

Relations between Coping Skills, Symptom Severity, Psychological Symptoms, and Quality of Life in Patients with Irritable Bowel Syndrome

Abstract

Background: Irritable bowel syndrome (IBS) is one of the most common functional gastrointestinal disorders with significant impact on quality of life (QOL). Considering the role of stress in the clinical course of IBS, we investigated associations between stress coping skills and symptoms and QOL in IBS patient. **Methods:** A cross-sectional study was conducted on 95 IBS patients referring to tertiary care centers. Coping skills (Jalowiec coping scale), IBS symptom severity scale, disease-specific QOL (IBS-QOL), and symptoms of depression and anxiety (Hospital Anxiety and Depression Scale [HADS]) were evaluated by questionnaires. Bivariate and multivariate analyses were performed to investigate association among these parameters. **Results:** Disease severity was positively correlated with emotive ($r = 0.30$) and fatalistic ($r = 0.41$) and negatively correlated with optimistic ($r = -0.25$) and confrontive ($r = -0.24$) coping strategies. Psychological dysfunction (total HADS score, B [95% (confidence interval) CI] = 2.61 [0.001–5.21]) and fatalistic coping (B [95% CI] = 35.27 [0.42–70.13]) were significant predictors of IBS severity. **Conclusions:** However, IBS patients involved in this study utilized adaptive coping strategies more frequently. Our study showed that use of maladaptive coping strategies had positive correlation with symptom severity and degree of anxiety and depression among patients, while implementation of optimistic strategies were found to be negatively correlated to severity of symptoms and also utilization of adaptive coping styles was associated with lesser degree of anxiety and depression.

Keywords: Anxiety, coping skills, depression, irritable bowel syndrome, psychological stress, quality of life

Introduction

Irritable bowel syndrome (IBS) is one of the most common functional gastrointestinal disorders, which is presenting with periodic episodes of abdominal pain accompanied by changes in bowel habits, classified into four subtypes based on dominant stool pattern: Constipation (IBS-C), diarrhea (IBS-D), mixed (IBS-M), and undefined (IBS-U).^[1-3] IBS is reported to affect 5%–15% of western societies.^[3] In Iran, the prevalence of IBS is reported to be between 1.1% and 25% (depending on diagnostic criteria and selected study population).^[4] IBS has been reported not only to have a negative impact on patients' quality of life (QOL) but also to put a significant financial burden on both patients and society.^[5,6] Definite underlying etiology of this disorder has not been completely understood. Different studies accounted multiple factors, such as biological, environmental, and psychological factors in the development of IBS. This led to the formation of biopsychosocial theory.^[7,8]

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Recent studies showed higher prevalence of psychological disorders such as depression and anxiety in IBS patients, however, Naliboff *et al.* reported level of psychological distress in IBS patients to be less dependent on symptom severity when compared to patients with inflammatory bowel disease.^[9] On the other hand, IBS is usually considered as a stress-related disorder.^[10-13] Although it is still not clear if psychological stress can cause IBS independently, it is shown that stress can play a role in initiating and/or exacerbating IBS symptoms.^[10,14] Moreover, it is believed that even though, amount of stress IBS patients face during life is not significantly different from normal population, IBS patients interpret stressful situations differently and utilize different coping strategies while encountering a stressful situation^[11,15]

Folkman and Lazarus defined coping as “the constantly changing cognitive and behavioral efforts to manage the specific

How to cite this article: Torkzadeh F, Danesh M, Mirbagher L, Daghighzadeh H, Emami MH. Relations between coping skills, symptom severity, psychological symptoms, and quality of life in patients with irritable bowel syndrome. *Int J Prev Med* 2019;10:72.

Farnaz Torkzadeh,
Manizheh Danesh¹,
Leila Mirbagher,
Hamed
Daghighzadeh²,
Mohammad Hassan
Emami^{2,3}

Student Research Center,
School of Medicine, Isfahan
University of Medical Sciences,
Isfahan, Iran, ¹Department of
Cardiology, Isfahan University
of Medical Sciences, Isfahan,
Iran, ²Gastroenterology
Research Center, Isfahan
University of Medical Sciences,
Isfahan, Iran, ³Gastrointestinal
and Hepatobiliary Disease
Research Centre, Poursina
Hakim Research Institute for
Health Care Development,
Isfahan, Iran

Address for correspondence:

Dr. Farnaz Torkzadeh,
Student Research Center,
School of Medicine, Isfahan
University of Medical Sciences,
Isfahan, Iran.
E-mail: farnaz.torkzadeh@gmail.com

Access this article online

Website:
www.ijpvmjournal.net/www.ijpvmjournal.net

DOI:
10.4103/ijpvm.IJPVM_464_17

Quick Response Code:



external and/or internal demands that are appraised as taxing or exceeding the resource of person.”^[16] Coping strategies against stress are divided into two different categories: Adaptive problem-focused and maladaptive avoidant and emotion-focused strategies.^[16] Each individual may utilize divergent methods in different occasions based on type and severity of stress. More interestingly, an individual’s coping strategies may also alter over time.^[17] Crane and Martin and Jones *et al.*, studies showed that passive coping strategies are used by IBS patients more frequently in comparison with the control groups, which was associated with diminished QOL and also psychological distress.^[18,19]

As not employing positive coping strategies in stressful situations can cause internalization of stress and lead to psychological disorders such as anxiety,^[20] coping strategies were hypothesized to play an independent role in the patients’ QOL, symptom severity, and psychological disorders. Therefore, this study was designed to explore utilization of coping strategies by IBS patients and its association with symptom severity, psychological symptoms, and QOL.

Methods

Patients and settings

Patient referring to two outpatient gastroenterology clinics in Isfahan city, Iran between August 2013 and February 2014 were invited to participate. The inclusion criteria consisted of age between 18 and 65 years, diagnosis of IBS, made by a gastroenterologist or internist physicians, based on the ROME III criteria and the ground of symptoms, physical examination, and after necessary laboratory tests.^[21] Patients were also supposed to be able to complete the study questionnaires either through self-administration or interview. This research was approved by the Ethical Committee of the Isfahan University of Medical Sciences, and all patients gave consent to be included in this study.

Assessments

Demographic data included age, gender, literacy status (educations years), physical activity (never, sometimes and regular), marital status, and smoking history. Based on reported weight and height, body mass index was calculated (kg/m^2).

Duration of disease and IBS subtype (constipation dominant, diarrhea-dominant, and mixed type) was assessed through the Rome III criteria questionnaire.^[21] To evaluate IBS symptom severity, the IBS-symptom severity scale was used. This questionnaire assesses IBS severity with 5 items evaluating the severity of abdominal pain, frequency of abdominal pain, severity of abdominal bloating, satisfaction with bowel habits, and disease effect on daily life. Each item score ranges from 0 to 100 (for bloating after conversion),

and the total score ranges from 0 to 500 with higher scores indicating more severe disease.^[22]

To evaluate IBS patients’ QOL, the IBS-QOL questionnaire was used, consisting of 34 questions about a different aspect of QOL in IBS patients. The IBS-QOL covers eight dimensions including dysphoria, interference with activity, body image, health worry, food avoidance, social reaction, sexual concerns, and relationships. Total score and scores in each dimension are converted into 0–100 scale with higher values indicate better health-related QOL.^[23]

To assess patients understanding of their own coping strategies, Jalowiec coping scale was used. This scale assesses “situation-specific coping behaviour by measuring the degree of use and the perceived effectiveness of 60 cognitive and behavioural coping strategies in a stressful situation” and includes 8 different coping strategies: confrontive, evasive, optimistic, fatalistic, emotive, palliative, supportant, and self-reliant.^[24]

To study psychological symptoms, the Hospital Anxiety and Depression Scale (HADS) was used, consisting of 14 questions to assess depression and anxiety level. Scores in each domain range between 0 and 21 with higher scores indicating more severe symptoms.^[25,26] For all of the above-mentioned measures validated questionnaires in the Persian language were used.^[27,28]

Statistical analysis

Data were analyzed using the SPSS software (version 16.0, SPSS Inc., Chicago, IL, USA). Descriptive data are presented as mean \pm standard deviation or number (%). Chi-square test was used to compare qualitative variables, and independent sample *t*-test was used to compare quantitative variables. Pearson test (or Spearman test for nonparametric data) was used to investigate the association between quantitative variables. $P < 0.05$ was considered statistically significant in all analyses.

Results

Demographic data and disease characteristics

During the study, 115 IBS patients were invited to participate in which 14 patients were not willing to attend (mostly due to lack of time during physician visit), and 6 patients filled out the questionnaires incompletely. Therefore, in this study, 95 patients were considered where the mean age was 37.1 ± 13.5 , and 65.2% of patients were female. Other demographic data and disease characteristics are shown in Table 1.

Coping strategies

The Jalowiec Coping Scale (JCS) dimensions’ scores are presented in Figure 1, where the outcomes are sorted by frequency. Patients were using self-reliant, confrontive, supportive, optimistic, evasive, emotive, fatalistic, and palliative coping strategies.

Table 1: Demographic data and disease characteristics (n=95)

Variables	Mean
Age, year	37.1±13.5
Female/male	62 (65.2)/33 (34.7)
Education, year	11.5±4.4
Marital status	
Single	22 (23.2)
Married	71 (74.7)
Divorced/widow	2 (2.1)
Occupation	40 (42.1)
Physical activity	
Never/seldom	18 (18.9)
Sometimes	51 (53.6)
Regular	26 (27.3)
BMI, kg/m ²	24.1±3.3
BMI >25 kg/m ²	38 (40)
Smoking	6 (6.3)
IBS symptom duration, year	6.4±7.7
IBS subtypes	
IBS-C	26 (27.4)
IBS-D	13 (13.7)
IBS-M	53 (55.8)
IBS-U	3 (3.2)
IBS severity	
Mild	14 (14.7)
Moderate	49 (51.6)
Severe	32 (33.7)

Data are presented as mean±SD or n (%). BMI=Body mass index, IBS=Irritable bowel syndrome, IBS-C=IBS-constipation, IBS-D=IBS-diarrhoea, IBS-M=IBS-mixed, IBS-U=IBS-undefined, SD=Standard deviation

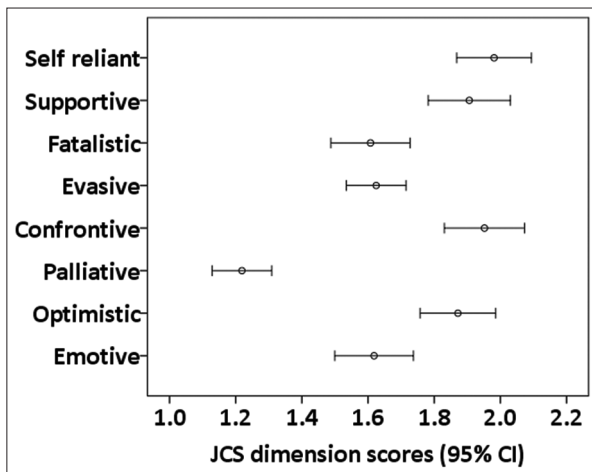


Figure 1: JCS dimension score (95% CI)

Association of coping strategies with study variables

It is shown that the age variable was not significantly associated with coping strategies. Furthermore, the results indicated that the emotive coping score was higher in female in comparison with male patients (1.68 ± 0.54 vs. 1.42 ± 0.57 , $P = 0.048$). On the other hand, the

evasive (1.78 ± 0.43 vs. 1.54 ± 0.41 , $P = 0.010$) and self-reliant (2.17 ± 0.44 vs. 1.90 ± 0.58 , $P = 0.043$) coping scores were higher in male patients. Education level, marital status, or occupation status were not associated with any of the coping strategies (for all dimensions $P > 0.05$).

Association of coping strategies with disease and psychological characteristics and QOL are shown in Table 2. Disease severity was positively correlated with emotive ($r = 0.30$) and fatalistic ($r = 0.41$) and negatively correlated with optimistic ($r = -0.25$) and confrontive ($r = -0.24$) coping strategies. Anxiety and depression were also positively correlated with emotive ($r = 0.42$ and 0.30), palliative ($r = 0.22$), and fatalistic ($r = 0.53$ and 0.47) coping strategies, and negatively correlated with optimistic ($r = -0.27$ and -0.25) and confrontive ($r = -0.32$ and -0.26) coping strategies. Palliative ($r = -0.21$) and fatalistic ($r = -0.36$) coping strategies were negatively correlated with QOL.

The result of the linear regression analysis is presented in Table 3. Psychological dysfunction (total HADS score, B [95% confidence interval (CI)] = 2.61 [0.001–5.21]) and fatalistic coping (B [95% CI] = 35.27 [0.42–70.13]) were significant predictors of IBS severity. There was also a nonsignificant association between emotive coping and IBS severity (B [95% CI] = 32.30 [–1.89–66.50]).

Discussion

Biopsychosocial theory is one of the models used to explain factors involved in pathophysiology of IBS. Stress is one of the main factors which is proven to have effect on exacerbation and severity of symptoms of IBS.^[29] Some studies showed although the number of stressful situations IBS patients face is not significantly different in comparison with control population, IBS patients use dysfunctional behaviors/beliefs while encountering stressful situations more often. It is also shown that use of different coping strategies varies among IBS patients compared to healthy population, which may be caused by interpreting stressful situations differently.^[15,30]

Stanculete *et al.* study^[31] showed IBS patients to apply problem-focused coping strategies more while dealing with IBS symptoms. They also demonstrated that IBS patients utilize problem focused and avoidant oriented coping strategies more frequently in comparison with control groups. Moreover, Phillips *et al.*^[14] reported active coping strategies to be a predictor for distinguishing IBS patients from healthy control groups. Contrary to those results, a number of other studies declared IBS patients to apply less active and more emotion-oriented coping styles.^[11,32,33] The result of the present study showed that IBS patients utilizing adaptive coping strategies (self-reliant, supportive, and confrontational) more frequently compared to maladaptive coping strategies (palliative, emotive, and evasive). Outcomes of our study also indicated that IBS

Table 2: Correlations of the JCS dimension scores with demographic, disease, psychological and quality of life variables

JCS dimensions	IBS duration	IBS severity	Anxiety	Depression	QOL
Emotive	0.27*	0.30**	0.42**	0.30**	-0.17
Optimistic	0.03	-0.25*	-0.27**	-0.25*	0.13
Palliative	0.02	-0.07	0.22*	0.05	-0.21*
Confrontive	0.05	-0.24*	-0.32**	-0.26*	0.13
Evasive	0.12	-0.16	-0.06	-0.03	-0.05
Fatalistic	0.07	0.41**	0.53**	0.47**	-0.36**
Supportive	0.00	-0.14	-0.01	-0.03	0.10
Self-reliant	0.06	0.00	-0.04	-0.10	-0.03

Data are presented as the Spearman's correlation coefficients, * $P < 0.05$, ** $P < 0.01$. IBS=Irritable bowel syndrome, QOL: Quality of life, JCS=Jalowiec Coping Scale

Table 3: Linear regression analysis of factors associated with disease severity

	B	P	95.0% CI for B
Age	0.55	0.434	-0.84-1.95
Gender	11.35	0.559	-27.11-49.82
Education level	-6.32	0.281	-17.92-5.26
Anxiety-depression	2.61	0.050	0.001-5.21
Emotive	32.30	0.064	-1.89-66.50
Optimistic	-19.53	0.396	-65.04-25.97
Palliative	-17.79	0.400	-59.64-24.04
Confrontive	21.64	0.322	-21.61-64.89
Evasive	-31.52	0.153	-75.04-11.98
Fatalistic	35.27	0.047	0.42-70.13
Supportive	-24.09	0.127	-55.21-7.02
Self-reliant	15.22	0.481	-27.55-58.00

$R^2=0.349$, adjusted $R^2=0.253$. CI=Confidence interval

symptom severity have direct correlation with use of maladaptive coping strategies (emotive and fatalistic) and inverse correlation with recruiting optimistic strategies.

It is also shown that there is a positive association between use of emotive, palliative and fatalistic coping styles with higher degrees of anxiety and depression, while use of confrontational coping styles was accompanied with lesser degrees of anxiety and depression. Other studies such as Pellissier *et al.*^[34] suggested similar trend, as IBS patient with negative affect had lower problem-focused coping scores and lower seeking social support coping scores compared to IBS patients with positive affect. Furthermore, the presence of psychological disorders such as anxiety and depression and also utilization of fatalistic coping styles had independent predictive values in determining symptom severity. Our result is confirming previous studies,^[14,35] identifying the presence of psychological distress as an important predictor of disease severity in IBS patients.

A few work such as Spiegel *et al.*^[36] declined depression and anxiety to have an independent predictive role on IBS

symptoms severity. However, our result was in line with the majority of previous research,^[37] reporting the presence of psychological distress as an important predictor of disease severity in IBS patients. Moreover, based on our study, fatalistic and palliative coping strategies correlated negatively to patients' QOL.

In light of effect of psychological factors on IBS, some studies evaluated the effect of psychological interventions such as cognitive-behavioral therapy (CBT), psychotherapy, and stress management, and hypnotherapy in the treatment of IBS, most of which showed promising results in reducing the gastrointestinal symptoms, enhancing mental health and improving patients daily performance.^[12,13,37-39] For example, recently, Laird *et al.* meta-analysis reported that CBT to be more effective in rising daily functioning of IBS patients compared to relaxation, which might be due to the fact that CBT promotes behavioral change and assists patients in dealing with uncomfortable situations.^[37,39]

The outcome of this study suggests that using CBT to change patients' coping strategies toward utilizing adaptive coping strategies, may result in reduced level of anxiety and depression among IBS patient, diminish their symptom severity, and enhance IBS patients' QOL. This study has some limitations as it was a cross-sectional research, making it unable to explicit causative association between assessed factors. Other limitation derives from the lack of participants' demographic information such as race and duration of symptoms in the trials, which prevent systematic investigation and validation across different populations. To find out how exactly each factor affected these results, further assessment is required in future studies.

Conclusions

Although our sample of Iranian IBS patients relied on adaptive coping strategies more frequently, our results revealed application of maladaptive coping skills to be associated with higher severity of IBS symptoms, higher degrees of anxiety and depression and poorer QOL. In contrast, using adaptive coping styles were correlated with lesser degree of anxiety and depression. Future prospective studies are warranted in order to better understand the complex and dynamic interactive network of biopsychosocial factors in patients with IBS.

Acknowledgments

This study was supported by the Isfahan University of Medical Sciences. We would also like to express our deepest appreciation to all those who helped us in completing this project with a special gratitude to staff of Poursina Hakim Research Institute and Dr. Hamed Daghighzadeh's Clinic.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Received: 21 Oct 17 **Accepted:** 28 Dec 17

Published: 17 May 19

References

- Williams EA, Nai X, Corfe BM. Dietary intakes in people with irritable bowel syndrome. *BMC Gastroenterol* 2011;11:9.
- Vork L, Weerts ZZ, Mujagic Z, Kruijmel JW, Hesselink MA, Muris JW, *et al.* Rome III vs. Rome IV criteria for irritable bowel syndrome: A comparison of clinical characteristics in a large cohort study. *Neurogastroenterol Motil* 2017;e13189.
- Lovell RM, Ford AC. Global prevalence of and risk factors for irritable bowel syndrome: A meta-analysis. *Clin Gastroenterol Hepatol* 2012;10:712-21.e4.
- Jahangiri P, Jazi MS, Keshteli AH, Sadeghpour S, Amini E, Adibi P, *et al.* Irritable bowel syndrome in Iran: SEPAHAN systematic review no 1. *Int J Prev Med* 2012;3:S1-9.
- Sandler RS, Everhart JE, Donowitz M, Adams E, Cronin K, Goodman C, *et al.* The burden of selected digestive diseases in the United States. *Gastroenterology* 2002;122:1500-11.
- Shaheen NJ, Hansen RA, Morgan DR, Gangarosa LM, Ringel Y, Thiny MT, *et al.* The burden of gastrointestinal and liver diseases, 2006. *Am J Gastroenterol* 2006;101:2128-38.
- Seres G, Kovács Z, Kovács A, Kerékgyártó O, Sárdi K, Demeter P, *et al.* Different associations of health related quality of life with pain, psychological distress and coping strategies in patients with irritable bowel syndrome and inflammatory bowel disorder. *J Clin Psychol Med Settings* 2008;15:287-95.
- Drossman DA. The functional gastrointestinal disorders and the rome III process. *Gastroenterology* 2006;130:1377-90.
- Naliboff BD, Kim SE, Bolus R, Bernstein CN, Mayer EA, Chang L, *et al.* Gastrointestinal and psychological mediators of health-related quality of life in IBS and IBD: A structural equation modeling analysis. *Am J Gastroenterol* 2012;107:451-9.
- Hertig VL, Cain KC, Jarrett ME, Burr RL, Heitkemper MM. Daily stress and gastrointestinal symptoms in women with irritable bowel syndrome. *Nurs Res* 2007;56:399-406.
- Drossman DA, Leserman J, Li Z, Keefe F, Hu YJ, Toomey TC, *et al.* Effects of coping on health outcome among women with gastrointestinal disorders. *Psychosom Med* 2000;62:309-17.
- van Dulmen AM, Fennis JF, Mokkink HG, van der Velden HG, Bleijenberg G. Persisting improvement in complaint-related cognitions initiated during medical consultations in functional abdominal complaints. *Psychol Med* 1997;27:725-9.
- Shen YH, Nahas R. Complementary and alternative medicine for treatment of irritable bowel syndrome. *Can Fam Physician* 2009;55:143-8.
- Phillips K, Wright BJ, Kent S. Psychosocial predictors of irritable bowel syndrome diagnosis and symptom severity. *J Psychosom Res* 2013;75:467-74.
- Kovács Z, Kovács F. Depressive and anxiety symptoms, dysfunctional attitudes and social aspects in irritable bowel syndrome and inflammatory bowel disease. *Int J Psychiatry Med* 2007;37:245-55.
- Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. *J Health Soc Behav* 1980;21:219-39.
- Graff LA, Walker JR, Clara I, Lix L, Miller N, Rogala L, *et al.* Stress coping, distress, and health perceptions in inflammatory bowel disease and community controls. *Am J Gastroenterol* 2009;104:2959-69.
- Crane C, Martin M. Social learning, affective state and passive coping in irritable bowel syndrome and inflammatory bowel disease. *Gen Hosp Psychiatry* 2004;26:50-8.
- Jones MP, Wessinger S, Crowell MD. Coping strategies and interpersonal support in patients with irritable bowel syndrome and inflammatory bowel disease. *Clin Gastroenterol Hepatol* 2006;4:474-81.
- Chan AO, Cheng C, Hui WM, Hu WH, Wong NY, Lam KF, *et al.* Differing coping mechanisms, stress level and anorectal physiology in patients with functional constipation. *World J Gastroenterol* 2005;11:5362-6.
- Korkut E, Bektas M, Oztas E, Kurt M, Cetinkaya H, Ozden A, *et al.* The prevalence of celiac disease in patients fulfilling rome III criteria for irritable bowel syndrome. *Eur J Intern Med* 2010;21:389-92.
- 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* 1997;11:395-402.
- Drossman DA, Patrick DL, Whitehead WE, Toner BB, Diamant NE, Hu Y, *et al.* Further validation of the IBS-QOL: A disease-specific quality-of-life questionnaire. *Am J Gastroenterol* 2000;95:999-1007.
- Jalowiec A, Murphy SP, Powers MJ. Psychometric assessment of the jalowiec coping scale. *Nurs Res* 1984;33:157-61.
- Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the hospital anxiety and depression scale. An updated literature review. *J Psychosom Res* 2002;52:69-77.
- Montazeri A, Vahdaninia M, Ebrahimi M, Jarvandi S. The hospital anxiety and depression scale (HADS): Translation and validation study of the Iranian version. *Health Qual Life Outcomes* 2003;1:14.
- Gholamrezaei A, Nemati K, Emami MH. Which end point is more comprehensive in reflecting changes in irritable bowel syndrome treatment trials? *Am J Gastroenterol* 2009;104:2859.
- Gholamrezaei A, Zolfaghari B, Farajzadegan Z, Nemati K, Daghighzadeh H, Tavakkoli H, *et al.* Linguistic validation of the irritable bowel syndrome-quality of life questionnaire for Iranian patients. *Acta Med Iran* 2011;49:390-5.
- Whitehead WE, Crowell MD, Robinson JC, Heller BR, Schuster MM. Effects of stressful life events on bowel symptoms: Subjects with irritable bowel syndrome compared with subjects without bowel dysfunction. *Gut* 1992;33:825-30.
- Bowers H, Wroe A. Beliefs about emotions mediate the relationship between emotional suppression and quality of life in irritable bowel syndrome. *J Ment Health* 2016;25:154-8.
- Stanculete MF, Matu S, Pojoga C, Dumitrascu DL. Coping strategies and irrational beliefs as mediators of the health-related quality of life impairments in irritable bowel syndrome. *J Gastrointestin Liver Dis* 2015;24:159-64.
- Sibelli A, Chalder T, Everitt H, Workman P, Bishop FL, Moss-Morris R, *et al.* The role of high expectations of self and social desirability in emotional processing in individuals with irritable bowel syndrome: A qualitative study. *Br J Health Psychol* 2017;22:737-62.
- Knowles SR, Austin DW, Sivanesan S, Tye-Din J, Leung C, Wilson J, *et al.* Relations between symptom severity, illness perceptions, visceral sensitivity, coping strategies and well-being in irritable bowel syndrome guided by the common sense model of illness. *Psychol Health Med* 2017;22:524-34.
- Pellissier S, Dantzer C, Canini F, Mathieu N, Bonaz B. Psychological adjustment and autonomic disturbances in inflammatory bowel diseases and irritable bowel syndrome. *Psychoneuroendocrinology* 2010;35:653-62.

35. Porcelli P, De Carne M, Leandro G. The role of alexithymia and gastrointestinal-specific anxiety as predictors of treatment outcome in irritable bowel syndrome. *Compr Psychiatry* 2017;73:127-35.
36. Spiegel B, Strickland A, Naliboff BD, Mayer EA, Chang L. Predictors of patient-assessed illness severity in irritable bowel syndrome. *Am J Gastroenterol* 2008;103:2536-43.
37. Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS. Comparative efficacy of psychological therapies for improving mental health and daily functioning in irritable bowel syndrome: A systematic review and meta-analysis. *Clin Psychol Rev* 2017;51:142-52.
38. Pajak R, Lackner J, Kamboj SK. A systematic review of minimal-contact psychological treatments for symptom management in irritable bowel syndrome. *J Psychosom Res* 2013;75:103-12.
39. Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS. Short-term and long-term efficacy of psychological therapies for irritable bowel syndrome: A Systematic review and meta-analysis. *Clin Gastroenterol Hepatol* 2016;14:937-47.e4.

