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The mediating role of psychological adjustment in predicting quality of life in Iranian female with ulcerative colitis

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Abstract

Adjustment to chronic disease can help the patients deal with profound changes resulting from illness. Ulcerative Colitis (UC) is challenging among chronic diseases and little know about the role of psychological adjustment of the patients to it. The aims of this study were to identify determinants of psychological adjustment in UC patients, to examine its mediational role and the role of other predictors in predicting quality of life (QOL). Participants were 58 female UC patients and 58 normal subjects. All participants completed a set of questionnaires including Hospital Depression and Anxiety scale, Coping Inventory for Stressful Situations, Perceived Stress Scale, WHO QOL questionnaire, NEO-Five Factor Inventory, Brief Illness Perception questionnaire and Lichtiger Colitis Activity Index. Psychological adjustment was measured as a composite of depression, anxiety, perceived stress, neuroticism, and emotion-focused coping strategies. Data analysis was performed using the SPSS and Amos software conducting independent T-test and path analysis. The difference between psychological adjustment of UC patients and normal subjects was significant. In the final model, the mediating role of psychological adjustment was confirmed and among other variables, cognitive representation of illness was found to be the strongest predictor of QOL. The results accentuate on the importance of psychological adjustment in dealing with ulcerative colitis and on helping to better understanding of the illness perceptions and developing appropriate complementary interventions for these patients.

Keywords: Colitis, Ulcerative, Adaptation, Psychological, Quality of Life

Introduction

Chronic diseases are "illnesses that are prolonged, do not resolved spontaneously, and are rarely cured completely" [1]. Ulcerative Colitis (UC) is one of two main and common types of Inflammatory Bowel Disease (IBD) that usually is chronic and disabling disease with unknown etiology. This disease with unpredictable, uncertain and chronic course and some features such as fiscal incontinence or lack of bowel control interferes with daily life activities such as recreational and work-related activities so that many of the patients experience absenteeism and lost productivity [2]. In such diseases, like IBD patients are confronted with new situations that associated with numerous difficulties and have the potential to make pervasive changes in a patient's life [3].These diseases generally begin in young adulthood and continue throughout life and since there is no certain cure for them, the

patients must find new ways of coping to adjust their altered conditions. Researchers [3] used the term adjustment and/or psychological adjustment to refer to the healthy rebalancing by patients to their new conditions. Stanton et. al[4] pointed out to five conceptualization of adjustment to chronic disease: mastery of disease related adaptive tasks, preservation of functional status, perceived QOL in several domains, absence of psychological disorder and low negative affect. The IBD patients' general well-being depends upon how they adapt to disease-induced worries and concerns and adjust with the condition. Thereby investigating psychological adjustment to IBD, factors predicting it and its effect on the patients' life is very important because it may help to better manage these chronic diseases.

The energy expended or motivation to enhance health, to prevent threat and rehabilitate from illness, is directed by what is perceived about illness. Based on Levanter's self-regulation model [5] it is proposed that illness representations are the primary determinants of patients' cognitive and behavioral actions to manage health threats. Therefore, it seems that cognitive representations of illness (including illness identity, its time-line, its consequences, personal control and treatment control over the illness), through affecting patients' actions to manage health threats, influence and predict psychological adjustment of IBD patients.

Once IBD develops, worries such as loss of bowel control, energy, body image, and not reaching to one's full potential [6,7], along with chronicity of IBD, its unpredictability, uncertainty and fear of relapses, can distressed the patient. In addition, some researchers [8,9] suggested that IBD patients relied significantly on passive coping strategies, utilizing less purposeful problem solving and positive reappraisal ways and more use of escape-avoidance strategies. Such coping strategies against life stressors adversely affect patients' adjustment and along with other conditions impair quality of life (QOL) of the patients [10,11].

In most of the patients because of the problems due to illness or the disease impact on their life activity and plans, psychological functioning impair and result emotional reactions such as distress, grief [7], anxiety and depression [12-16] and poorer QOL.

Some studies point out to variables such as age [16], level of education [17] and disease activity[18,19]that affects QOL of IBD patients. It is hypothesized that these variables exert their effects through affecting psychological adjustment and then this factor play a meditational role in the effects of age, level of education and disease activity on QOL in IBD patients.

Because of contribution of culture and ethnicity to adjustment variations to chronic diseases [20] and the impact of socio-cultural beliefs and values about the illness on adjustment to diseases [21], the investigation of psychological adjustment and its determinants in IBD Iranian patients as compared to normal subjects is justified. Since among inflammatory bowel diseases, Ulcerative Colitis (UC) is much more prevalent than Crohn's Disease (CD) in Iran [22], this study only utilizes the UC patients. Also since numerous studies[16] point out to poorer adjustment and QOL in women than men in order to increase the homogeneity of the sample by reducing possible response variations due to gender or type of diagnosis(CD vs. UC), only female UC patients were included in this study. Consequently the aims of the present study were to identify the determinants of psychological adjustment in female UC patients, to compare their psychological adjustment to normal subjects, and to determine the predictors of QOL of UC patients with the emphasis on the meditational role of psychological adjustment.

Method

A cross-sectional study with ex-post facto method was used to examine the determinants of psychological adjustment and to identify predictors of QOL in UC patients. The proposal of the study was approved by the "Regional Bioethics Committee".

Participation: Our sample was comprised of fifty eighth female UC patients and 58 normal individuals. These patients were recruited from an outpatient gastroenterology clinic affiliated

with Isfahan University of Medical Sciences during March 2009-September 2011. The average age of UC patients was 35.06±10.97 and 77.6% of them were married. 27.6% of them had middle school education, 36.2% had high school education and 36.2% had university education. The average age of normal group was 25.50±6.28 and 54.2% of them were married. In this group 1.7% of them had middle school education, 13.6% had high school education and 84.7% had university education.

Inclusion criteria were: 1) being female, 2) receiving the diagnosis of UC based on endoscopic and histologic criteria by a gastroenterologist (the last author), 3) age 18-69 years old 4), being able to read and write, 5) willingness to participate in the study. Patients were excluded if: 1) they had a major psychiatric disorder, 2) were unable to read and write or did not agree to be participate in the study. The first exclusion criterion was evaluated based on the patient's medical profiles and their self-report of pre-existing disorders.

The procedure was as follows: First patients were visited by a gastroenterologist and the diagnosis based on endoscopic, histologic and radiologic criteria was established. Then for those who fulfilled the inclusion criteria, the aim and the process of the study along with confidentiality of the gathered information were described. If the patient agreed to continue and was orally consent to participate in the study, then they were asked to complete 7 questionnaires including Hospital Depression and Anxiety Scale (HDAS), emotion-focused subscale of Coping Inventory for Stressful Situations (CISS), Perceived Stress Scale (PSS), Neuroticism subscale of NEO-Five Factor Inventory (NEO-FFI), World Health Organization(WHO) Quality of Life Questionnaire (QOL), Brief Illness Perception Scale and Colitis Activity Index (CAI).

In order to compare psychological adjustment between UC patients and normal, to control the genetic factors and global stress levels in the family that have been shown to influence the incidence of UC [23,24], 58 healthy normal females were selected from healthy siblings of UC patients. This group was selected if they were between 18 to 60 years old, did not have a major gastrointestinal or psychiatric disorder and had consented to participate in the study. At the same time that UC patients received questionnaires to complete, another set of questionnaires were given to each patient and was asked to get their healthy sisters to complete them. All the patients were asked to bring their own and their sister's completed questionnaires in the next visit to gastroenterologist.

Hospital Depression and Anxiety Scale (HDAS): The Persian version of the 14-item Hospital Depression and Anxiety Scale [25] was used to assess current levels of depression and anxiety. The answer format is a 4-point Likert-type scale ranging from 0 to 3. The total score for each subscale ranges from 0 to 21, with higher scores indicating higher levels of symptomatology. The Persian version of HADS has demonstrated good psychometric qualities [26]. In this sample, Cronbach's alpha coefficients were .78 for anxiety and .74 for depression.

Coping Inventory for Stressful Situations (CISS): The Persian 48-item version CISS [27] was used to measure ways of coping. The CISS consists of three subscales: emotion-oriented coping, task-oriented coping, and avoidance. The items are rated on a 5-point Likert scale, ranging from 1, not at all, to, 5, very much. The Persian version of the CISS has demonstrated good psychometric properties [28]. Cronbach's alpha coefficient for emotion-oriented coping was .85.In this sample Cronbach's alpha coefficient for emotion-focused coping was .79.

The Perceived Stress Scale (PSS): The Persian version of the Perceived Stress Scale [29] was used to measure perceived stress .This scale is a 14-item measure of self-appraised life stress (e.g., "In the last month, how often have you been upset because of something that happened unexpectedly?"). Respondents are asked to rate the frequency of these items across a 5-point Liker-type scale ranging from 0 (never) to 4 (very often). Higher scores reflect greater perceived stress in the last month. Evidence for construct validity of the PSS with life events measures has been reported in Cohen et al [30]. Test-retest reliability (6 weeks) for the 14-item

PSS has been reported to be .55.The Persian version of this scale has demonstrated good psychometric properties [29]. In this study, Cronbach's alpha coefficient of this scale was .86.

WHO Quality Of Life (QOL): This form is an abbreviated 26 item version of the WHO QOL-100 items which measure the following broad domains: physical health, psychological health, social relationships, and environment. This instrument was developed for measuring QOL and contains two items about the overall quality of life and general health. The important aspects of quality of life used in this instrument were derived on the basis of statements made by patients with a range of diseases, and healthy people and health professionals in a variety of cultures. The validity and reliability of the instrument in different populations and countries namely in Iran [31] are tested and reported to be suitable. All items are rated on a five point scale (1-5). In this study, Cronbach's alpha coefficient of this scale was .81.

NEO-Five Factor Inventory (NEO-FFI): This inventory is a 60-items version of the NEO-PI-3 which was developed by McCray and Costa [32]. It provides a quick, reliable and accurate measure of the five domains of personality and is particularly useful when time is limited and when global information on personality is needed. Five domains measured by the NEO-FFI consisted of: Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness. The answer format is a five-point Likert-type scale. Answers range from strongly disagree (0) to strongly agree (4). 23 of 60 items are reversed keyed. The internal consistencies of each domain were reported to be: N=0.79, E=0.79, O=0.80, A=0.75, C=0.83[36]. High psychometric properties have been reported for the Persian version of NEO-FFI in a survey of an Iranian population of all universities [33]. In this study, Cronbach's alpha coefficient of neuroticism subscale was 0.81.

The Brief Illness Perception Questionnaire: This questionnaire is a nine-item scale designed to rapidly assess the cognitive and emotional representation of illness. Cognitive representation included five dimensions: identity, consequences, time-line, and personal control, and treatment control. All of the items in the questionnaire except the causal question are rated using a 0-10 response scale. The Persian version of this questionnaire which was used in this study has satisfactory psychometric properties [34]. In this study, Cronbach's alpha coefficient of this scale was .66. Colitis Activity Index (CAI): This index was introduced for measuring disease activity by Lichtiger [35]. The LCAI is based on assessment of daily stool frequency, nocturnal stooling, bloody stools, fecal incontinence, abdominal pain/cramping, general well-being, abdominal tenderness on palpation, and use of antidiarrheal medications. LCAI elements, includes the patient's estimate of his/her general well-being. The maximum clinical activity score was 21.Scores greater than 10 indicate no response to therapy. Scores of less than 10 indicate a positive response to therapy but not disease remission. In this study, Cronbach's alpha coefficient of this scale was .76. Data analysis was performed using the SPSS-19 (SPSS Inc., Chicago, IL, UAS) and Amos version 18 software. The normality of distributions of scores for all the variables was not rejected and therefore, parametric statistics could be used for data analysis. An exploratory factor analysis was performed to identify the underlying factor or latent construct that can explain the inter-correlations among the variables (depression, anxiety, perceived stress, neuroticism and emotion-focused coping) which were a prior hypothesis of psychological adjustment. After obtaining the scores of this single-factor which was extracted from the five given variables, the means of this factor using an independent T-test was compared in UC patients and normal subjects. Then, using Amos software path analysis was conducted to test the model which showed the direct and indirect effects of age, level of education, disease activity and cognitive representations of illness on QOL with the mediation of psychological adjustment.

Results

Using the entire study sample (n=116), principal component extraction with varimax rotation was performed. The Kaiser-Meyer-Olkin analysis yielded an index of 0.85, and Bartlett's test of sphericity gave ($\chi2(10)=238.87$, $P<0.001$); these indicate the appropriateness of the data for principal component analysis. One factor with eigenvalues more than 1 were extracted by the analysis and accounted for 63.70% of the overall variance. Factor loadings of the five variables mentioned above are presented in Table 1.

Table 1 *Factor loadings after varimax rotation of one factor extracted by principal component extraction*

	Factor
	Psychological Adjustment
Depression	0.81
Anxiety	0.83
Perceived stress	0.78
Neuroticism	0.82
emotion-focused coping	0.72

Then using an independent T-test, the mean scores of psychological adjustment was compared in UC patients and normal subjects and results indicated that the difference between UC patients and normal subjects in psychological adjustment was significant ($T=6.26$, $P<0.001$). The comparison of the mean scores of two groups showed that the mean score of UC patients was (0.497±0.85), while the mean score of normal subjects was (0.506±0.87). In the first model ((Figure 1) the results of chi-square test indicated the poor fit of the model ($\chi2(6)=18.52$, $P<0.005$); The model fit indices such as GFI, AGFI, TLI and RMSEA were evaluated as well, and were 0.91, 0.69, 0.56 and 0.19 respectively. Coefficient correlations of the paths in this figure are shown in Table 2. Results showed that some modifications of the model were necessary. Therefore, with regarding to modification indices some covariance were considered and added to the model.

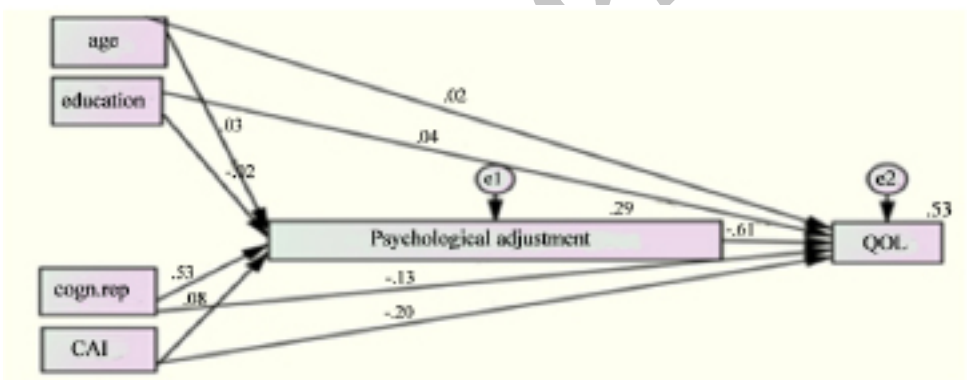

Figure 1 *The preliminary model showing direct and indirect paths to QOL*

Table 2 *Coefficient correlations of the paths in figure1*

Path		**Coefficients**
Age	Psychological adjustment	0.3
Education	Psychological adjustment	-0.2
Cognitive representations of illness	Psychological adjustment	0.53
Disease activity(which measured by CAI)	Psychological adjustment	0.08
Psychological adjustment	QOL	-0.61
Age	QOL	0.02
Education	QOL	0.04
Cognitive representations of illness	QOL	-0.13
Disease activity(which measured by CAI)	QOL	-0.20

In the modified model (Figure 2), the non-significance of chi-square test ($\chi2(4)=2.49$, $P=0.64$)indicated that the fit of the model was satisfactory and GIF, AGFI, TLI and RMSEA of the model were 0.98, 0.92, 1.07 and 0.000 respectively. Also the standardized regression

coefficients for direct and indirect effects of age and level of education on psychological adjustment and QOL, direct effect of cognitive representations of illness on QOL and indirect effect of disease activity on psychological adjustment were not significant. In addition 31% of variance in psychological adjustment is explained by age, level of education, disease activity (CIA) and cognitive representations of illness and 57% of variance of QOL is explained by aforementioned variable plus psychological adjustment. Cognitive representation of illness was the strongest predictor of psychological adjustment and the prediction power of disease activity is weaker. Among direct and indirect paths which predict QOL, psychological adjustment was the strongest predictor and then disease activity with notable weak power predicts the dependent variable. The powers of other paths were not significant. Therefore, these paths were omitted. The model and are shown in Figure 2 and standard regression coefficients for the relevant paths are shown in Table 3.

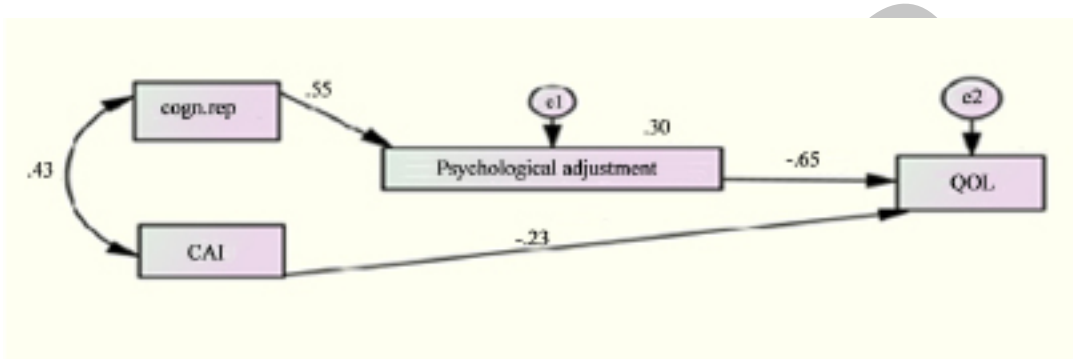

Figure 2 *The final model showing direct and indirect paths to QOL*

Table 3 *Coefficient correlations of the paths in figure2*

Path		Coefficients
Cognitive representations of illness	Psychological adjustment	0.66
Psychological adjustment	Quality of Life(QOL)	-0.66
Disease activity(which measured by CAI)	Quality of Life(QOL)	-0.23
Cognitive representations of illness	Disease activity(which measured by CAI)	0.43

In the final model, the non-significance of chi-square test ($\chi 2(2)=1.50$, P=0.47)indicated the good fit of the new model. GIF, AGFI, TLI and RMSEA of this model were 0.98, 0.93, 1.02 and 0.000 respectively. The standardized regression coefficients for the relevant paths are shown, all of which them are significant. Also it can be seen in this model after paths of age and level of education are omitted, 30% of variance in psychological adjustment is explained by disease activity and cognitive representations of illness and 55% of variance of QOL is explained by aforesaid variable plus psychological adjustment. Therefore a cognitive representation of illness is the strongest predictor of psychological adjustment and this variable is powerful predictors of QOL as well.

Discussion

The present study aimed to identify the determinants of psychological adjustment in female UC patients, compare this factor in UC patients and normal subjects, and to examine the direct and indirect effects of age, level of education, disease activity and cognitive representations of illness on UC patients' QOL with testing meditational role of psychological adjustment.

The current findings showed that the psychological adjustment construct depression, anxiety, perceived stress, neuroticism and emotion-focused coping fit the data well and 64% of its variance can be explained by these five variables. The present study also compared the psychological adjustment of UC patients and normal subjects and showed that the difference

of these two groups was significant. These findings are consistent with Adler et. al[37] who reported that IBD patients had poorer college adjustment than controls and there was an inverse correlation between disease activity and college adjustment in these patients. These findings are in line with those of previous studies which have shown poorer psychological adjustment in patients with other chronic diseases such as multiple sclerosis [38], cancer [39], and diabetes [40], compared to healthy normal subjects.

In this study also the predictor factors of QOL in female UC patients emphasizing the mediating role of psychological adjustment were examined and findings showed that among other variables psychological adjustment was the strongest predictor of QOL and variables such as age, level of education, and disease activity exert their effects on QOL through psychological adjustment. Also, cognitive representations of illness in the final model, was the strongest predictor of psychological adjustment and age and level of education had very weak power in predicting psychological adjustment and QOL. This finding highlights the role of cognitive representations of illness in patients' adjustment and QOL, and is consistent with similar findings in other condition. In other chronic diseases such as psoriasis [41], irritable bowel syndrome [42], and chronic fatigue syndrome [43] researchers have shown that patients, who believe that their disease will have serious consequences and, is chronic, have less self-control over it, have poorer adjustment and QOL. Dorian et al [44] also confirmed these findings with IBD patients. In addition, in contrast to other studies [10, 11] that reported disease activity as the most important predictor of adjustment and QOL, in this study disease activity did not have a strong contribution to prediction of psychological adjustment and QOL. Researchers who have investigated psychological adjustment in chronic diseases have consented that psychological distress is one of the important factors that can adversely affect the process of adjustment. Numerous studies [45, 46] have shown high psychological distress, anxiety, depression and perceived stress in IBD patients.

Smith & Gallo[47] and Ridder e. al[3] pointed out to some personality characteristics such as neuroticism which may impair psychological adjustment to chronic disease. Since some researchers reported higher neuroticism scores in IBD patients than in normal's.

Kinash et.al [48] and Smolen&Topp[49] suggested that not only patients with IBD relied significantly on emotion-focused coping strategies, but also emotion-focused coping in these patients was associated with poorer QOL, poorer psychological well-being and worse perceived health status. Therefore these variables were considered as predictors of psychological adjustment.

Some researchers such as Stanton et. al[20] considered QOL as a part of adjustment to chronic disease and identified preservation of QOL as a one of indicators of adjustment. In this study the variables that had greater psychological nature were considered to have more importance and thereby "psychological adjustment" term was selected. It was hypothesized that other variable may exert their effects through QOL factor that was confirmed. Indeed current findings showed no differences in psychological adjustment between Iranian culture and other cultures, perhaps due to very strong effect of components such as neuroticism, coping strategies, anxiety, depression and perceived stress on psychological adjustment. Of course it can be suggested that cultural differences in psychological adjustment could be refer to physician-patient relationships, availability of healthcare services and so on, which were not intended to be investigated in this study.

The positive scores of the UC patients on this variable, indicates that UC patients experienced more depression, more anxiety, perceived more stress in their lives, had higher neuroticism scores and used more emotion-focused coping strategies than normal subjects. This hypothesis partly looked at the physiological facts. Pellissieret. al[50] suggested that the interrelations between digestive disease and psychological disturbances reflect the special link between the brain and the gut through the

"gut-brain axis". Visceral sensations are carried through vagal bottom-up afferents and directly modulate efferent top-down premotor regions of the nervous system [51]. On the one hand, these efferent regions can be modulated some brain regions like amygdale, hippocampus and prefrontal cortex [52], and on the other these brain regions which can modulate gut function, also contribute to the regulation of some emotions such as mood and anxiety and cognitive behaviors such as planning, decision-making (in coping with stressors) and therefore are involved in global functioning and well-being [53,54].

Another variable which has been proposed to affect psychological adjustment and QOL is cognitive representations of illness. Illness perceptions indeed reflect individuals' beliefs, cognitions or predictions about their illness and give personal meaning to symptoms. These perceptions in turn can influence coping behaviors adopted by the individuals and their adjustment to the illness. Illness perceptions or representations can be classified into 2 main domains: cognitive representation and emotional representation. While emotional representation only include individuals' concerns and emotions, cognitive representation encompasses dimensions such as identity, consequences, time-line, personal control and treatment control. It seems that cognitive representation, dealing with individuals' knowledge about the disease label and symptoms and their beliefs about disease' prognosis, duration and its impact, would be more important and impinge upon emotional representation. Indeed misleading information or perceptions about illness can causes individuals to misattribute symptoms not related to illness, which in turn adversely affect their adjustment.

Age and level of education had very weak power in predicting psychological adjustment and QOL and omitted from the model. Perhaps one explanation for this finding could refer to small range of variance of age and level of education among participants. Because of this limitation it is not possible to compare very young patients with very old patients. In addition, in this study disease activity did not have strong contribution to prediction of psychological adjustment and QOL. This finding partly could refer to relatively high covariance between disease activity and cognitive representations of illness. Probably part of the contributing role of disease activity may exert through cognitive representations of illness. Patients who experienced disease severity had worse and biased cognitive representations of illness.

Conclusion

The current study highlights the importance of psychological adjustment in dealing with ulcerative colitis, and the mediating role of this factor in predicting QOL of these patients. Findings also accentuate on the variable that has already received little attention in IBD, namely cognitive representations of illness. Since, the current findings shows that cognitive factors significantly contribute to psychological adjustment and then QOL of UC patients, complementary interventions should target the individuals' personal beliefs about IBD and correct misleading patients' knowledge and perceptions. This may help better management of this disabling and unpredictable disease.

The results of this study should be interpreted with some cautions because of some limitations. First, the current findings were based on relatively small sample size which causes difficulties in using Amos software. Second, this study performed only on female UC patients while perhaps considering males may result in different findings. Third, the data gathered for this study was only through self-reporting questionnaires and possibly applying other resources such as physician's ratings might provide more precise information and findings.

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Contributions

Study design: MA
Data collection and analysis: HM, KA, PA
Manuscript preparation: HM, KA, PA

Conflict of interest

"The authors declare that they have no competing interests."

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