

Psychosocial Factors Contributing to Inflammatory Bowel Disease Activity and Health-Related Quality of Life

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Abstract: *Objective:* This study aimed to examine the contributions of coping and social constraint to disease activity and health-related quality of life (HRQOL) and to examine group differences in disease activity and HRQOL between patients with high versus low anxiety or depression symptoms in adults with inflammatory bowel disease (IBD). *Methods:* This study was a retrospective analysis in which disease activity was measured with either the Harvey-Bradshaw Index or the Simple Clinical Colitis Activity Index. HRQOL was measured with the Short Inflammatory Bowel Disease Questionnaire. Coping was measured with a modified COPE questionnaire. Anxiety and depression symptoms were measured with the Hospital Anxiety and Depression Scale. Social constraint was measured with the Social Constraint Questionnaire. Correlational and regression analyses were performed to assess the relationships between social constraint, coping, anxiety symptoms, depression symptoms, and HRQOL and disease activity. *Results:* Data from 80 adults with IBD were reviewed. Social constraint, disengagement coping, anxiety symptoms, and depression symptoms were inversely correlated with HRQOL. Disengagement coping was positively correlated with disease activity. Regression analyses showed that smokers had significantly worse HRQOL than nonsmokers and that greater use of engagement coping was associated with significantly diminished HRQOL. Regression analyses also showed that patients diagnosed between 17 and 40 years of age were significantly less likely to have active disease than patients diagnosed before 16 years of age and that greater use of disengagement coping was associated with increased odds of having active disease. *Conclusions:* Medical providers should be aware that coexisting social constraint and symptoms of anxiety and depression are common in patients with IBD. Screening for these factors, as well as patients' coping styles, should be strongly considered, and patients should be referred to mental health providers as appropriate.

Inflammatory bowel disease (IBD) affects 1.4 million Americans.^{1,2} Crohn's disease (CD) and ulcerative colitis (UC) are the 2 main conditions that comprise IBD, an idiopathic disease of the gastrointestinal system that is characterized by chronic inflammation. The goal of treatment for IBD is to diminish or eliminate disease activity and optimize quality of life. Thus, physicians need to address any factors that contribute to disease flares and diminished quality of life.

Patients with active disease report poorer health-related quality of life (HRQOL) than patients with quiescent disease.³⁻⁷ In fact, patients with quiescent disease report HRQOL and general quality of life similar to those of healthy controls.^{6,8} Researchers have found that higher levels of anxiety and depression are independently associated with lower overall HRQOL.^{4,6,9,10} In addition, Larsson and colleagues found that patients with quiescent disease report lower levels of anxiety and depression, and other researchers have found that patients with active disease report increased levels of anxiety and depression.^{6,11-14}

The type of coping that patients employ may be associated with their disease activity and HRQOL.¹⁵⁻¹⁸ Larsson and colleagues did not find a significant association between coping style and disease activity in patients with IBD; however, this study examined patients' general coping style, rather than assessing IBD-specific coping.⁶ More studies have examined the relationship between coping and HRQOL. Increased use of engagement coping (a response toward the stressor or emotions and/or thoughts generated by the stressor) is associated with improved HRQOL, whereas increased use of disengagement coping (a response away from the stressor or emotions and/or thoughts generated by the stressor) is associated with diminished HRQOL.^{9,16-19}

The quality of patients' social support is likely associated with how they adapt to their IBD.²⁰⁻²⁴ Therefore, it is surprising that IBD research has given minimal attention to social constraint on disclosure—the perception of feeling unsupported, misunderstood, or alienated from one's social network when seeking social support to discuss a stressor or a traumatic event.²⁵ Research studies have shown that IBD patients have good overall social support but higher levels of social constraint than healthy controls.^{20,26} Research with patients who have other chronic illnesses has demonstrated that increased social constraint is associated with greater psychological distress, diminished HRQOL, and greater use of disengagement coping.²¹⁻²⁴

Increased disease activity is associated with diminished HRQOL. Decreasing disease activity, and thus improving HRQOL, should reduce both direct and indirect costs associated with IBD. In order to better achieve these goals, research needs to identify psychological factors that con-

tribute to patients' disease activity and HRQOL. Toward this end, the present study has 3 goals: (1) to examine contributions of coping and social constraint on disclosure to disease activity and HRQOL, (2) to replicate previous research by demonstrating a significant relationship between disease activity and HRQOL, and (3) to examine group differences in HRQOL and disease activity for patients with high anxiety and depression symptoms versus those with low anxiety and depression symptoms.

Materials and Methods

Participants

The study was approved by the Human Research Protections Offices of the University of Maryland (UMB) and the University at Albany, State University of New York. This study was a retrospective chart review that examined clinical data obtained during patients' first appointment to the UMB IBD program. Data were gathered from a standard battery of measures that patients completed during their first office visit. All participants in this study were new to the UMB IBD program but were not necessarily newly diagnosed patients. Data were analyzed for a total of 92 patients seen between June 2008 and March 2009. Eleven of these patients did not have a confirmed diagnosis of IBD, and 1 patient was younger than 18 years of age; therefore, data from 80 patients were evaluated.

Disease-Related Measures

Data on disease activity were assessed via the Harvey-Bradshaw Index (HBI) for patients with CD and via the Simple Clinical Colitis Activity Index (SCCAI) for patients with UC or indeterminate colitis.^{27,28} The score derived from the HBI is based on 5 items that assess general well-being, abdominal pain, number of liquid stools per day, abdominal mass on physical examination, and complications or extraintestinal manifestations. The score derived from the SCCAI is based on 6 items that assess daytime and nighttime bowel movements, urgency, presence of blood in the stool, general well-being, and extraintestinal manifestations. For the purpose of data analyses, data from both of these measures were dichotomized to represent quiescent versus active disease. Remission or quiescent disease was defined as a score less than 3 for the SCCAI and a score less than 5 for the HBI.^{29,30}

Data on HRQOL were assessed via the Short Inflammatory Bowel Disease Questionnaire (SIBDQ).³¹ The SIBDQ is a 10-item self-report measure for assessing HRQOL in patients with IBD. Five domains of HRQOL were assessed: (1) systemic, (2) social, (3) bowel, (4) emotional, and (5) overall. Each item was scored on a 7-point graded scale—from 1 (a severe problem) to 7 (not a problem at all)—giving an absolute SIBDQ score from 10 (poor HRQOL) to 70 (optimum HRQOL).

Table 1. Social Constraint Questionnaire for Patients with Inflammatory Bowel Disease

1. How often do your friends avoid talking with you about your inflammatory bowel disease?
2. How often are your friends uncomfortable because of your inflammatory bowel disease?
3. How often do your friends have difficulty talking with you about your inflammatory bowel disease?
4. How often do you not know what to say to friends about your inflammatory bowel disease?
5. How often do you have difficulty asking your friends to do something to help you because of your inflammatory bowel disease?
6. I had difficulty telling friends about my inflammatory bowel disease.
7. How often does your partner/spouse avoid talking with you about your inflammatory bowel disease?
8. How often is your partner/spouse uncomfortable because of your inflammatory bowel disease?
9. How often does your partner/spouse have difficulty talking with you about your inflammatory bowel disease?
10. How often do you not know what to say to your partner/spouse about your inflammatory bowel disease?
11. How often do you have difficulty asking your partner/spouse to do something to help you because of your inflammatory bowel disease?
12. I had difficulty telling my partner/spouse about my inflammatory bowel disease.

Psychosocial Measures

Coping with IBD was assessed via a modified situational version of the COPE questionnaire, a 64-item self-report scale.³² Adults were asked to indicate how often they used particular coping strategies in response to their IBD; responses were reported on a 4-point Likert scale ranging from 1 (I usually don't do this at all) to 4 (I usually do this a lot). The coping measure utilized in this study consisted of 10 subscales of engagement coping—8 from the COPE questionnaire (active, planning, suppression of competing activities, use of instrumental support, use of emotional support, positive reinterpretation and growth, acceptance, and turning to religion) and 2 from the Emotional Approach Coping Scale (emotional processing and emotional expression)—plus 5 subscales of disengagement coping (denial, behavioral disengagement, mental disengagement, humor, and substance use).^{32,33} Carver and associates and Stanton and colleagues discuss the 64 items utilized and the allocation of each item to each subscale.^{32,33} The allocation of the subscales into engagement coping versus disengagement coping was derived from prior research and conceptual reasoning.³⁴⁻³⁶

For data analyses, the mean value of the 10 subscales of engagement coping and the mean value of the 5 subscales of disengagement coping were utilized. To facilitate the interpretation of the coping subscales, all scores were multiplied by 100, so that patients' scores ranged from 0 to 100. The internal consistency of the engagement and disengagement subscales was calculated for the current study and yielded Cronbach α values of .96 for engagement coping and .68 for disengagement coping.

Anxiety and depression symptoms were assessed via the Hospital Anxiety and Depression Scale (HADS).³⁷ The HADS is a 14-item self-report scale designed to mea-

sure depression and anxiety symptoms in patients with a physical illness. Optimal balances between sensitivity and specificity have been achieved most frequently when a cutoff of 8 or higher is used for both anxiety and depression symptoms, yielding sensitivities and specificities of .80 for both subscales.³⁸ Based on these findings, patients who scored 8 or higher on the depression and/or anxiety subscales were coded as having high depression and/or high anxiety symptoms, respectively.

Social constraint on disclosure was assessed via the Social Constraint Questionnaire, a measure adapted from a social constraint questionnaire developed by Lepore and Helgeson for use with cancer patients.³⁹ Modifications to the wording of this measure were made to reflect IBD; thus, social constraint in the present study measured perceived feelings of being misunderstood, unsupported, or alienated from one's social support network when seeking support with regard to IBD or an IBD-related stressor. The new 12-item questionnaire assessed the degree of perceived social constraint on disclosure when discussing IBD with friends (for the first 6 items) and with the patient's partner or spouse (for the last 6 items). Patients indicated how frequently they had experienced the social constraint described in each item over the previous month; responses were reported using a 4-point scale ranging from never to always. For data analyses, overall social constraint was calculated by computing the mean of all 12 items (6 items for patients who did not have a partner or spouse). The 12 items in the Social Constraint Questionnaire are listed in Table 1.

Statistical Analysis

Descriptive statistics were computed for study demographics. Preliminary statistical analyses were calculated

for all variables using SPSS (v.18.0); these analyses looked for missing data, normality, homoscedasticity, outliers, and multicollinearity. There were 3 missing values for predictor variables; for these cases, mean substitution was used. All of the continuous predictor and outcome variables were screened for normality.⁴⁰ Social constraint was not normally distributed ($z=6.57$; $P<.05$). In fact, 32.5% of patients denied experiencing social constraint; therefore, social constraint was dichotomized and recoded. In addition, engagement coping violated the normality assumption ($z=-2.16$; $P<.05$). Due to the slight negative skew exhibited by engagement coping, the following transformation was conducted: reflection, followed by the square root.⁴⁰ This transformation aided in the distribution of the variable both in terms of the skew ($z=1.65$; $P>.05$), as well as the visual aspect evidenced via frequency histograms and normal probability plots. Thus, hierarchical regression analyses utilized both the original variable (engagement coping) and the transformed variable (reflected and square root of engagement coping).

Independent sample t-tests were conducted to examine group differences in HRQOL. Chi-square analyses were computed to examine group differences in disease activity and social constraint. Pearson and point-biserial correlations were computed to examine associations among coping, anxiety symptoms, depression symptoms, social constraint, HRQOL, and disease activity. One-way analysis of variance, t-tests, chi-square tests, and correlation analyses were conducted to examine the relationship between the categorical variables and disease activity and HRQOL for the regression analyses. A series of 3 hierarchical regressions were conducted to examine the extent to which perceived social constraint on disclosure moderated the relationship between coping and HRQOL in patients with IBD. Lastly, a logistic regression was conducted to examine the contributions of coping and social constraint to disease activity.

Results

Demographic Information

Of the 80 study participants, 53% ($n=42$) had CD, 46% ($n=37$) had UC, and 1% ($n=1$) had indeterminate colitis. Sixteen percent of participants were diagnosed by the age of 16 years, 73% were diagnosed between the ages of 17 and 40 years, and 11% were diagnosed after the age of 40 years. The mean age of participants was 37.2 ± 13.5 years, and 51% ($n=41$) of patients were female. Seventy-eight percent ($n=62$) of patients were white, 15% ($n=12$) were black, 6% ($n=5$) were Asian American, and 1% ($n=1$) did not report race. In terms of marital status, 56% ($n=45$) of patients were married, 39% ($n=31$) were single, 4% ($n=3$) were divorced or separated, and 1%

Table 2. Disease Location and Behavior in Adult Patients with Inflammatory Bowel Disease (IBD) Evaluated at the University of Maryland, Baltimore IBD Program From June 2008 to March 2009

	Ulcerative colitis N=38 % (n)	Crohn's disease N=42 % (n)
Disease location		
Proctitis	5.4 (2)	—
Left-sided	29.8 (11)	—
Extensive/ pancolitis	64.8 (25)	—
L1	—	22 (9)
L2	—	17.1 (12)
L3	—	46.3 (19)
Isolated L4	—	4.9 (2)
Upper tract involvement overall	—	14.6 (6)
Disease behavior		
Nonstricturing/ nonpenetrating	—	44.7 (19)
Stricturing	—	31.6 (13)
Penetrating	—	23.7 (10)
Perianal involve- ment	—	31.0 (13)

L1=ileal involvement; L2=colonic involvement; L3=ileal and colonic involvement; L4=involvement of the upper gastrointestinal tract (esophagus, stomach, duodenum, and/or jejunum), not in combination with L1, L2, or L3.

($n=1$) were widowed. In terms of highest education level achieved, 51% of patients reported a high school degree or less; 28% reported an associate or bachelor's degree; and 17.5% reported a master's, professional, or doctorate degree. The remaining 3.5% of patients did not report the highest level of education achieved. Finally, 65% of patients reported never having smoked cigarettes, 22.5% were former smokers, and 12.5% were current smokers.

See Table 2 for descriptive statistics regarding disease location and behavior. Sixty percent of patients ($n=48$) had active disease at the time of their visit. Sixty-eight percent of patients ($n=54$) reported perceiving some level of social constraint. In addition, 49% of patients ($n=39$) reported high levels of anxiety symptoms, and 26% ($n=21$) reported high levels of depression symptoms.

Table 3. Correlations Between Coping, Social Constraint, Anxiety, Depression, Disease Activity, and Health-Related Quality of Life (HRQOL)

	Social constraint	HRQOL	Disease activity	Engagement coping	Disengagement coping	Anxiety symptoms	Depression symptoms
Social constraint	1	-.25*	N/A	.27*	.33*	N/A	N/A
HRQOL	—	1	-.64*	-.18	-.35*	-.50*	-.56*
Disease activity	—	—	1	.16	.24*	N/A	N/A
Engagement coping	—	—	—	1	.44*	.12	-.03
Disengagement coping	—	—	—	—	1	.33*	.23*
Anxiety symptoms	—	—	—	—	—	1	N/A
Depression symptoms	—	—	—	—	—	—	1

* $P < .05$.

N/A=not applicable.

Correlations Between Coping, Social Constraint, Anxiety Symptoms, Depression Symptoms, Disease Activity, and Health-Related Quality of Life

Correlations revealed significant inverse relationships between HRQOL and social constraint, disease activity, disengagement coping, anxiety symptoms, and depression symptoms. Correlations also revealed significant positive relationships between social constraint and engagement and disengagement coping, between disease activity and disengagement coping, between engagement and disengagement coping, and between disengagement coping and anxiety and depression symptoms (Table 3).

Group Differences in Health-Related Quality of Life and Disease Activity

HRQOL scores were 37.6 ± 12.3 in patients with high anxiety symptoms versus 52.2 ± 13.0 in patients with low anxiety symptoms ($t(78) = 5.15$; $P < .05$). Similarly, HRQOL scores were 31.6 ± 9.7 in patients with high depression symptoms versus 49.9 ± 12.9 in patients with low depression symptoms ($t(78) = 5.91$; $P < .05$). Among patients with high depression symptoms, 81% had active disease; only 53% of patients with low depression symptoms had active disease ($\chi^2(1, N=80) = 5.21$; $P < .05$). Significant group differences in disease activity were not found for patients with high versus low anxiety symptoms.

Tests for Covariates for Regression Analyses

The only significant relationship was between smoking and HRQOL ($F(2, 77) = 5.31$; $P < .05$). Tukey post-hoc comparisons indicated that patients who had never smoked had significantly higher SIBDQ scores compared to current smokers (48.2 ± 14.2 vs 33.0 ± 12.9 ; $P < .05$). Comparisons between former smokers and the other

2 groups were not statistically significant (data not shown). A higher education level was associated with increased HRQOL ($r = .27$; $P < .05$), and a lower education level was associated with increased disease activity ($r = -.23$; $P < .05$). In addition, older age at diagnosis was associated with increased disease activity ($r = .26$; $P < .05$). For the multivariate logistic regression analysis, the reference group for age at diagnosis was 16 years or younger, and the reference group for education level was high school or less.

Hierarchical Regressions Predicting Health-Related Quality of Life

The first hierarchical regression examined the moderating effect of social constraint on the relationship between engagement coping and HRQOL. The covariates, level of education and smoking status, were entered on the first step of the regression, followed by social constraint and engagement coping on the second step; the interaction term (social constraint \times engagement coping) was entered on the last step of the regression. The overall model explained 25% of the variance in HRQOL ($R = .50$; $F(5, 72) = 4.70$; $P < .05$). Smoking status and social constraint significantly accounted for the variance in patients' HRQOL; however, the interaction term was not significant. In addition, engagement coping approached significance in accounting for the variance in HRQOL ($P = .06$; Table 4).

This same regression was repeated with the engagement coping variable transformed. The overall model was still significant and explained 24% of the variance in HRQOL ($R = .49$; $F(5, 72) = 4.63$; $P < .05$). With the transformation, only smoking status significantly accounted for the variance in HRQOL ($t = -2.86$; $P < .05$), although engagement coping transformed approached significance ($t = 1.88$; $P = .06$). Again, the interaction term was not significant.

Table 4. Hierarchical Regression Coefficients for Predictors of Health-Related Quality of Life

Predictor	Unstd. B	Std. B	Standard error	t	95% confidence interval
Smoking	-6.06	-.29	2.17	-2.79*	-10.38 to -1.74
Education	2.88	.15	2.04	1.41	-1.19 to 6.95
Engagement coping	-.55	-.66	.28	-1.94**	-1.11 to 0.02
Social constraint	-25.22	-.81	11.33	-2.23*	-47.80 to -2.65
Engagement coping × social constraint	.31	.95	.18	1.75	-.04 to .66

Values for the table were obtained from the last step of each regression. For smoking history, 0 denotes patients who have never smoked and 2 denotes current smokers. 95% confidence intervals represent the range of Short Inflammatory Bowel Disease Questionnaire scores explained by the variable of interest.

* $P < .05$. ** $P = .06$.

Std. B=standardized coefficient; Unstd. B=unstandardized regression coefficient.

The final hierarchical regression examined the moderating effect of social constraint on the relationship between disengagement coping and HRQOL. The overall model was statistically significant and accounted for 27% of the variance in HRQOL ($R = .52$; $F(5, 72) = 5.41$; $P < .05$). However, smoking status was the only variable that significantly accounted for the variance in patients' HRQOL ($t = -2.56$; $P < .05$).

Logistic Regression Predicting Disease Activity

A multivariate logistic regression model was conducted to examine the independent contributions of engagement coping, disengagement coping, and social constraint on disease activity, while controlling for education level and age at diagnosis. The overall model was significant ($\chi^2 = 16.33$; $P < .05$; Table 5). Patients diagnosed between the ages of 17 and 40 years were less likely to have active disease compared to patients diagnosed at or before the age of 16 years (odds ratio [OR] = 0.12; 95% confidence interval [CI], 0.01–0.97). Increased use of disengagement coping was associated with increased odds of having active disease (OR = 1.08; 95% CI, 1.00–1.16). Higher education level, increased use of engagement coping, and perceived social constraint were not associated with active disease.

Discussion

A significant percentage of the patients evaluated for IBD at a tertiary referral center reported perceived social constraint (68%), anxiety symptoms (49%), and depression symptoms (26%). Increased use of disengagement coping, social constraint, anxiety symptoms, depression symptoms, and current smoking status were associated with diminished HRQOL. In addition,

depression symptoms and younger age at diagnosis were associated with increased disease activity.

Social constraint did not moderate the relationship between coping (engagement or disengagement) and HRQOL; thus, this study's first hypothesis was not supported. Nicholas and colleagues found that individuals experiencing social constraint had greater difficulty coping with their IBD.⁴¹ Thus, these individuals likely used more disengagement coping and experienced diminished HRQOL. One possibility is that the patient's perceived control over his or her disease moderates the relationship between disengagement coping and HRQOL. In fact, previous research has associated attributions of mastery or responsibility with decreased use of avoidance coping and increased psychological adjustment.^{8,42} Similarly, Voth and Sirois found that attribution of self-blame was associated with increased avoidance coping and poor psychological adjustment.⁴² Thus, the use of disengagement coping could be quite beneficial in terms of HRQOL for patients who do not perceive that they have control over their disease. In contrast, the use of disengagement coping would likely result in diminished HRQOL for patients who perceive that they do have control over their disease. In addition, it is difficult to interpret this study's findings with regard to the independent contributions of social constraint and engagement coping on HRQOL due to the normality assumption being violated with regard to the engagement coping variable. A larger sample size and prospective follow-up might be able to clarify the relationships among these variables.

This study's hypothesis was that increased use of engagement coping would be inversely associated with disease activity, whereas increased use of disengagement coping would be positively associated with disease activity. The current study found a significant association between

Table 5. Logistic Regression Analysis Examining Effects of Coping and Social Constraint on Disease Activity

Variable	Odds ratio	95% confidence interval
Age at diagnosis		
≤16 years (reference)	1.0	
17–40 years	.12*	.01–.97
>40 years	.53	.09–3.18
Education		
High school or less (reference)	1.0	
Associate or bachelor's degree	.51	.15–1.65
Master's/doctorate/professional degree	.29	.07–1.18
Disengagement coping	1.08*	1.00–1.16
Engagement coping	1.01	.97–1.04
Social constraint		
No constraint (reference)	1.0	
Perceived constraint	.47	.14–1.60

* $P < .05$.

disengagement coping and active disease. Only 1 prior study examined the relationship between coping and disease activity; it found no direct association.⁴ However, Farrokhyar and colleagues looked at individuals' general coping rather than looking at how they coped with their IBD.⁴ Intuitively, the use of disengagement coping likely influences disease activity; for example, if patients are using avoidance or denial, this coping style will have a direct impact on their behaviors and thus on their disease activity (eg, nonadherence to medications).

Conversely, the current study did not find an association between the use of engagement coping and disease activity. One possibility is that patients might have to restrict activities due to flares when their disease is active. Some of these limitations may impede patients' ability to engage in active coping. For example, patients might exercise as a form of relaxation; however, when patients' disease is active, they might need to restrict their daily routines. Physicians should also remember that coping is an ongoing process. Thus, examining coping prospectively might result in a negative association between engagement coping and disease activity.

The current study confirmed a negative association between disease activity and HRQOL, replicating past research.^{3-7,31,43} It also found that patients with high depression or anxiety symptoms experienced diminished HRQOL compared to patients with low depression or anxiety symptoms; also, patients with depression symptoms experienced increased disease activity compared to

patients without depression symptoms. These findings are consistent with previous research.^{5,6,12-14} In contrast to prior research, the current study did not find significant group differences in disease activity between patients with high anxiety symptoms versus those with low anxiety symptoms.^{5,6,11-14} This discrepancy is likely related to the fact that the current study screened for symptoms of anxiety rather than assessing for the presence of clinical anxiety disorders.^{10,12,44,45}

While the present study contributes to the literature and to patient care, it has several limitations. Because patients in this study were seen at a tertiary referral center, most had moderate-to-severe disease. Therefore, this patient population may not be representative of all patients with IBD. It would be interesting to assess whether individuals with mild disease cope differently than those with moderate-to-severe disease. Nonetheless, the current study is an important first step toward acquiring information regarding the function of coping and social constraint in IBD patients with moderate-to-severe disease.

Another limitation is the potential bidirectionality of the variables of interest measured in the current study. This study hypothesized coping and social constraint to be predictor variables, based on prior research and conceptual reasoning; however, the reverse is equally plausible: Disease activity could impact coping style and social interactions. Therefore, conclusions regarding causality are not possible given the design of the present study.

In addition, the clinical utility of the information generated from the COPE questionnaire might be limited. Although the current study utilized a situational version of the COPE questionnaire, a coping instrument specifically addressing stressors and challenges faced by individuals with IBD may be more informative.

Finally, the data only represent 1 point in time (the baseline visit). Patients' responses regarding anxiety, depression, coping, and perceived social constraint may have changed as the patient-physician relationship became more established and patients developed greater comfort with their physician. Moreover, patient responses regarding their coping behaviors would likely change as a function of disease activity and patients' perceived control over their disease.

Several directions for future research are suggested by the findings of the present study. Future studies should collect prospective data on anxiety, depression, social constraint, coping, disease activity, and HRQOL over multiple time points. Prospective data collection would elucidate whether a relationship exists among these variables and would help to clarify the roles of both coping and social constraint, as both of these variables can change in response to stressors and the patient's environment. Discovering situations in which particular coping strategies are adaptive can lead to more effective interventions that target the teaching

of effective coping strategies given particular situations and stressors. Future research should also examine whether outcomes differ based on whether mental health or behavioral treatment for elevated anxiety, depression, and perceived social constraint is provided as part of the medical office visit, as part of group therapy targeting individuals with IBD, or as part of individual psychotherapy.

The current study has important implications for gastroenterologists who care for patients with moderate-to-severe IBD. Since a significant percentage of these patients experience perceived social constraint with regard to their IBD, screening for the presence of social constraint and providing appropriate referrals are strongly advised. Social constraint appears to be associated with diminished HRQOL. Thus, patients who experience social constraint are likely to benefit from referral to a mental health provider or a support group offered through the Crohn's and Colitis Foundation of America and/or the gastroenterologist's office. Individual counseling could address ways to increase perceived support with regard to the patient's disease; group counseling could not only address ways to increase support but also provide a supportive atmosphere for patients coping with the different aspects of their disease.

In addition to screening for and addressing the impact of social constraint, gastroenterologists should assess for the manner in which patients are coping with their disease, as disengagement coping is associated with both impaired HRQOL and greater disease activity. Based on this study's findings regarding the significant relationship between disengagement coping and disease activity and HRQOL, as well as prior research with chronic pain and diabetes, cognitive behavior therapy (CBT)—particularly acceptance and commitment therapy (ACT) with an emphasis on acceptance, mindfulness, and values clarification—could yield improvements in patients' disease activity (indirectly through adherence) and HRQOL.⁴⁶⁻⁴⁸ In addition, within general CBT, or more specifically, ACT, therapists would acknowledge and address depression and anxiety as these symptoms manifest in patients' IBD. Further research is required to explore whether these therapies improve outcomes in patients with IBD.

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