher than the US, Canada, and India, $p<.05$ (Fig. 1).

To examine the overall relationship between the predictor variables and IBS symptomatology, all predictors (conflict, depth, and support subscales of the QRI; mind and body subscales of the MB/IBS; physical and mental subscales of the SF-36) were entered simultaneously in a multiple linear regression analysis predicting BSS scores. The overall regression predicting mean BSS scores was significant, ($R = .446$, $F(7, 198) = 7.02$, $p<.001$, $R^2 = .199$). Significant regression coefficients for individual variables take into account the six other scales.

Quality of relationships inventory

Aggregate correlational analysis showed that total BSS was directly correlated with overall conflict for all countries combined and inversely correlated with depth and support. In other words, conflicted family relationships were associated with

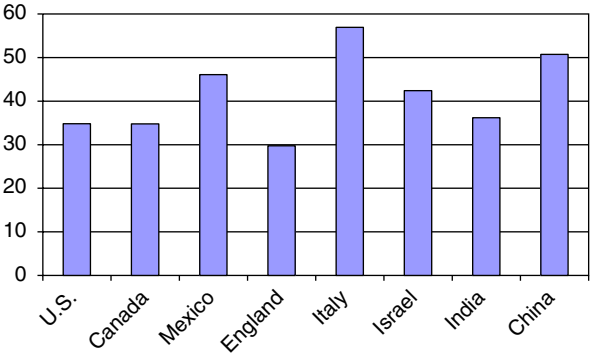

Fig. 1. Mean bowel symptom score for each country.

Table 1
Descriptive measures

Country	*n*	Percentage female (%)	Percentage married (%)	Mean age	Mean years educated	Mean symptom onset
US	29	55	48	36.1	16.9	10.7
Canada	30	83	60	42.8	14.7	15.1
Mexico	30	100	57	34.4	12.9	15.1
England	31	100	77	53.8	14.1	20.4
Italy	30	67	57	36.9	10.3*	4.9*
Israel	30	70	63	43.6	14.6	15.4
India	27	7*	63	36.9	13.2	7.6
China	32	56	78	40.8	12.3	8.7

* = different from overall mean, $p<.05$.

worse IBS symptoms; stronger depth and support were associated with less severe IBS symptoms (Fig. 2) (Table 2).

Multiple regression analysis showed that QRI conflict positively predicted mean BSS, such that more conflict predicted more symptoms, $B = 5.41$, $t(198) = 2.54$, $p = .01$.

Fig. 3 shows the pattern of means for the three subscales by country. All countries except for Italy had scores on the support and depth subscale scores that were significantly higher than the conflict subscale score. Italy's scores on all three scales were statistically equivalent. The countries differed significantly on their scores on the support subscale, $F(7, 230) = 11.58$, $p < .001$, $\eta^2 = .261$, on the conflict subscale, $F(7, 230) = 7.71$, $p < .001$, $\eta^2 = .190$, and on the depth subscale, $F(7, 229) = 14.58$, $p < .001$, $\eta^2 = .308$. Tukey's HSD procedure was used to explore these significant effects.

China and Italy reported significantly less support and less depth in their relationships than the US, Mexico, England, Israel, and India, $p < .05$. India reported greater conflict than England, Canada, the US and Israel, $p < .05$. China and Italy reported greater conflict than England and Canada, $p < .05$.

MB/IBS belief scale

For all countries, correlational analysis showed significant correlation between mean BSS and body agreement (Table 2). Using multiple regression analysis, the mind subscale of the MB/IBS significantly predicted symptoms, such that the less people endorsed these items, the more symptoms they reported, $B = -6.53$, $t(198) = -2.80$, $p = .006$. The body subscale of the MB/IBS also significantly predicted symptoms, in that the more people endorsed these items, the more symptoms they reported, $B = 8.90$, $t(198) = 3.91$, $p < .001$. Thus greater agreement with mind statements was associated with lower IBS symptoms and greater agreement with body statements was associated with higher IBS symptoms.

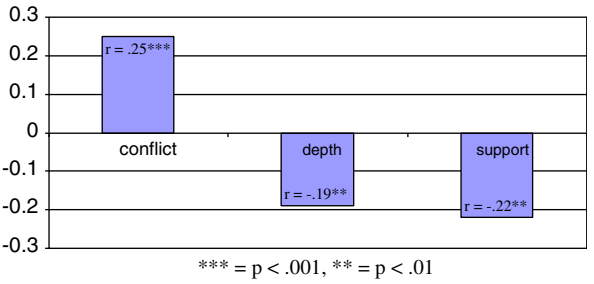

Fig. 2. Correlations between total BSS symptoms and quality of relationship subscales.

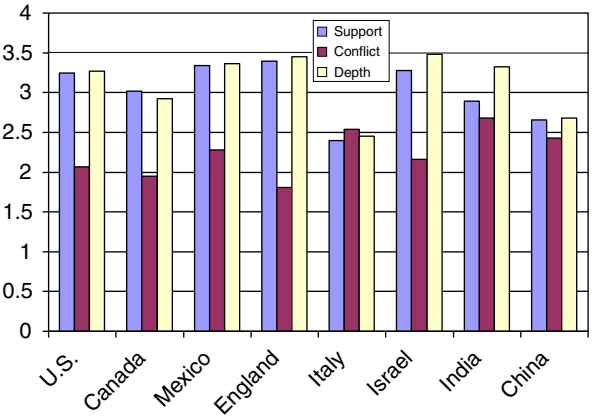

Fig. 3. Quality of relationship scores for each country, according to subscales of support, conflict and depth.

Table 2
Correlations between measures for all countries

	1	2	3	4	5	6	7
1. Mind							
2. Body	.36***						
3. Support	−.16*	−.36***					
4. Conflict	.20**	.30***	−.42***				
5. Depth	−.07	−.32***	.70***	−.12			
6. Physical	−.07	−.09	.11	−.08	.10		
7. Mental	−.37***	−.34***	.38***	−.26***	.34***	−.05	
8. BSS total	.00	.32***	−.22**	.25***	−.19**	−.12	−.20**

* = $p < .05$, ** = $p < .01$, *** = $p < .001$. India only provided cell means without standard deviations, so they are not included in any analyses involving the SF-36.

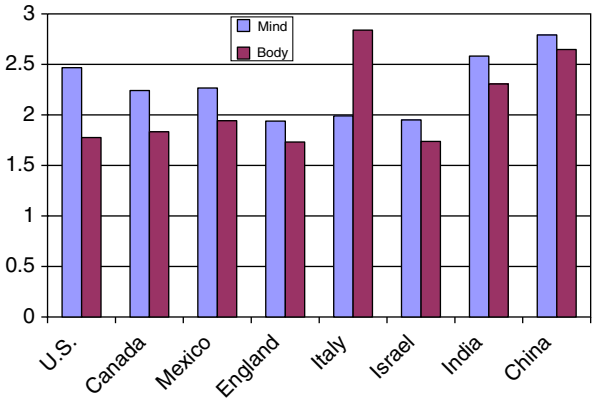

Fig. 4. Agreement with mind and body attributions for each country.

In general, participants tended to agree more with statements on the mind subscale than on the body subscale, $F(1, 231) = 28.00$, $p < .001$, $\eta^2 = .108$ (Fig. 4). However, this main effect of subscale was qualified by a significant subscale × country interaction, $F(7, 231) = 22.61$, $p < .001$, $\eta^2 = .407$. Scores were significantly higher on the mind subscale than on the body subscale for the US, Canada, Mexico, India, and China, whereas the reverse was true for Italy. Scores on the two subscales did not significantly differ for England and Israel.

For the mind subscale, China agreed more than England, Italy, Israel, Canada and Mexico, $p < .05$. India and the US agreed more with mind statements than England, Italy and Israel, $p < .05$. For the body subscale, China, India and Italy agreed more with the statements than the US, Canada, Mexico, England, and Israel, $p < .05$.

Correlations between QRI and MB/IBS scale

It was found that agreement with mind statements correlated positively with QRI support, $p < .05$ and inversely with QRI conflict, $p < .01$. On the contrary, agreement with body statements correlated positively with QRI conflict, $p < .001$ and inversely with QRI depth and support, $p < .001$ (Table 2).

SF 36

On aggregate correlational analysis, low SF-36 mental summary score was associated with high mean BSS score ($p < .01$) (Table 2).

In general, participants tended to score higher on the physical subscale than on the mental subscale, $F(1, 200) = 52.11$, $p < .001$, $\eta^2 = .207$. However, this main effect of subscale was qualified by a significant subscale × country interaction, $F(6, 200) = 5.45$, $p < .001$, $\eta^2 = .141$. The most striking result was for China, which was significantly lower on the mental subscale than Mexico, England, Israel, the US and Canada ($p < .05$).

Cross-cultural comparison of predictors of IBS symptoms

While there were many differences between countries on individual measures, we wanted to determine whether countries differed in the relationships between predictor variables and IBS symptoms. We first split the overall sample by country, and ran multiple linear regressions predicting mean BSS scores from the QRI, MB/IBS, and SF-36 scales. These seven scales accounted for a significant amount of variance in BSS scores for most of the countries. We next performed Chow tests (Chow, 1960; Gujarati, 1970a, b) to test for possible differences in slopes between these countries.

The only significant difference between countries was for the body subscale of the MB/IBS. The relationship between the body subscale and mean BSS scores for Israel was significantly more positive than the average relationship between the body subscale and mean BSS for the other countries, $B = 29.96$, $t(22) = 3.17$, $p = .004$. There were no other significant differences between countries.

Discussion

This study yielded a number of significant and new findings. First of all, the composite data analysis indicated that the degree of symptom reporting was significantly associated with quality of relationships, mind-body attributions of illness and quality of life. Secondly, the universality of findings was more significant than inter-country differences.

The data analysis strongly supports the notion that the patient who attributes his or her symptoms primarily to physical factors suffers more intense symptomatology. Conversely, attribution of IBS to psychological factors was associated with a lower level of distress. In the IBS clinical literature, researchers have inferred that successful, psychotherapeutic treatment is enhanced by patients' belief that psychological stress is linked to symptomatology (Guthrie, Creed, Dawson, & Tomenson, 1991). Our data extends this association by suggesting that patients who view their symptoms as

psychologically associated may have a milder form of IBS, even in the absence of psychological treatment.

In a study of patients without medical illness, Robbins and Kirmayer (1991) found that subjects who made psychological attribution to hypothetical illness were more hypochondrical and body-focused. Our results of patients who suffer actual symptoms and illness differ. We hypothesize that patients who are actually suffering physically, and who are psychologically minded, may minimize physical symptoms, believing them to be symbolic of psychological distress. When dealing with an illness without clear organic pathology, a psychological explanatory schema may offer the patient a greater sense of mastery. Conversely, it is possible that patients who actually experience more pain may be preoccupied with their bodily experience and thus tend to favor organic etiology.

We were also interested in the effect of relationship quality on IBS activity. The QRI examines three aspects, depth, support and conflict. The results were quite striking, indicating that depth and support, strongly correlated with each other, were associated with a lower level of IBS symptoms. In contrast, conflict in relationship appears to have a negative association with IBS symptoms. Levels of general social support clearly differ from support in intimate relationships (Pierce et al., 1991). Consequently, these results extend the well-documented positive link between health and social support, the latter generally defined by number of social contacts (Penninx, Kriegsman, Van Eijk, Boeke, & Deeg, 1996; Ray, 2004).

As noted, the literature on pain and intimate relationships is controversial (Kielcolt-Glazer & Newton, 2001). Research data suggests that individuals may exaggerate pain in the context of perceived support, as a way to activate reassurance (Sullivan et al., 2001). However, there is also significant empirical evidence that spousal support is related to lower levels of reported pain, and in one study, pain reduction over a 12-month period (Keefe et al., 1999). Our finding, that perception of support is correlated with lower levels of symptom distress on an international level and partially strengthens the latter association, but requires further investigation.

While our findings suggest that distressed relationships may be detrimental to the IBS patient, we are unable to rule out other ways of explaining the association between perceived relationship quality and symptomatic distress. For example, illness behavior may have a negative effect on relationship quality, leading to decreased depth and support and increased conflict. IBS patients suffer from chronic pain, and because of their physical distress, may be more sensitive to conflict and perceive significant others as less supportive. As noted by Good, Brodwin, Good, and Kleinman (1992), "Pain can drive a wedge … between the sufferers and those closest to them" (p.5). It is a subjective, personal experience that can be seen "as at least partially willful, voluntary, and hence under the patient's control" (p.6).

It was also interesting to find that agreement with "mind" attributions correlated with QRI support while agreement with "body" attributions correlated with QRI conflict. The presence of depth and support in a patient's relationships may facilitate reflection on emotional factors and free the patient from an exclusive physical preoccupation. Those who experience conflict in relationship may be less willing to acknowledge the complexities of emotional life, be less equipped to cope with their IBS as a mind–body illness. It is important to highlight the gender effect of relationship distress on physiological functioning, characteristically more common in women (Kielcolt-Glazer & Newton, 2001). Our subjects, typical of IBS epidemiology, were predominantly female.

A possible limitation of this study is that symptomatology was based on self-report, which can be readily influenced by psychological distress. However, Kielcolt-Glazer and Newton (2001) note that "self-report methods that focus on very specific, well-operationalized symptom clusters can show reliable associations with physicians' diagnoses" (p. 480). There are two clear limitations of this preliminary global survey: a relatively small number of patients per country were studied. Secondly, there was some variation in recruitment of patients, and one expected variation in gender ratio (Jain & Gupta, 1991). However, the level of statistical significance of the results remains compelling and indicates that the findings deserve serious discussion. Certainly, further evaluation of psychosocial aspects of IBS in different cultures, with larger study populations, is important.

One of our goals in this study was to investigate the universality of the IBS illness experience. Our results indicate that there were common associations between psychological factors and reported symptoms across the samples within these eight

countries. Who were these patients and how do we explain such a result? Except for Italy and England, these were urban, middle class individuals. It is possible that because our samples were largely urban, they reflect contemporary attitudes towards mind–body relationships and the importance of relationship factors. In fact, though there have been no rigorous studies on this point, the percent of population afflicted with this syndrome appears to be higher in more industrially developed urbanized societies (Pan & Lu, 2000; Sperber et al., 2005). There may be something about the conditions of urban life that leads to a greater perceived importance of psychological and relationship effects. Patients in all samples shared access to both psychological and medical care, and thus, perhaps, a privileged "sense of being able to cope with problems in physical health, emotional life, or the social world" (Robbins & Kirmayer, 1991). Italy's results were most deviant from the total and may represent, in part, the fact that 50% of the subjects were of rural origin and the level of education was lower than the other countries. In a recent study in the US, lower educational level was found to correlate with a higher prevalence of IBS (Wigington, Johnson, & Minocha, 2005).

Though the major findings of this study derived from the global data, there are exceptions to universality. It should be pointed out that the small sample size in each country provided somewhat limited power to determine a full range of country differences. However, the significant results that were found suggest that fairly large effect sizes were present.

In addition to Italy, with its outlying results, it is notable that China and India had a number of questionnaire scores that differed from the other countries. Chinese and Indian subjects expressed significantly more agreement with both mind and with body statements than the other countries. Shared agreement could be related to a general holistic view of illness that equally privileges both domains of etiology. This raises the question of symptomatic meaning in different cultures, particularly the possibility that physical pain may represent a way to express distressed feelings. Kleinman (1986) has described survivors of the Cultural Revolution in China as expressing disturbed thoughts via an experience of pain. On our BSS pain subscale, China had the second highest score. What explains the particularity of QRI findings in the Chinese and India? Both cultures had high QRI conflict scores and China had low QRI depth and support scores. High conflict, lack of depth and support in relationship may represent a modern phenomenon, with disruption of the traditional family network creating a fulcrum of family dysfunction. On a basic epidemiologic level, in the Indian sample, the ratio of males to females was high. Our Indian collaborator hypothesized that the reversed male: female ratio in India may represent, at least in part, the difficulties Indian women have gaining access to modern health-care facilities, rather than a true male: female dominance (Chowdury, 2004).

Conclusion

In this global study, IBS symptoms were directly associated with relationship conflict and inversely associated with relationship depth and support. In addition, strong physical attribution of symptoms was associated with high IBS symptoms while strong mental attribution was associated with low symptoms. This is the first international survey of psychosocial aspects of IBS and universal results were highly significant.

There are important clinical implications of this study. The results support the usefulness of considering illness within a relationship context, and linking somaticization to a family systems perspective. The importance of healthy relationships should be incorporated into the treatment of patients with IBS, with physicians inquiring about the attitudes of significant others and, in some cases, recommending family counseling. Certainly, recognition of the psychological life of the IBS patient appears to be crucial, both from the point of view of the patient and their physician. Numerous studies (Gerson & Gerson, 2003; Heymann-Monikes et al., 2000) have documented the effectiveness of psychological treatment in this condition where medical treatment has failed; perhaps this is due to the integration of psyche and soma, so important in a mind–body condition like irritable bowel syndrome (IBS).

Lastly, it is crucial that physicians be aware of discrepancies in their working model of illness, in this case IBS, and the illness schema of patients (Kleinman et al., 1978). If the physician is focusing on the absence of laboratory verification, and the patient is suffering from the lack of support and hostility from a significant other, they are, in fact disconnected in their discourse and ability to relieve distress.

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