Research Journal of Biological Sciences 3 (11): 1292-1299, 2008
ISSN: 1815-8846
© Medwell Journals, 2008

Irritable Bowel Syndrome: Trait Anxiety and Illness Attribution Predict Quality of Life

Usha Barahmand
Department of Psychology, University of Mohaghegh Ardabili, Ardabil, Iran

Abstract: Our goal was to assess the association between hostility, current psychological morbidity and quality of life in Irritable Bowel Syndrome (IBS). A purposive sample of 57 patients diagnosed with Irritable Bowel Syndrome and a group of matched controls constituted the sample of the study. Data was collected using the Buss-Durkee Hostility Inventory (BDHI), State-Trait Anxiety Inventory (STAI) and the Quality of Life Questionnaire (WHOQOL-BREF). Information was also gathered on patient demographics, disease history, symptom rate of recurrence, health care use, medication use and the influence of symptoms on productivity and daily activities. All data were subject to multivariate analyses of variance to reveal group differences. Regression analysis was run to determine the factors that impact quality of life. Findings demonstrate that, overall, patients with IBS experience poorer quality of life compared with their normal counterparts. Furthermore, IBS patients reported greater anxiety, indirect aggression, irritability and suspicion than normals. Regression analysis revealed trait anxiety and attribution of illness to psychological causes as predictors of quality of life. Findings illustrate that to improve functional ability and quality of life in IBS patients, gastroenterologists should consult with psychiatric services to provide assessment irrespective of IBS symptom severity.

Key words: Quality of life, irritable bowel syndrome, hostility, anxiety

INTRODUCTION

Irritable Bowel Syndrome (IBS) is part of a broader group of disorders known as functional gastrointestinal disorders. In the absence of detectable organic pathology, IBS is a gastrointestinal condition diagnosed when there is chronic or recurrent abdominal pain together with an associated alteration of bowel function (constipation, diarrhea or alternating constipation and diarrhea) with bloating or abdominal distension that increases through the day. Other symptoms may include altered stool frequency, altered stool form, or passage, or the presence of mucus. Fatigue and lethargy are also common, but not diagnostic.

To qualify for the diagnosis of IBS the gastrointestinal symptoms must be present for >3 months and be unexplained even after comprehensive medical evaluation. Estimates from some parts of the world suggest that symptoms compatible with a diagnosis of IBS may affect from 10-22% of the general population (Drossman *et al*., 2002; Talley *et al*., 1996; Kennedy *et al*., 2005; Thompson, 2001). Although, seen in both sexes, it is more common in women (15-25%) than men (5-20%) (Drossman *et al*., 2002; Talley *et al*., 1996; Kennedy *et al*., 2005; Thompson, 2001).

Although, many IBS patients trace the onset of their symptoms to childhood, the condition usually occurs in people who are between the ages of 20 and 50; and most systematic studies report that symptoms begin before the age of 35 in 50% of patients and 40% of IBS patients are aged 35-50 years. While the overall prevalence rate remains relatively stable, the course of the disease any particular IBS patient is often unpredictable as the symptoms tend to fluctuate (Agreus *et al*., 1995; Locke *et al*., 2000, 1997), with only about 9% experiencing a complete recovery within 2 years (Van Dulmenn *et al*., 1996).

With the emergence of recent physiological and psychosocial data, it is now felt that a biopsychosocial model of IBS involving physiological, emotional, cognitive and behavioral factors is involved in symptom generation. A review of current evidence suggests that IBS may be precipitated by a variety of factors such as visceral hypersensitivity (Azpiroz *et al*., 2000; Hu *et al*., 1997a, b; Mearin *et al*., 2004), dysregulation of the brain-gut system (Kumar *et al*., 1992), dietary factors as well as a host of psychosocial factors. Abnormal psychological profiles, abnormal illness behaviors and psychiatric diagnoses have been found in 42-62% of IBS patients in comparison with around 20% of patients with other gastrointestinal diagnoses (Walker *et al*., 1990; Talley, 2003) and healthy controls (Toner *et al*., 1990; Jarrett *et al*., 2003). The majority of psychiatric diagnoses are cases of anxiety (Clouse, 1988; Drossman, 1990; Drossman *et al*., 1998) and depression (Clouse, 1988; Drossman *et al*., 2000; Drossman, 1994; Harvey *et al*.,

1987). Clinical studies using research diagnostic criteria for psychiatric disorders report a diagnosis of major depression in 10-27% of patients with IBS (Dinan *et al*., 1991; Wender and Kalm, 1983), other studies (Blanchard *et al*., 1990; Blanchard and Malamood, 1996) have reported a low-grade mood disturbance for most individuals with IBS resembling psychological distress, sadness and unhappiness rather than a clinically significant depressive illness. The status of depression in IBS is controversial. In some studies I (Blanchard *et al*., 1990; Gomborone *et al*., 1995) IBS patients reported a higher mean level of depression compared to patients with other gastrointestinal disorders, while in others (Kumar *et al*., 1990; Van Dulmen *et al*., 1996; Welch *et al*., 1985) depression levels were similar. Regarding anxiety in IBS, a diagnosis of anxiety disorder during the previous year (Toner *et al*., 1990) or a lifetime diagnosis of generalized anxiety disorder (Jarrett *et al*., 2003) has been reported to occur significantly more frequently in patients with IBS than in community control subjects, while the presence of one or more phobias seems to be more likely in IBS than in inflammatory bowel disease (Walker *et al*., 1990). State anxiety has been found to be elevated in IBS (Blanchard *et al*., 1990; Kumar *et al*., 1990; Heaton *et al*., 1992; Sullivan *et al*., 1995). Although, some studies support the prominence of trait anxiety (Gick and Thamson, 1997; Hochstrasser and Angest, 1996; Latimer *et al*., 1981; Schwarz *et al*., 1993) in individuals with IBS, others have failed to find any differences in trait anxiety (Blanchard *et al*., 1990) or claim that that more women than men of all ages have higher levels of state and trait anxiety than other people (Longstreth, 1993; Longstreth and Wolde, 1993).

Other common psychiatric diagnoses include somatization disorder (Whorwell *et al*., 1987; Whitehead *et al*., 2002) and hypochondriasis (Hill and Blendis, 1967; Magni *et al*., 1991). Cognitive factors such as inappropriate coping styles and illness behavior are common in IBS patients and influence healthcare utilization and clinical outcomes. However, IBS patients who do not seek medical care do not appear to have a psychological profile different from the general population. Therefore, rather than being a cause, the psychological make-up of IBS patients is better considered as contributing to their outcome and illness behavior. Different people respond differently to their IBS and IBS symptoms, depending on a number of psychosocial factors. Stress can affect the functioning of the gastrointestinal tract of all people and particularly those with IBS. Several studies have shown that IBS patients are more likely to report changes in their stool pattern and abdominal pain consequent to stress than people without bowel problems. Other studies have shown that a sizable proportion of IBS patients reported a severe stressful life event prior to developing IBS. The kinds of psychological stressors often reported by patients with IBS vary considerably, but include: loss of a parent or spouse through death, divorce, or separation and sometimes is accompanied by feelings of unresolved grief and also significant life changes which demand many social and personal adjustments such as moving to a new job or a new city. Some IBS symptoms are reported to occur with feelings of anger or of intense pleasure in engaging with the environment while other symptoms occur with fear and depression or disengagement or withdrawal from the environment. Chronically constipated patients as a group have been found to be more anxious and more depressed than the general population. An association of Panic Disorder with IBS symptoms has been documented and it has been discovered that symptoms of IBS are made worse within a month of stressful life events. The scientific literature also says that IBS patients are more likely to have experienced the trauma of sexual and physical abuse than the general population. However, IBS patients are wary of negative stigma associated with psychological treatment of their condition. Studies have also found that IBS patients have high moral standards and high need for approval and because of this need for social desirability they are particularly frustrated by the disagreeable symptoms. Given the association between psychosocial factors and IBS symptoms, it seems reasonable to conclude that IBS is likely to impair the person's functioning in various spheres of activity. Studies investigating the impact of IBS have noted that patients afflicted with IBS have limited social interaction, which affects different aspects of their social and professional life. IBS patients (Kumar *et al*., 1992; Whitehead *et al*., 1996) also report a higher rate of hospitalizations, work absenteeism, feelings of poor quality of life and abdominal surgeries than healthy controls and patients with other gastrointestinal illnesses. The financial burden of IBS in terms of direct medical costs and indirect costs in the form of missed job opportunities or increased absenteeism from work is also high. Considering that IBS sufferers incur high costs of treatment and have decreased productivity and limited social interaction caused by the disease, they are likely to experience a reduction in quality of life. On the other hand, the association between psychological factors and health care seeking by IBS sufferers, rather than IBS symptoms per se, suggests that psychological distress is not causally related to IBS. Instead, it is likely that other factors such as personality traits or psychiatric comorbidity explain the observations. Systematic studies investigating the association between psychological factors and IBS are lacking in Iran. Therefore, the purpose

of the present study was to determine the differences between IBS patients and healthy controls on anxiety, hostility and quality of life, to determine factors impacting quality of life in IBS.

MATERIALS AND METHODS

Participants: Patient data for this study were derived from 57 consecutive new referrals to two gastrointestinal clinics in Tehran, one in Qom and one in Kashan during the year 2006. All patients were diagnosed using the Rome criteria and divided into 2 subgroups with diarrhea (15 patients) or constipation (Longstreth *et al*., 1993) as their predominant complaint. All subjects had duration of illness of at least 3 months. A healthy control group (n = 57) balanced to match the age and gender composition of the IBS patients was selected from the staff working at these centers.

Measures: A socio-demographic and clinical data sheet to gather information regarding age, sex, socio-economic status, symptom frequency and symptom intensity was constructed for the study.

Anxiety was measured using the Iranian version of the Spielberger State-Trait Anxiety Inventory (STAI). The STAI consists of 40 statements on a 4-point Likert-type scale that assess the level of anxiety a person reports as generally characteristic of himself or herself as well as the level of anxiety the person feels in response to a specific situation. The magnitude of the reliability coefficients for the Trait-anxiety scale range from 0.72-0.89, whereas the range for the State-anxiety scale decreases as a function of interval length since responses to the items on this scale are thought to reflect the influence of whatever transient situational factors exist at the time of testing. An attempt was also made to measure visceral anxiety and depression. To measure these 2 factors, 5 items pertaining to visceral anxiety from the Anxiety Sensitivity Inventory (Zinbarg *et al*., 1997) and seven items pertaining to the depression subscale of the Hospital Anxiety and Depression Scale (HADS; Zimong and Snaith, 1983) were used. Both subscales were added to the STAI items and scored on a 4-point Liker-type scale.

Hostility was measured using the Iranian version of the 75 item Buss-Durkee Hostility Inventory (BDHI). The inventory consists of 8 subscales: assault (physical expression of anger), indirect aggression (expression of anger without direct confrontation), irritability (agitation and sense of control), negativism, (defiance and non-compliance), resentment (jealousy), suspicion (pessimism and paranoia) and verbal aggression (argumentative and hostile language). Items are answered on a four-point Likert-type scale ranging from 1 (Not at all like me) to 4 (Completely like me). Thus, scores can range from 75-300, with higher scores indicating more self-reported hostility. The Iranian scale has Cronbach's alpha coefficients in the range of 0.76-0.82. Illness attribution was assessed using a scale constructed for an earlier study on Functional gastrointestinal disorders. The scale consists of 12 items subdivided into 2 primary scales: a medical scale and a psychological scale. Patients rated the 12 questions on 6-point Likert-type scales (strongly disagree to strongly agree). The medical illness attributions were related to dietary factors, functional defect, past injury, imbalance, overreactivity, immune dysfunction and infection. The possible psychological illness attributions were related to emotional experience, excessive worry, rumination, oversensitivity, excessive stress and excessive pressure or expectation. The scale is reported to have Cronbach's alpha coefficients in the range of 0.84-0.92.

Quality of Life was assessed using the WHOQOL-BREF. The questionnaire consists of 24 facets grouped into four domains related to quality of life (Physical Health, Psychological, Social Relationships and Environment) as well as two items on overall quality of life and general health for a total of 26 items. The WHOQOL-BREF is a reliable (Cronbach alpha 0.86-0.88) and valid survey instrument for measuring the four domains of quality of life as well as overall global quality of life.

The Illness Attribution Scale was constructed by Smith *et al*. (2003) and adapted by the authors. It consists of 13 items. Six of these items tapped the likely constitutional or environmental illness attributions pertaining to dietary deficiency, functional defect, past injury, imbalance, overreactivity, immune dysfunction and infection. The possible psychological/stress illness attributions were related to past emotional experience, excessive worry, rumination, oversensitivity, excessive stress and excessive pressure or expectation. Patients rated the 13 questions on 6-point Likert-type scales (strongly disagree to strongly agree) (Smith *et al*., 2003).

Overview of data analysis: A series of multivariate analyses were run to test for differences between the clinical groups and normal controls, with socioeconomic status controlled. Next, the correlations between the significant variables and quality of life were computed. Finally, Regression analysis was performed with quality of life as the dependent variable and the significant variables as predictors.

RESULTS

Table 1 indicates that subjects ranged in age from 27 years to 46 years with a mean age of 33.23±4.87 years and 35.86±4.53 years in the patient and control groups, respectively. The male female ratio was found to

Table 1: Demographic characteristics of sample, by group

					Socio-economic status		
Group	N	Males	Females	Age	Low	Middle	High
IBS	56	53.6%	46.4%	33.23±4.87	21.4%	64.3%	14.3%
Normal controls	38	60.5%	39.5%	35.86±4.53	23.68%	63.15%	13.17%
Group differences		$\chi^2 = 0.505$, p = 0.532		t = 0.639, p = 0.524	$\chi^2 = 0.077$, p = 0.962		

Table 2: Multivariate analysis of variance of dimensions of hostility

Dependent variable	F (2, 88)	Sig.
Assault	0.547	0.581
Indirect aggression	2.060	0.133
Irritability	3.128	0.049
Negativism	0.627	0.537
Resentment	15.721	0.000
Suspicion	8.136	0.001
Verbal	0.756	0.473

Table 3: Multiple Comparisons showing significant group differences in dimensions of hostility

Dependent variable	(I) Independent variables	(J) Independent variables	Mean difference (I-J)	Sig.
Indirect aggression	Normals	IBS (constipation)	-1.8158	0.048
Irritability	Normals	IBS (constipation)	-3.4211	0.033
Resentment	Normals	IBS (diarrhea)	-5.7298(*)	0.000
		IBS (constipation)	-5.9474(*)	0.000
Suspicion	Normals	IBS (diarrhea)	-4.9860(*)	0.002
		IBS (constipation)	-4.1053(*)	0.001

*The mean difference is significant at the 0.005 level

Table 4: Multivariate analysis of variance of measures of anxiety and depression

Dependent variable	F(2, 88)	Sig.
Trait anxiety	41.369	0.000
State anxiety	39.482	0.000
Depression	9.017	0.000

be 1.15:1 and 1.53:1 in the patient and control groups, respectively. For the present analyses, socioeconomic categories were collapsed into three levels (i.e., lower class, middle class and higher class). Most of the subjects in the patient (64.3%) and control groups (63.15%) belonged to the middle socio-economic status. The two groups did not differ with regard to sex distribution ($\chi^2 = 0.505$, p = 0.532), age (t = 0.639, p = 0.524) and socio-economic status ($\chi^2 = 0.077$, p = 0.962). Demographic variables for each groups of subjects are listed in Table 1.

A total of 3 multivariate analyses of variance (MANOVAs) were conducted to determine whether the two clinical groups and normal controls differed with regard to indices of hostility, anxiety and depression and quality of life. First, three groups (i.e., IBS diarrhea patients, IBS constipation patients and normal controls) were compared in terms of hostility. The omnibus MANOVA was significant for three of the seven hostility dimensions: greater irritability F (2, 88) = 3.13, p<0.05, resentment F (2, 88) = 15.72, p<0.001 and suspicion F(2, 88) = 8.14, p<0.01. To clarify the omnibus test, multiple comparisons were conducted by using a Bonferroni correction (a Bonferroni correction yields a criterion p-value of 0.007) Results of these analyses suggest that both groups of IBS patients with diarrhea as their chief complaint and those with constipation as their chief complaint reported greater, resentment (p<0.001) and suspicion (p<0.001) than normal controls. Results are displayed in Table 2 and 3.

Multivariate analysis to explore group differences in anxiety and depression revealed significant omnibus MANOVAs for all three measures of state anxiety, F (2, 88) = 39.48, p<0.001 trait anxiety F (2, 88) = 41.37 and depression F (2, 88) = 9.02, p<0.001. Multiple comparisons using a Bonferroni correction with a criterion p-value of 0.016 shows that both groups of IBS patients reported significantly greater trait anxiety, state anxiety and depression (Table 4 and 5).

The 3rd multivariate analysis was run to examine group differences in quality of life dimensions and significant omnibus MANOVAs were obtained for all the indices (p<0.05). Post hoc analyses indicated that normal controls differed significantly from the 2 clinical groups on all the indices of quality of life (p<0.001). Results are depicted in Table 6 and 7.

Next, the correlations between hostility, anxiety, depression, illness attribution and quality of life were computed for the clinical subjects separately (Table 8).

Table 5: Showing significant group differences in anxiety and depression

Dependent variable	(I) Independent variables	(J) Independent variables	Mean difference (I-J)	Sig.
Trait anxiety	Normals	IBS (diarrhea)	-14.2842(*)	0.000
		IBS (constipation)	-12.8684(*)	0.000
State anxiety	Normals	IBS (diarrhea)	-16.9088(*)	0.000
		IBS (constipation)	-18.3421(*)	0.000
Depression	Normals	IBS (diarrhea)	-1.7316(*)	0.003
		IBS (constipation)	-1.6842(*)	0.000

Based on observed means. *The mean difference is significant at the 0.016 level

Table 6: Multivariate analysis of variance of quality of life indices

Dependent variable	F (2, 88)	Sig.
Physical health	39.384	0.000
Psychological health	9.791	0.000
Social relations	16.037	0.000
Environment	14.786	0.000
Overall perception of quality of life	801.665	0.000
Overall perception of health	45.367	0.000

Table 7: Showing significant group differences in quality of life indices

Dependent variable	(I) Independent variables	(J) Independent variables	Mean difference (I-J)	Sig.
Physical health	Normals	IBS (diarrhea)	5.8754(*)	0.000
		IBS (constipation)	7.3421(*)	0.000
Psychological health	Normals	IBS (diarrhea)	4.7842(*)	0.003
		IBS (constipation)	4.8158(*)	0.000
Social relations	Normals	IBS (diarrhea)	1.9211(*)	0.003
		IBS (constipation)	2.6053(*)	0.000
Environment	Normals	IBS (diarrhea)	7.0702(*)	0.000
		IBS (constipation)	5.2105(*)	0.000
Overall perception of quality of life	Normals	IBS (diarrhea)	6.6667(*)	0.000
		IBS (constipation)	6.6579(*)	0.000
Overall perception of health	Normals	IBS (diarrhea)	1.3579(*)	0.000
		IBS (constipation)	1.5526(*)	0.000

Table 8: Showing the correlation coefficients between Quality of Life and measures of anxiety, depression, hostility and attribution factors

	Trait anxiety	State anxiety	Visceral anxiety	Depression	Resentment	Suspicion	Attribution to constitutional factors	Attribution to psychological factors
Quality of life	-0.355**	-0.342**	-0.183	-0.276*	-0.177	-0.100	-0.167	0.283*

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed)

Table 9: Shows the final step of the equation with quality of life regressed on trait anxiety, state anxiety, depression and illness attribution to psychological factors

	B	SE B	Beta
Constant	126.863	15.919	
Trait Anxiety	-0.651	0.336	-0.307*
State Anxiety	-0.192	0.231	-0.130
Depression	-1.362	0.780	-0.210
Attribution to psychological factors	1.191	0.546	0.265*

$R^2 = 0.273$; $p<0.05$

Findings show that state anxiety, trait anxiety and depression correlate negatively with quality of life ($p<0.05$). While, illness attribution to psychological factors correlated positively with quality of life ($p<0.05$).

Finally, an attempt was made to predict quality of life from these factors. Regression analysis using the enter method was run and a significant model emerged ($R^2 = 0.273$; $p<0.05$). As can be seen from Table 9, only trait anxiety and illness attribution to psychological factors contribute to the prediction of quality of life.

DISCUSSION

Irritable bowel syndrome is a gastrointestinal condition which is believed to involve physiological, emotional, cognitive and behavioral factors. However, the precise contribution of these factors is far from clear in the scientific literature. Attempts to distinguish between psychosocial disturbance as cause and effect remain elusive.

Therefore, the present study was conducted to reveal the differences between IBS patients and normal controls in terms of the anxiety, depression and hostility they generally experience and to determine the factors that may impact quality of life in IBS patients.

Based on their chief complaint, IBS patients were divided into two groups of those with diarrhea or constipation as their predominant symptom and compared with normal healthy subjects. Although, no between-clinical group differences emerged with regard to the psychological variables of anxiety, depression, hostility

and quality of life, both the clinical groups differed significantly from normal controls on all indices of quality of life as well as trait anxiety, state anxiety, depression, resentment and suspicion.

Previous investigations have demonstrated that IBS sufferers report significantly elevated trait anxiety (Hochstrasser *et al*., 1996), state anxiety (Sullivan *et al*., 1995), depression (Gomborone *et al*., 1995) and anger (Bergernon and Monto, 1985). Consistent with these results, we found that IBS patients reported greater state and trait anxiety, depression and hostility, indicated by resentment and suspicion, than healthy subjects. These findings demonstrate that psychological distress is an important component of this disorder, although, these finings do not confirm whether psychological factors are a precursor to (or a vulnerability factor for) IBS.

A second goal of the study was to determine the association between the psychological variables of anxiety, depression and hostility and quality of life in IBS patients. Coping difficulties and poorer daily function were reported by Palsson *et al*. (2002). However, whether life's hassles and coping difficulties provoke symptom exacerbation or illness severity impact quality of life is unclear. In the present study, quality of life in the patient group was found to be associated with state anxiety, trait anxiety, depression and illness attribution to psychological factors. Furthermore, results of the regression analysis indicated that only trait anxiety and illness attribution to psychological factors accounted for a significant amount of the variance in quality of life. It is of interest to note that better quality of life was associated with attribution of IBS symptoms to psychological stressors. This finding may have therapeutic value. Encouraging IBS patients to consider their symptoms as being triggered by psychological stressors rather than constitutional factors might help improve the overall quality of their lives. Although, longitudinal study alone can determine the etiological significance of trait anxiety and attribution of illness to psychological factors to quality of life, it seems plausible that these factors may be associated with quality of life in a cyclic fashion. It is likely that trait anxiety is one of the factors that predisposes a person to IBS symptomatology and once developed, their impact on quality of life is moderated by, among other variables, the attributions the patient makes.

Findings, illustrate that to improve functional ability and quality of life in IBS patients, gastroenterologists should consult with psychiatric services to provide assessment irrespective of IBS symptom severity.

REFERENCES

Agreus, L., K. Svardsudd and O. Nyren *et al*., 1995. Irritable bowel syndrome and dyspepsia in the general population: Overlap and lack of stability over time. Gastroenterology, 109: 671-680.

Azpiroz, F., M. Dapoigny and F. Pace *et al*., 2000. Nongastrointestinal disorders in the irritable bowel syndrome. Digestion, 62: 66-72.

Bergernon, C. and G.L. Monto, 1985. Personality patterns seen in irritable bowel syndrome patients. Am. J. Gastroenterol., 80: 448-451.49.

Blanchard, E., L. Scharff, S. Schwarz, J. Suls and D. Barlow, 1990. The role of anxiety and depression in the irritable bowel syndrome. J. Behavioral Res. Ther., pp: 28.

Blanchard, E. and H. Malamood, 1996. Psychological treatment of irritable bowel syndrome. Professional Psychol. Res. Practice, 27 (3): 241-244, (5): 401-405.

Clouse, R., 1988. Anxiety and gastrointestinal illness. Psychiatr. Clin. North Am., 11: 399-417.

Dinan, T.G., V. O'Keane and C. O'Boyle *et al*., 1991. A comparison of the mental status, personality profiles and life events of patients with irritable bowel syndrome and peptic ulcer disease. Acta Psychiatr. Scand., 84: 26-28.

Drossman, D., 1990. Personality and psychological factors in the irritable bowel syndrome. J. Gastroenterol. Clin. Biol., 14 (5): 49-53.

Drossman, D., 1994. Irritable bowel syndrome: The role of psychosocial factors. Stress Med., 10 (1): 49-55.

Drossman, D.A., D.C. McKee and R.S. Sandler, 1998. Psychosocial factors in the irritable bowel syndrome. A multivariate study of patients and nonpatients with irritable bowel syndrome. Gastroenterology, 95: 701-708

Drossman, D.A., M. Camilleri and E.A. Mayer, 2002. Whitehead W.E. A technical review on irritable bowel syndrome. Gastroenterology, 123: 2108-213.

Drossman, D.A., Y. Hu and H. Jia *et al*., 2000. The influence of psychosocial factors on health status in patients with functional bowel disorders. Gastroenterology, 118: A398.

Gick, M.L. and W.G. Thompson, 1997. Negative effect and the seeking of medical care in university students with irritable bowel syndrome: A preliminary Study. J. Psychosom Res., 43: 535-540.

Gomborone, J., P. Dewsnap, G. Libby and M. Farthing, 1995. Abnormal illness attitudes in patients with irritable bowel syndrome. J. Psychosom Res., 39 (2): 227-230.

Harvey, R.F., E.C. Mauad and A.M. Brown, 1987. Prognosis in the irritable bowel syndrome: A 5-year prospective study. Lancet, 1: 963-965.

Heaton, K.W., L.J. O'Donnell, F.E. Braddon, R.A. Mountford, A.O. Hughes and P.J. Cripps, 1992. Symptoms of irritable bowel syndrome in a British urban community: Consulters and nonconsulters. Gastroenterology, 102: 1962-1967.

Hill, OW. and L. Blendis, 1967. Physical and psychological evaluation of non-organic abdominal pain. Gut, 8: 221.

Hochstrasser, B. and J. Angst, 1996. The Zurich study: XII. Epidemiology of gastrointestinal complaints and comorbidity with anxiety and depression. Eur. Arch. Psychiatr. Clin. Neurosci., 246: 261-272.

Hu, W., W. Hui and C. Lam *et al*., 1997. Anxiety and depression are co-factors determining health care utilisation in patients with dyspepsia: A Hong Kong population based study. Gastroenterology, 112: A153.

Hu, Y., Z. Li, T. Toomey, D.A. Drossman and J. Leserman, 1997. Personality traits in prediction of the health status of female gastrointestinal patients. Psychosom Med., pp: 59.

Jarrett, M.E., R.L. Burr, K.C. Cain, V. Hertig, P. Weisman and M.M. Heitkemper, 2003. Anxiety and depression are related to autonomic nervous system function in women with irritable bowel syndrome. Dig. Dis. Sci., 48: 386-394.

Kennedy, T., R. Jones, S. Darnley, P. Seed, S. Wessely and T. Chalder, 2005. Cognitive behaviour therapy in addition to antispasmodic treatment for irritable bowel syndrome in primary care: Randomised controlled trial. BMJ, 331 (7514): 435.

Kumar, D., J. Pfeffer and D. Wingate, 1990. Role of psychological factors in the irritable bowel syndrome. Digestion, 45 (2): 80-87.

Kumar, D., P. Thompson, D. Wingate, C. Vesselinova-Jenkins and G. Libby, 1992. Abnormal REM sleep in the irritable bowel syndrome. Gastroenterology, 103 (1): 12-17.

Latimer, P., S. Sarna, D. Campbell, M. Latimer, W. Waterfall and E.E. Daniel, 1981. Colonic motor and myoelectrical activity: A comparative study of normal subjects, psychoneurotic patients and patients with the irritable bowel syndrome. Gastroenterology, 80: 893-901.

Locke, G.R. *et al*., 2000. Risk factors for irritable bowel syndrome: role of analgesics and food sensitivities. Am. J. Gastroenterol., 95: 157-165.

Locke, G.R., N.J. Talley and S.L. Fett *et al*., 1997. Prevalence and clinical spectrum of gastroesophageal reflux: a population-based study in Olmsted County, Minnesota. Gastroenterology, 112: 1448-1456.

Longstreth, G.F., 1993. Bowel patterns and anxiety: Demographic factors. J. Clin. Gastroenterol., 17: 128-132.

Longstreth, G.F. and G. Wolde-Tsadik, 1993. Irritable bowel-type symptoms in HMO examinees: Prevalence, demographics and clinical correlates. Dig. Dis. Sci., 38: 1581-1589.

Magni, G., G. Bernasconi, P. Mauro, A. D'Odorico, G.C. Sturniolo, G. Canton and A. Martin, 1991. Psychiatric diagnoses in ulcerative colitis: A controlled study. Br. J. Psychiatr., 158: 413-1415.

Mearin, F., E. Baró, M. Roset, X. Badía, N. Zárate and I. Perez, 2004. Clinical patterns over time in Irritable Bowel Syndrome: Symptom instability and severity variability. Am. J. Gastroenterol., 99: 113-121.

Palsson, O.S., M.J. Turner and D.A. Johnson *et al*., 2002. Hypnosis treatment for severe irritable bowel syndrome: Investigation of mechanism and effects on symptoms. Dig. Dis. Sci., 47: 2605-2614.

Schwarz, S., E. Blanchard, C. Berreman, L. Scharff, A. Taylor, B. Greene, J. Suls and H. Malamood, 1993. Psychological aspects of irritable bowel syndrome: Comparisons with inflammatory bowel disease and nonpatient controls. Behav. Res. Ther., 31 (3): 297-304.

Smith, MS., P. Susanne, S.P. Martin-Herz, W.M. Womack and J.L. Marsigan, 2003. Comparative study of anxiety, depression, somatization, functional disability and illness attribution in adolescents with cfs. Pediatrics, 111 (4): 376-381.

Sullivan, G., P.L. Jenkins and A.E. Blewett, 1995. Irritable bowel syndrome and family history of psychiatric disorder: A preliminary study. Gen. Hosp. Psychiatr., 17: 43-46.

Talley, N.J., 2003. Pathophysiology and treatment of irritable bowel syndrome. Medscape Gastroenterology Coverage of Digestive Disease Week. http://www.medscape.com/viewarticle/4569862003.

Talley, N.J., B.K. Owen, P. Boyce and K. Paterson, 1996. Psychological treatments for irritable bowel syndrome: A critique of controlled treatment trials. Am. J. Gastroenterol., 91: 277-283.

Thompson, W.G., 2001. IBS in men: A different disease? Participate. Milwaukee, Wis: IFFGD; Fall, 10 (3).

Toner, B., P. Garfinkel and K. Jeejeebhoy, 1990. Psychological factors in irritable bowel syndrome. Can. J. Psychiatr., 35 (2): 158-161.

Van Dulmen, A., J. Fennis, H. Mokkink and G. Bleijenberg, 1996. The relationship between complaint-related cognitions in referred patients with irritable bowel syndrome and subsequent health care seeking behavior in primary care. J. Fam Pract., 13 (1): 12-17.

Van Dulmen, A.M., J.F.M. Fennis and G. Bleijenberg, 1996. Cognitive-behavioral group therapy for irritable bowel syndrome: Effects and long-term follow-up. Psychosom. Med., 58: 508-514.

Walker, EA., P.P. Roy-Byrne, W.J. Katon, L. Li, D. Amos and G. Jiranek, 1990. Psychiatric illness and irritable bowel syndrome: A comparison with inflammatory bowel disease. Am. J. Psychiatr., 147: 1656-1661.

Welch, G.W., L.C. Hillman and E.W. Pomare, 1985. Psychoneurotic symptomatology in the irritable bowel syndrome: A study of reporters and non-reporters. BMJ, 291: 1362-1364.

Wender, P.H. and M. Kalm, 1983. Prevalence of attention deficit disorder, residual type and other psychiatric disorders in patients with irritable colon syndrome. Am. J. Psychiatr., 140: 1579-1582.

Whitehead, W.E., C.K. Burnett, E.W. Cook and E. Taub, 1996. Impact of irritable bowel syndrome on quality of life. Dig. Dis. Sci., 41: 2248-2253.

Whitehead, W.E., O. Palsson and K.R. Jones, 2002. Systemic review of the comorbidity of irritable bowel syndrome with o ther disorders: What are the causes and implications? Gastroenterology, 98: 1187-1192.

Whorwell, P.J., A. Prior and S.M. Colgan, 1987. Hypnotherapy in severe irritable bowel syndrome: Further experience. Gut., 28 (4): 423-425.

Zimong, AS. and R.P. Snaith, 1983. The Hospital Anxiety and Depression Scale. Acta. Psychiatr. Scand., 67: 361-370.

Zinbarg, R., D.H. Barlow and T. Brown, 1997. The hierarchical structure and general factor saturation of the Anxiety Sensitivity Index: Evidence and implications. Psychol. Assess., 9: 277-284.