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Coping with Stress in Patients with Inflammatory Bowel Disease and Its Relationship with Disease Activity, Psychological Disorders, and Quality of Life

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Quantitative Study

Abstract

Background: Inflammatory bowel diseases (IBD) are chronic diseases with significant impact on patients' well-being. The aim of this study was to determine stress coping strategies in IBD patients and their association with disease activity, psychological health, and quality of life (QOL).

Methods: This cross-sectional study was conducted on IBD patients referred to a gastroenterology clinic in Isfahan city (Iran). Disease activity, severity of anxiety and depression symptoms, stress coping strategies, and QOL were assessed using self-administered questionnaires. Coping strategies in IBD patients were compared to an unaffected control group.

Results: In the present study, 80 patients with mean age of 52.9 years (57.5% female) and mean disease duration of 6.5 years were studied. Compared to the controls, IBD patients had higher scores in the maladaptive coping styles (evasive and palliative) ($P < 0.05$). Association between coping strategies and disease activity was not significant. Severity of anxiety and depression was directly correlated with the maladaptive strategies (fatalistic and emotional) ($r = 0.283$ to 0.468) and inversely correlated with the adaptive strategies (confrontive, optimistic, and self-reliant) ($r = -0.320$ to -0.534). In addition, QOL was inversely correlated with the maladaptive strategies (fatalistic and emotional) ($r = -0.278$ to -0.327) and directly correlated with the adaptive strategies (confrontive and optimistic) ($r = 0.262$ to 0.355).

Conclusion: Patients with IBD use more maladaptive and less adaptive stress coping strategies which are associated with their psychological health and QOL. Larger and prospective studies on the dynamic and interactive network of biopsychosocial factors in IBD patients are required.

Keywords: Anxiety, Crohn's disease, Depression, Inflammatory bowel disease, Quality of life, Stress, Ulcerative colitis

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Introduction

Crohn's disease (CD) and ulcerative colitis (UC) are inflammatory bowel diseases (IBDs) accompanied by periods of relapse and remission, and generally require lifelong treatment (Podolsky, 2002). Due to their chronicity and unpredictable clinical course, IBDs have a significant impact on psychological health (Graff, Walker, & Bernstein, 2009) and quality of life (QOL) of the patients (Sainsbury, & Heatley, 2005). Anxiety and depression are common in these patients and not only impair their QOL (Guthrie, Jackson, Shaffer, Thompson, Tomenson, & Creed, 2002), but may also affect the clinical course of the disease (Mittermaier et al., 2004). Recent data have shown that (psychological) stress can aggravate symptoms and even increase the risk of relapse in patients with IBD, probably by changing the function of the hypothalamic-pituitary-adrenal axis and proinflammatory effects (Mawdsley, & Rampton, 2005). However, not all patients react similarly to stress, and the way they perceive and deal with stress may mediate the association between stress and the clinical course of the disease (Goodhand, & Rampton, 2008).

People show different physical, emotional, and behavioural reactions to stress (Schneiderman, Ironson, & Siegel, 2005), and have different ways of coping with stress (Folkman & Lazarus, 1980). Folkman and Lazarus defined coping as "the constantly changing cognitive and behavioural efforts to manage the specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Folkman, & Lazarus, 1980). Stress coping styles can be divided into two main categories of adaptive problem-focused and maladaptive avoidant or emotion-focused strategies (Folkman, & Lazarus, 1980). Problem solving, consulting with others, and looking on the bright side of the situation are examples of adaptive and active strategies. Avoiding the situation or people, sleeping too much, self-blame, having the desire that the situation would go away, and smoking and using alcohol or drugs are examples of avoidant and emotional maladaptive strategies (Folkman, & Lazarus, 1980).

Relatively few studies have evaluated stress coping strategies in patients with IBD. Some studies showed that patients with IBD use less adaptive (problem solving) and more maladaptive (avoidance and emotional) coping strategies compared with non-IBD controls (Jones, Wessinger, & Crowell, 2006). However, some other studies found no difference between IBD and non-IBD subjects in terms of adaptive strategies (Graff et al., 2009). The association of coping styles with disease outcomes has been less investigated, but in previous studies adaptive styles have been associated with lower risk of relapse (Gandhi et al. 2014; Parekh, McMaster, Nguyen, Shah, Speziale, & Miller, 2015) and maladaptive styles with more severe disease and relapse (Graff et al., 2009). Moreover, most studies found an association between maladaptive coping styles, particularly emotion-focused strategies, and psychological disorders, mainly anxiety and depression (Iglesias-Rey et al., 2013; Knowles, Wilson, Connell, & Kamm, 2011; McCombie, Mulder, & Gearry, 2015) and impaired QOL in patients with IBD (McCombie et al., 2015; Moskovitz, Maunder, Cohen, McLeod, & MacRae, 2000; Smolen, & Topp, 1998; van der Zaag-Loonen, Grootenhuis, Last, & Derkx, 2004).

Regarding the role of psychological factors and stress in the clinical course of IBD and patients' QOL, investigators have evaluated the effectiveness of psychological interventions in the treatment of IBD (McCombie, Mulder, & Gearry, 2013b). Although there has been some promising results (Keefer, Kiebles, Martinovich, Cohen, van Denburg, & Barrett, 2011), review studies have found the efficacy of such treatments for IBD to be mixed, and minimal at best, even for psychological health and QOL (Knowles, Monshat, & Castle, 2013b; McCombie et al., 2013b). Psychological interventions may

not be equally beneficial for all patients with IBD and how the treatment protocol is tailored to the patients' needs may affect its outcomes (Knowles et al., 2013b). A prerequisite for psychological interventions for stress is knowledge of the common coping strategies applied by the target population. Knowledge of the coping strategies of patients with IBD and the mediating/moderating factors can help in the designing of coping training courses appropriate to the needs of patients with particular internal and external supporting resources. There is a lack of studies on coping strategies of patients with IBD, especially in our society (Iran), and there are cross-cultural variations in coping styles (O'Connor, & Shimizu, 2002). Thus, this study was performed with the aim to identify coping strategies in a sample of Iranian patients with IBD and the relationship of these strategies with disease activity, psychological health, and QOL.

Methods

This cross-sectional study was conducted on patients with IBD referring to the Poursina Hakim Gastroenterology Clinic and Research Institute, in Isfahan city (Iran), between August 2013 and February 2014. The inclusion criteria consisted of age of between 18 and 65 years, diagnosis of IBD by a gastroenterologist based on symptoms, physical examination, and serologic tests and confirmation through endoscopic and pathologic studies, and the ability to complete the study questionnaires either through self-administeration or interview. Data from another study in a sample of unaffected adult population of Isfahan city was used for comparison (Bagherian Sararoudi, Ahmadzadeh, & Mahmmodi, 2009). The study was approved by the Ethics Committee of Isfahan University of Medical Sciences and verbal consents were obtained from patients to participate in the study.

Patients' demographic characteristics included age, sex, education level, and marital status. Data on characteristics of the disease, including type and duration of disease (from diagnosis), were collected from the patient records. Disease activity, stress coping strategies, severity of symptoms of anxiety and depression, and QOL were assessed using the following self-administered questionnaires. A trained interviewer was present to interview the patients while completing the questionnaires, if necessary.

Disease activity in patients with CD was measured using the Simplified Crohn's Disease Activity Index (SCDAI) (Thia Faubion, Loftus, Persson, Persson, & Sandborn, 2011), a simplified version of the CDAI (Best, Becktel, Singleton, & Kern, 1976). The SCDAI contains items on the number of liquid/soft stools, severity of abdominal pain, and general wellbeing. A total score of higher than 150 is indicative of active disease status in this scale (Thia et al., 2011). In patients with UC, activity was measured using the Simple Clinical Colitis Activity Index (SCCAI) (Walmsley, Ayres, Pounder, & Allan, 1998), containing items on bowel frequency, urgency for defecation, bloody stool, and general well-being. The total score of this scale ranges from 0 to 16 with scores of 6 and above indicating active disease state (Walmsley et al., 1998).

To evaluate stress coping styles, the Jalowiec Coping Scale (JCS) was used (Jalowiec, Murphy, & Powers, 1984). The revised version of the scale contains 60 items evaluating frequency of various coping behaviors. Each item was graded on a four-point Likert scale; 0-3 (never to most of the time). This measure covers the confrontive, evasive, optimistic, fatalistic, emotive, palliative, supportive, and self-reliant coping styles. Confrontive coping style is defined as dealing with the situation directly and trying to change it, and evasive coping style as avoiding the situation. Optimistic coping style is thinking positively in dealing with the situation and fatalistic style is hopelessness and sense of lack of control. Emotive coping style is described as showing emotional response and worrying in

the face of the situation. Palliative coping style is engaging in some activities in order to obtain a sense of control but not directly dealing with the challenging situation. Supportive coping style is defined as using support resources and self-reliant coping style as action or decision based on own volition and without relying on others. The score of each dimension is a mean of its composing items' scores (Jalowiec et al., 1984). This questionnaire was translated to Persian by Bagherian Sararoudi et al. (2009). The Persian version has good psychometric properties (Cronbach's alpha = 0.65 to 0.84) (Bagherian Sararoudi et al., 2009).

The Hospital Anxiety and Depression Scale (HADS) was used to measure the severity of psychological symptoms (Zigmond, & Snaith, 1983). The questionnaire includes 14 questions (7 for each dimension) with scores ranging from 0 to 3 representing the severity of anxiety and depression symptoms. Total score for each dimension ranges from 0 to 21. The Persian version of the questionnaire was standardized by Montazeri, Vahdaninia, Ebrahimi, & Jarvandi (2003) with appropriate psychometric characteristics (Cronbach's alpha = 0.78 to 0.86) (Montazeri et al. 2003).

The short form of the Inflammatory Bowel Disease Questionnaire (IBDQ-9) was used to assess the patients' QOL (Casellas, Alcala, Prieto, Miro, & Malagelada, 2004). Through 9 items, the IBDQ-9 measures the four dimensions of bowel and systemic symptoms, emotional function, and social impairment. Items are scored on a Likert scale from 1 to 7 [lowest level of function (extreme problem) to excellent function (no problem at all)], and the total score ranges from 1 to 63; higher score indicates better QOL. The questionnaire was translated into Persian by Gholamrezaei, Shemshaki, Tavakoli, & Emami (2011) with appropriate psychometric characteristics (Cronbach's alpha = 0.76) (Gholamrezaei et al. 2011).

The SPSS software (version 16.0, SPSS Inc., Chicago, IL, USA) was used for data analysis. Descriptive data are shown as mean ± SD 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 non-parametric data) was used to investigate the association between quantitative variables. A P value of less than 0.05 was considered statistically significant in all analyses.

Results

Patients and disease characteristics

During the study period, 92 patients with IBD who had the inclusion criteria were invited to participate; 10 patients were not willing to participate and 2 patients had extremely missing data. Finally, data on 80 patients with a mean age of 52.9 years (57.5% female) and disease duration of 6.5 years were entered into the study. Patients' and disease characteristics are summarized in table 1.

Table 1: Patients' and disease characteristics (n = 80)

Variable	
Age (years) (mean ± SD)	52.9 ± 13.4
Gender (female) [n (%)]	46 (57.5)
Marital status (married) [n (%)]	66 (82.5)
Education	
Elementary to diploma [n (%)]	46 (57.5)
Bachelor's degree and higher [n (%)]	34 (42.5)
Disease subtype	
Ulcerative colitis [n (%)]	55 (68.8)
Crohn's disease [n (%)]	21 (26.2)
Indeterminate colitis [n (%)]	4 (5)
Disease duration (years) (mean ± SD)	6.5 ± 5.2
Disease activity (active) [n (%)]	13 (16.2)

Coping with stress

Scores of the JCS dimensions in patients with IBD compared with the control population are shown in table 2. Compared with controls, patients with IBD had a lower, though not statistically significant, score in the confrontive coping style (2.0 ± 0.6 vs. 2.2 ± 0.6, P = 0.056). They had significantly higher scores in the evasive (1.5 ± 0.4 vs. 1.4 ± 0.3, P = 0.033) and

palliative (1.0 ± 0.4 vs. 0.7 ± 0.3, P < 0.011) coping styles compared with the control group.

Correlation of coping strategies with the study variables

Regarding demographic characteristics, patients' age had no significant relationship with coping styles (r = -0.156 to 0.116, P > 0.05). The use of fatalistic and emotive styles was more frequent in women, while the use of confrontive and self-reliant coping styles was more frequent in men (Table 3). The level of education was directly related to the confrontive coping style (r = 0.253, P = 0.024) and inversely related with the fatalistic style (r = -0.358, P = 0.001). There was no significant relationship between marital status and coping styles (P > 0.05).

There was no difference between patients with UC and CD in terms of coping strategies (all P values > 0.05). The relationships of coping strategies with duration of illness, disease activity, anxiety and depression, and the QOL of the patients are presented in table 4. In patients with UC, there was a weak but not statistically significant inverse relationship between the severity of disease activity and optimistic style (r = -0.238, P = 0.072). In patients with CD, a direct and moderate but not statistically significant association was observed between disease activity and fatalistic (r = 0.380, P = 0.081) and evasive strategies (r = 0.368, P = 0.092). Severity of anxiety and depression was directly correlated with the maladaptive strategies (fatalistic and emotional, r = 0.283 to 0.468) and inversely correlated with the adaptive strategies (confrontive, optimistic, and self-reliant, r = -0.320 to -0.534). Moreover, QOL was inversely correlated with the maladaptive strategies (fatalistic and emotional, r = -0.278 to -0.327) and directly correlated with the adaptive strategies (confrontive and optimistic, r = 0.262 to 0.355) (Table 4).

Table 2: Comparison of coping strategies between patients and controls

Coping strategies	Patients [(n = 80)]	Controls [(n = 100)]	P*
Confrontive	2.0 ± 0.6	2.2 ± 0.6	0.056
Evasive	1.5 ± 0.4	1.4 ± 0.3	0.033
Optimistic	2.0 ± 0.6	1.9 ± 0.5	0.502
Fatalistic	1.5 ± 0.5	1.5 ± 0.6	0.786
Emotive	1.4 ± 0.6	1.4 ± 0.5	0.896
Palliative	1.0 ± 0.4	0.7 ± 0.3	< 0.011
Supportive	1.8 ± 0.6	1.7 ± 0.4	0.687
Self-reliant	1.9 ± 0.6	2.0 ± 0.5	0.140

Data are displayed as mean ± SD
*Independent t-test

Table 3: Comparison of coping strategies between male and female patients

Coping strategies	Male (n = 34)	Female (n = 46)	P*
Confrontive	2.24 ± 0.58	1.85 ±0.70	0.010
Evasive	1.57 ± 0.45	1.61 ±0.42	0.666
Optimistic	2.13 ± 0.58	1.94 ± 0.73	0.213
Fatalistic	1.38 ± 0.48	1.71 ± 0.60	0.014
Emotive	1.23 ± 0.58	1.53 ± 0.59	0.024
Palliative	1.04 ± 0.41	1.04 ± 0.45	0.924
Supportive	1.73 ± 0.62	1.87 ± 0.58	0.318
Self-reliant	2.09 ± 0.56	1.83 ± 0.60	0.050

Data are displayed as mean ± SD
*Independent t-test

Table 4: Correlation of the study variables with coping strategies

Variables	Stress coping strategies							
	Confrontive	Evasive	Optimistic	Fatalistic	Emotive	Palliative	Supportive	Self-reliant
Age	0.116	-0.105	0.104	-0.156	0.133	-0.097	0.042	-0.027
Education	0.234*	-0.072	0.134	-0.385†	-0.159	-0.188	-0.081	0.077
Disease duration	0.046	0.077	0.026	0.027	-0.060	0.130	0.100	0.055
SCCAI	-0.113	-0.181	-0.238††	0.025	0.179	-0.174	-0.169	0.020
SCDAI	-0.133	-0.368	-0.046	0.380††	0.296	0.100	-0.263	0.276
Depression	-0.416†	-0.105	-0.534†	0.283*	0.422†	-0.183	0.002	-0.305†
Anxiety	-0.320†	-0.009	-0.374†	0.379†	0.468†	-0.081	0.057	-0.156
Quality of life	0.262†	0.089	0.355†	-0.278*	-0.327†	0.120	0.003	0.174

Abbreviations: SCCAI: Simple Clinical Colitis Activity Index; SCDAI: Simplified Crohn's Disease Activity Index
* $P < 0.05$; † $P < 0.001$; †† $P < 0.1$

Discussion

Although it is not yet proven that psychological stress can increase the risk of developing IBD, studies have shown that stress has adverse impacts not only on QOL (Iglesias-Rey et al., 2014; Moradkhani, Beckman, & Tabibian, 2013; Tabibian et al 2015) and psychological health (Goodhand et al. 2012; Keegan, et al. 2015), but also on disease outcomes in patients with IBD (Bernstein, et al, 2010; Duffy, et al., 1991; Maunder, & Levenstein, 2008). In the present study, stress coping strategies were investigated in a sample of Iranian patients with IBD. We found that these patients, compared with the unaffected population, use less adaptive (e.g., confrontive) and more maladaptive (e.g., evasive and palliative) strategies for coping with stressful situations. This finding was relatively similar to that of other previous studies (McCombie, Mulder, & Gearry, 2013a). Stress coping strategy varies over time (Folkman, & Lazarus, 1985) and each person in different situations uses different coping strategies depending on stress type and severity and the available internal and external resources (Folkman, & Lazarus, 1985). Disease duration in the majority of patients in our study was 2 years and higher. Accordingly, we cannot be certain whether the trend toward more maladaptive and less adaptive coping approaches in these patients is related to the chronicity of the disease and the resultant helplessness or to the natural tendency of these patients to such stress coping strategies. Studying a large sample of patients with various disease durations and longitudinal studies with long-term follow-ups on changes in coping strategies of patients with IBD over time can help to better clarify this issue.

Adaptive coping strategies (e.g. optimistic, confrontive, and self-reliant) were more frequently applied in our sample of patients, while maladaptive styles (e.g. palliative and emotive) were less applied. In the study by Parekh et al. on adult patients with IBD in the USA, confrontive style was the most common and fatalistic strategy was the least common way of coping with stress (Parekh et al., 2015). In contrast, the most common strategies used to deal with stress in patients with IBD in Spain were maladaptive strategies (e.g., emotion-focused) (Iglesias-Rey et al., 2014; Iglesias-Rey et al., 2013). Disease characteristics (duration and activity), psychological health, and cultural factors may explain some of the differences between studies in coping strategies among patients with IBD. Furthermore, various research designs and coping instruments are involved in this issue and highlight the necessity for standardization of future studies (McCombie et al., 2013a).

Regardless of the order of various coping styles in patients with IBD, use of maladaptive strategies are associated with worse outcomes in these patients (McCombie et al., 2013a). Previous studies found association between coping and disease activity (McCombie et al., 2013a). In contrast, in our study, a clear relationship was

not observed between the severity of the disease and stress coping strategies. We believe this is due to the small sample of patients in each IBD subtype and small number of patients with active disease in our study (16.2%). A cause and effect relationship between coping and disease activity cannot be concluded from cross-sectional studies; however,, a few cohorts (some prospective) have found association between disease flares and using more maladaptive and less adaptive coping strategies (Bitton et al., 2008; Gandhi et al., 2014; Graff et al., 2009; Parekh et al., 2015). Therefore, stress coping strategies may mediate the effects of psychological stress on IBD activity, highlighting the necessity for identifying patients with maladaptive coping strategies and addressing their needs in clinical practice (Goodhand, & Rampton, 2008).

There is also an interaction between coping and psychological health in patients with IBD. Similar to other studies (Iglesias-Rey et al., 2013; Knowles, Cook, & Tribbick, 2013a; Knowles et al., 2011; McCombie et al., 2015), we found an association between stress coping styles and psychological health. Adaptive coping styles were associated with lower severity of anxiety and depression and maladaptive styles were associated with worse psychological health. Moreover, coping strategies were associated with QOL, as an important outcome, in our study. This finding was in agreement with that of most previous investigations (Dorrian, Dempster, & Adair, 2009; Graff et al., 2009; McCombie et al., 2015; Moskovitz et al., 2000; Petrak et al., 2001; van der Zaag-Loonen et al., 2004). It must be noted that perceived psychological stress, coping, psychological disorders, and disease activity act in a complex interactive network. More importantly, these factors and the interactions among them are not stable over time (McCombie et al., 2015). Accordingly, larger and prospective studies are required to clarify the dynamic and complex interactive relationship between various biopsychosocial factors in IBD. Such information is needed for designing comprehensive care programs for the treatment of patients with IBD.

Our study had a number of limitations. It was a cross-sectional study, and thus, cannot conclude the cause and effect relationship between the studied variables. We did not have a real control group for comparison between patients with IBD and the unaffected population. Furthermore, the study sample size was small and multivariate analysis was not possible to clarify the model of interactions between the study outcomes. In this regard, other important mediating/moderating psychosocial factors such as perceived stress and perceived social support should also be evaluated. Finally, our study results cannot be generalized to all patients with IBD in our society as our sample was selected from a single private outpatient clinic.

Conclusion

Our sample of Iranian patients with IBD applied more maladaptive and less adaptive coping strategies compared to the unaffected population. Patients who more frequently used adaptive coping strategies had less severe anxiety and depression and better QOL. In contrast, those who relied on maladaptive coping strategies had worse psychological symptoms and poorer QOL. Before these findings can be used in designing comprehensive care programs for patients with IBD, larger multicenter and prospective studies are required to better understand the complex and dynamic interactive network of biopsychosocial factors in patients with IBD.

Conflict of Interests

Authors have no conflict of interests.

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References

Bagherian Sararoud,i R., Mahmmodi, M., & Ahmadzadeh, G. h. (2009). Coping styles among diabetic patients. *J Arak Univ Med Sci, 12*(1), 9-17.

Bernstein, C. N., Singh, S., Graff, L. A., Walker, J. R., Miller, N., & Cheang, M. (2010). A prospective population-based study of triggers of symptomatic flares in IBD. *Am J Gastroenterol, 105*(9), 1994-2002. doi:ajg2010140 [pii];10.1038/ajg.2010.140 [doi]. Retrieved from PM:20372115

Best, W. R., Becktel, J. M., Singleton, J. W., & Kern, F., Jr. (1976). Development of a Crohn's disease activity index. National Cooperative Crohn's Disease Study. *Gastroenterology, 70*(3), 439-444. doi:S0016508576000504 [pii]. Retrieved from PM:1248701

Bitton, A., Dobkin, P. L., Edwardes, M. D., Sewitch, M. J., Meddings, J. B., Rawal, S. et al. (2008). Predicting relapse in Crohn's disease: a biopsychosocial model. *Gut, 57*(10), 1386-1392. doi:gut.2007.134817 [pii];10.1136/gut.2007.134817 [doi]. Retrieved from PM:18390994

Casellas, F., Alcala, M. J., Prieto, L., Miro, J. R., & Malagelada, J. R. (2004). Assessment of the influence of disease activity on the quality of life of patients with inflammatory bowel disease using a short questionnaire. *Am J Gastroenterol, 99*(3), 457-461. doi:10.1111/j.1572-0241.2004.04071.x [doi];AJG4071 [pii]. Retrieved from PM:15056085

Dorrian, A., Dempster, M., & Adair, P. (2009). Adjustment to inflammatory bowel disease: the relative influence of illness perceptions and coping. *Inflamm.Bowel.Dis., 15*(1), 47-55. doi:10.1002/ibd.20583 [doi]. Retrieved from PM:18626980

Duffy, L. C., Zielezny, M. A., Marshall, J. R., Byers, T. E., Weiser, M. M., Phillips, J. F. et al. (1991). Relevance of major stress events as an indicator of disease activity prevalence in inflammatory bowel disease. *Behav Med, 17*(3), 101-110. doi:10.1080/08964289.1991.9937553 [doi]. Retrieved from PM:1932843

Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *J Health Soc Behav, 21*(3), 219-239. Retrieved from PM:7410799

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: study of emotion and coping during three stages of a college examination. *J Pers.Soc Psychol, 48*(1), 150-170. Retrieved from PM:2980281

Gandhi, S., Jedel, S., Hood, M. M., Mutlu, E., Swanson, G., & Keshavarzian, A. (2014). The relationship between coping, health competence and patient participation among patients with inactive inflammatory bowel disease. *J Crohns.Colitis., 8*(5), 401-408. doi:S1873-9946(13)00356-5 [pii];10.1016/j.crohns.2013.10.005 [doi]. Retrieved from PM:24230968

Gholamrezaei, A., Haghdani, S., Shemshaki, H., Tavakoli, H., & Emami, M. H. (2011). Linguistic validation of the Inflammatory Bowel Disease Questionnaire-short form (IBDQ-9) in Iranian population. *J Isfahan Med Sch, 28*(123), 1850-1859.

Goodhand, J., & Rampton, D. (2008). Psychological stress and coping in IBD. *Gut, 57*(10), 1345-1347. doi:57/10/1345 [pii];10.1136/gut.2008.154229 [doi]. Retrieved from PM:18791113

Goodhand, J. R., Wahed, M., Mawdsley, J. E., Farmer, A. D., Aziz, Q., & Rampton, D. S. (2012). Mood disorders in inflammatory bowel disease: relation to diagnosis, disease activity, perceived stress, and other factors. *Inflamm.Bowel.Dis., 18*(12), 2301-2309. doi:10.1002/ibd.22916 [doi]. Retrieved from PM:22359369

Graff, L. A., Walker, J. R., & Bernstein, C. N. (2009a). Depression and anxiety in inflammatory bowel disease: a review of comorbidity and management. *Inflamm.Bowel.Dis., 15*(7), 1105-1118. doi:10.1002/ibd.20873 [doi]. Retrieved from PM:19161177

Graff, L. A., Walker, J. R., Clara, I., Lix, L., Miller, N., Rogala, L. et al. (2009b). Stress coping, distress, and health perceptions in inflammatory bowel disease and community controls. *Am J Gastroenterol, 104*(12), 2959-2969. doi:ajg2009529 [pii];10.1038/ajg.2009.529 [doi]. Retrieved from PM:19755973

Guthrie, E., Jackson, J., Shaffer, J., Thompson, D., Tomenson, B., & Creed, F. (2002). Psychological disorder and severity of inflammatory bowel disease predict health-related quality of life in ulcerative colitis and Crohn's disease. *Am J Gastroenterol, 97*(8), 1994-1999. doi:10.1111/j.1572-0241.2002.05842.x [doi]. Retrieved from PM:12190166

Iglesias-Rey, M., Barreiro-de, A. M., Caamano-Isorna, F., Rodriguez, I. V., Gonzalez, A. L., Lindkvist, B. et al. (2013). How do psychological variables influence coping strategies in inflammatory bowel disease? *J Crohns.Colitis., 7*(6), e219-e226. doi:S1873-9946(12)00418-7 [pii];10.1016/j.crohns.2012.09.017 [doi]. Retrieved from PM:23083699

Iglesias-Rey, M., Barreiro-de, A. M., Caamano-Isorna, F., Rodriguez, I. V., Ferreiro, R., Lindkvist, B. et al. (2014). Psychological factors are associated with changes in the health-related quality of life in inflammatory bowel disease. *Inflamm.Bowel.Dis., 20*(1), 92-102. doi:10.1097/01.MIB.0000436955.78220.bc [doi]. Retrieved from PM:24193152

Jalowiec, A., Murphy, S. P., & Powers, M. J. (1984). Psychometric assessment of the Jalowiec Coping Scale. *Nurs Res, 33*(3), 157-161. Retrieved from PM:6563533

Jones, M. P., Wessinger, S., & Crowell, M. D. (2006). Coping strategies and interpersonal support in patients with irritable bowel syndrome and inflammatory bowel disease. *Clin Gastroenterol Hepatol., 4*(4), 474-481. doi:S1542-3565(05)01183-3 [pii];10.1016/j.cgh.2005.12.012 [doi]. Retrieved from PM:16616353

Keefer, L., Kiebles, J. L., Martinovich, Z., Cohen, E., van Denburg, A., & Barrett, T. A. (2011). Behavioral interventions may prolong remission in patients with inflammatory bowel disease. Behav Res Ther, 49(3), 145-150. doi:S0005-7967(10)00254-8 [pii];10.1016/j.brat.2010.12.005 [doi]. Retrieved from PM:21256475

Keegan, D., Byrne, K., Cullen, G., Doherty, G. A., Dooley, B., & Mulcahy, H. E. (2015). The Stressometer: A Simple, Valid, and Responsive Measure of Psychological Stress in Inflammatory Bowel Disease Patients. *J Crohns.Colitis.*. doi:jjv120 [pii];10.1093/ecco-jcc/jjv120 [doi]. Retrieved from PM:26221000

Knowles, S. R., Wilson, J. L., Connell, W. R., & Kamm, M. A. (2011). Preliminary examination of the relations between disease activity, illness perceptions, coping strategies, and psychological morbidity in Crohn's disease guided by the common sense model of illness. *Inflamm.Bowel.Dis., 17*(12), 2551-2557. doi:10.1002/ibd.21650 [doi]. Retrieved from PM:21425208

Knowles, S. R., Cook, S. I., & Tribbick, D. (2013a). Relationship between health status, illness perceptions, coping strategies and psychological morbidity: a preliminary study with IBD stoma patients. *J Crohns.Colitis., 7*(10), e471-e478. doi:S1873-9946(13)00105-0 [pii];10.1016/j.crohns.2013.02.022 [doi]. Retrieved from PM:23541738

Knowles, S. R., Monshat, K., & Castle, D. J. (2013b). The efficacy and methodological challenges of psychotherapy for adults with inflammatory bowel disease: a review. *Inflamm.Bowel.Dis., 19*(12), 2704-2715. doi:10.1097/MIB.0b013e318296ae5a [doi]. Retrieved from PM:23846488

Maunder, R. G., & Levenstein, S. (2008). The role of stress in the development and clinical course of inflammatory bowel disease: epidemiological evidence. *Curr Mol Med, 8*(4), 247-252. Retrieved from PM:18537632

Mawdsley, J. E., & Rampton, D. S. (2005). Psychological stress in IBD: new insights into pathogenic and therapeutic implications. *Gut, 54*(10), 1481-1491. doi:54/10/1481 [pii];10.1136/gut.2005.064261 [doi]. Retrieved from PM:16162953

McCombie, A. M., Mulder, R. T., & Gearry, R. B. (2013a). How IBD patients cope with IBD: a systematic review. *J Crohns.Colitis., 7*(2), 89-106. doi:S1873-9946(12)00263-2 [pii];10.1016/j.crohns.2012.05.021 [doi]. Retrieved from PM:22718016

McCombie, A. M., Mulder, R. T., & Gearry, R. B. (2013b). Psychotherapy for inflammatory bowel disease: a review and update. *J Crohns.Colitis., 7*(12), 935-949. doi:S1873-9946(13)00069-X [pii];10.1016/j.crohns.2013.02.004 [doi]. Retrieved from PM:23466412

McCombie, A. M., Mulder, R. T., & Gearry, R. B. (2015). Coping Strategies and Psychological Outcomes of Patients with Inflammatory Bowel Disease in the First 6 Months After Diagnosis. *Inflamm.Bowel.Dis.*. doi:10.1097/MIB.0000000000000476 [doi]. Retrieved from PM:26099065

Mittermaier, C., Dejaco, C., Waldhoer, T., Oefferlbauer-Ernst, A., Miehsler, W., Beier, M. et al. (2004). Impact of depressive mood on relapse in patients with inflammatory bowel disease: a prospective 18-month follow-up study. *Psychosom.Med, 66*(1), 79-84. Retrieved from PM:14747641

Montazeri, A., Vahdaninia, M., Ebrahimi, M., & Jarvandi, S. (2003). The Hospital Anxiety and Depression Scale (HADS): translation and validation study of the Iranian version. *Health Qual.Life.Outcomes., 1*, 14. doi:10.1186/1477-7525-1-14 [doi]. Retrieved from PM:12816545

Moradkhani, A., Beckman, L. J., & Tabibian, J. H. (2013). Health-related quality of life in inflammatory bowel disease: psychosocial, clinical, socioeconomic, and demographic predictors. *J Crohns.Colitis., 7*(6), 467-473. doi:S1873-9946(12)00323-6 [pii];10.1016/j.crohns.2012.07.012 [doi]. Retrieved from PM:22884758

Moskovitz, D. N., Maunder, R. G., Cohen, Z., McLeod, R. S., & MacRae, H. (2000). Coping behavior and social support contribute independently to quality of life after surgery for inflammatory bowel disease. *Dis.Colon.Rectum., 43*(4), 517-521. Retrieved from PM:10789749

O'Connor, D. B., & Shimizu, M. (2002). Sense of personal control, stress and coping style: a cross-cultural study. *Stress and Health, 18*(4), 173-183. Retrieved from http://dx.doi.org/10.1002/smi.939. Retrieved from John Wiley & Sons, Ltd.

Parekh, N. K., McMaster, K., Nguyen, D. L., Shah, S., Speziale, A., Miller, J. et al. (2015). Coping Strategies Used by Adult Patients with Inflammatory Bowel Disease. *South.Med J, 108*(6), 337-342. doi:10.14423/SMJ.0000000000000292 [doi];SMJ50020 [pii]. Retrieved from PM:26079458

Petrak, F., Hardt, J., Clement, T., Borner, N., Egle, U. T., & Hoffmann, S. O. (2001). Impaired health-related quality of life in inflammatory bowel diseases: psychosocial impact and coping styles in a national

German sample. *Scand.J Gastroenterol, 36*(4), 375-382. Retrieved from PM:11336162

Podolsky, D. K. (2002). Inflammatory bowel disease. *N Engl J Med, 347*(6), 417-429. doi:10.1056/NEJMra020831 [doi];347/6/417 [pii]. Retrieved from PM:12167685

Sainsbury, A., & Heatley, R. V. (2005). Review article: psychosocial factors in the quality of life of patients with inflammatory bowel disease. *Aliment.Pharmacol.Ther, 21*(5), 499-508. doi:APT2380 [pii];10.1111/j.1365-2036.2005.02380.x [doi]. Retrieved from PM:15740531

Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annu.Rev Clin Psychol, 1*, 607-628. doi:10.1146/annurev.clinpsy.1.102803.144141 [doi]. Retrieved from PM:17716101

Smolen, D. M., & Topp, R. O. B. E. (1998). Coping methods of patients with inflammatory bowel disease and prediction of perceived health, functional status, and well-being. *Gastroenterology Nursing, 21* (3). Retrieved from http://journals.lww.com/gastroenterologynursing/Fulltext/1998/05000/Coping_Methods_of_Patients_with_Inflammatory_Bowel.3.aspx

Tabibian, A., Tabibian, J. H., Beckman, L. J., Raffals, L. L., Papadakis, K. A., & Kane, S. V. (2015). Predictors of health-related quality of life and adherence in Crohn's disease and ulcerative colitis: implications for clinical management. *Dig.Dis.Sci, 60*(5), 1366-1374. doi:10.1007/s10620-014-3471-1 [doi]. Retrieved from PM:25559754

Thia, K., Faubion, W. A., Jr., Loftus, E. V., Jr., Persson, T., Persson, A., & Sandborn, W. J. (2011). Short CDAI: development and validation of a shortened and simplified Crohn's disease activity index. *Inflamm.Bowel.Dis., 17*(1), 105-111. doi:10.1002/ibd.21400 [doi]. Retrieved from PM:20629100

van der Zaag-Loonen HJ, Grootenhuis, M. A., Last, B. F., & Derkx, H. H. (2004). Coping strategies and quality of life of adolescents with inflammatory bowel disease. *Qual.Life.Res, 13*(5), 1011-1019. Retrieved from PM:15233514

Walmsley, R. S., Ayres, R. C., Pounder, R. E., & Allan, R. N. (1998). A simple clinical colitis activity index. *Gut, 43*(1), 29-32. Retrieved from PM:9771402

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatr.Scand., 67*(6), 361-370. Retrieved from PM:6880820