Original Article

Mediating Role of Illness Perception and Coping Strategies among individuals with Inflammatory Bowel Disease

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Introduction: Inflammatory bowel disease (IBD) is a chronic disease of gastrointestinal system, which effects various aspects of the individuals' life. A vast majority of individuals with IBD suffered from depression symptoms compared to general population. This endeavor was designed to examine goodness of fit of an explaining structural model of depression on the basis of type D personality and mediating role of illness perception and coping strategies.

Method: In a correlational study 268 IBD Patients were selected by Purposive Sampling method from Clinic of the Liver and Digestive Research Center of Qom province and they completed the BDI-PC depression scale, Coping Strategies Questionnaire, Illness perception Questionnaire, and type D Personality scale. Data were analyzed by Lisrel software using the structural equation modeling.

Results: As regard of predictive role of negative affectivity (18.49%), illness perception (mediated by emotion-focused coping 3.8% and by problem-focused one 2.1%), and emotion (7.84%) and problem solving focused (10.24%) coping strategies on depression significantly, an acceptable goodness of fit was indicated for a structural model containing NA (negative affectivity) as exogenous variable, emotion and problem solving focused copings as mediating variable and depression as a endogenous variable.

Conclusion: These findings support mediating role of illness perception and coping strategies between type D personality and depression in IBD Patients

Declaration of Interest: None

Key words: Inflammatory Bowel Disease, Depression, Type D personality, Illness, Perception, Coping strategies

Introduction

According to the World Health Organization (WHO), chronic diseases prevalence are being increased in all countries, especially in developing ones. Nowadays, adjustment and living with chronic diseases and promoting mental and social health of these patients is one of the main challenge of health systems (1). Inflammatory bowel disease (IBD), as a chronic and serious debilitating disease, comprises two major gastrointestinal disease namely Crohn's disease (CD) and ulcerative colitis (UC). In this disease, there are a temporary but significant changes in the intestinal mucosa, which in the commune period, the intestinal mucosa is similar to the normal, but during the recurrence of the disease, severe ulcers occur. IBD onset is usually reported in the early adulthood, between 20 to 33 years old, with an equal prevalence in men and women (2). There has been no certain cure for IBD, due to this fact, IBD patients life expectancy do not differ from healthy population, they have to live with a unpredictable chronic disease therefore their quality of life, in various aspects, are being decreased by IBD symptoms (3, 4, 5, 6). In more than 70% of patients with colitis and Crohn's disease within 10 years of diagnosis, they need surgery and hospitalization, therefore, IBD has a negative impact on their physical, psychological, and social dimensions of patient's life (7). Depression is a more common psychological disorder with IBD (8, 9, and 10). Depression in patients with IBD is related to the combination of these factors: experiencing various levels of pain; awareness of no certain treatment; fear of stool incontinence, loss of colon, encountering to unknown time and period disease progress and not knowing when and where the disease becomes active (1). More than 23% of people with IBD show symptoms of depression after diagnosis, such as frustration, sadness, and guilt. Approximately, 9% of them have suicidal thoughts. Multiple surgeries, smoking, and reduced quality of life can exacerbate suicidal thoughts. In general, the level of depression increases several times during active periods (11, 12). A comparative study (13) with the control group showed that the IBD patients are more vulnerable to suffer from psychiatric problems (e.g. depression), and have a poorer quality of life and less interpersonal support. A study (14) showed that the chance of depression increases through six months after the diagnosis. The lower quality of life in IBD patients may be related to the poor coping strategies to adopt and the perception of illness they have. In fact, people with IBD adopt more passively rather than actively (8). A study (14) showed there is a correlation between maladaptive coping strategies and depression after the diagnosis of IBD.

Some health psychologists believe that the perception of illness is directly related to coping strategies and that coping relates to the adaptation outcomes, such as disability and reduced quality of life (15). In many chronic diseases, such as cancer, heart disease, diabetes, fatigue syndrome, and chronic kidney disease, the mediating role of illness perception and coping strategies in the outcomes, such as depression, has been examined (16); however, this role has not been investigated in IBD patients.

On the other hand, the relationship between personality traits and IBD has been one of the areas of interest among researchers in the field of psychology. With the emergence of type D personality, personality is more considered as a risk factor in the long-term prognosis of chronic diseases. The Type D personality, which represents the helpless personality, was presented by Denollet in 1995(8). From the viewpoint of Denollet and colleagues, psychological examination

of the disease-causing contexts, requires examination of personality traits that are constant over time and situations (8). Type-D personality is defined as the interaction of two constant and general personality traits, namely the negative affectivity and social inhibition. Negative affectivity is the tendency to experience negative emotions at different times and situations and is closely related to the concept of neuroticism. In personality traits, such as neuroticism, cognitive vulnerabilities to stress are likely to lead to the formation of psychological symptoms, such as depression. Social inhibition has also been defined as a tendency to refrain from expressing negative emotions during social contact for fear of rejection. Social isolation can exacerbate the effects of negative emotions and, thereby aggravating the symptoms of depression. Studies into personality have shown a higher risk of Type-D personality in patients with IBD than in a healthy population (8).

A variety of social, biological, genetic, and cultural factors are involved in the etiology of chronic diseases, so special attention has been paid to these disease (17). Depression is more common in patients with IBD than in the general population (18). Despite much research on IBD, the relation between IBD and depression after diagnosis is still unclear, which may be due to the conceptual and methodological weaknesses. The aim of present study was to examine the relationship between the structural model of depression and type-D personality and mediating role of illness perception and coping strategies.

Methodology

The statistical population were consisted of 268 IBD patients (155 men and 114 women, out of which 122 patients had a diploma and 147 patients had a bachelor's degree), referring to the Clinic of Liver and Digestive Research Center of Qom in the second half of 2018 and the first half of 2019, with a maximum of 6 months from diagnosis. The participants with IBD were selected by purposive sampling method. Regarding the ethical concerns, participants were asked to study the aims of research and all participants completed the consent forms before participation.

Measurement

Type-D Personality Scale: Type-D Personality Scale (DS-14), developed by Denollet, contains 14 items that assess the components of negative affectivity and social inhibition. Its scoring is based on the Likert style ranging from 0 to 4. The Cronbach's alpha for its sub-scales is 0.88 for negative affectivity and 0.86 for social inhibition.In this study, Cronbach's alpha for the Type-D scale was 0.73 (19). Its Persian version was developed with acceptable validity and reliability: internal consistency of the negative affect, social inhibition and total Cronbach's alpha was reported 0/77, 0/69 0/72 respectively) (20).

Beck Depression Inventory for Primary Care (BDI-PC). This inventory was designed by Beck et al., as a screening tool in medical centers, to exclude somatic items from the main questionnaire. This 7-item scale fits the 4th Edition of Diagnostic and Statistical Manual of Mental Disorders Text Revised (DSM-IV-TR) for clinically diagnosed depression (American Psychiatric Association) (21). Beck, Steer, Ball, Ciervo and Kabat (22) confirmed its psychometric qualities. Moreover, its psychometric measures were separately examined in an Iranian sample consisting of 176 patients inflicted by MI. Cronbach's Alpha was estimated 0.88, representing its internal consistency. Furthermore, its reliability was estimated at 0.74 in a sample of 62 patients using the test-retest method in a 3-week period. The construct validity of the scale was estimated 0.84 through comparing with the Iranian version of Anxiety and

Depression Inventory subscales in the hospital on 176 MI patients (23). In general, results from psychometric qualities of Iranian samples indicated that this scale has high quality and good diagnostic ability in differentiating depressed patients after a specific medical condition from those who are not depressed (24).

Coping Inventory for Stressful Situations (CISS-21): It is defined as an integrated biological and psychological response to stressors that create a balance between the biological and psychological factors and the threat posed by challenges. This scale was developed by Endler and Parker (25) to assess people's coping skills in stressful situations like chronic diseases. This 21-item inventory assesses three coping strategy categories, namely problem-focused, emotion-focused and avoidance-focused strategies. The CISS-21 is a valid and reliable scale for evaluating general coping strategies in adult patients suffering from chronic diseases. Calsbeek, Rijken, Henegouwen, and Dekker (26) assessed the psychometric characteristics scale in a sample of 521 patients suffering from chronic digestive diseases (including inflammatory bowel disease, chronic liver disease, congenital digestive diseases, and food sensitivity). Cronbach Alpha for all the scales in every group of patients was estimated in the range of 0.79-0.86. Analyzing the verification factor, using LISREL, confirmed the three-factorial structure of the inventory (27).

Brief Illness Perception Questionnaire (Brief IPQ): To assess the perception of the disease, the short form of IPQ was used. This scale is a brief version of the IPQ, .The Cronbach alpha of the scale was reported in the range of 0.71-0.84 (28). In addition to the comprehensiveness and abstraction of this scale, it provides a rapid assessment of illness perceptions regarding its severity. The main purpose of using this scale was to assess the perception of the disease regarding its severity. The Farsi version of the IPQ was developed with acceptable validity and reliability (internal consistency coefficient of the scale with Cronbach's alpha was 0.59) (29).

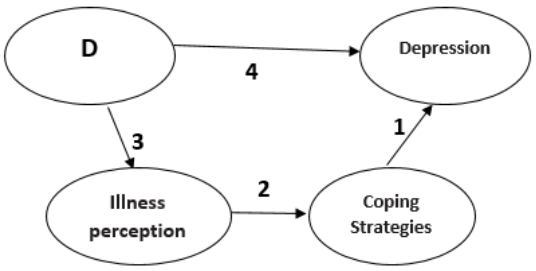

Figure 1: conceptual model to explain depression

In order to examine the above conceptual model, structural relationships between various variables will be scrutinized separately first, and later they will all be analyzed as a whole. Numbers written down on each path in figure 1, indicates sequences of relationships to be analyzed.

Data Analysis

Structural equation modeling was used to examine conceptual models hypothesized by researcher. In all models post- IBD depression entered as final ETA and personality type D entered as exogenous variable coping strategies entered as final ETA in 2nd model and as mediator endogenous variable in 5th model. Illness perception entered as final ETA in 3nd model and as mediator ETA in 5th model. Several goodness of fit indexes were used in all models

Results

As indicated in Figure 1, this model consists of 4 parts identified by numbers 1, 2, 3 and 4. Hence first each component has been examined through 4 different

hypotheses, and later the model was evaluated wholly.

1) Coping strategies predict depression in patients with inflammatory bowel disease.

As it appears in Table 1, the above model has an acceptable goodness of fit (it does not make sense, CHANGE THE WORDING). As the coefficient correlations are indicated on the paths, coping strategies determine overall. %53 of depression variance; with emotion-focused strategy having a positive correlation with depression predicting 46% of it, problem-focused strategy with negative correlation -42%, and avoidant strategy having a positive correlation 12%. Altogether, results indicate that coping strategies, specifically emotion-focused and then problem-focused strategies have significant impact on depression in patients with inflammatory bowel disease.

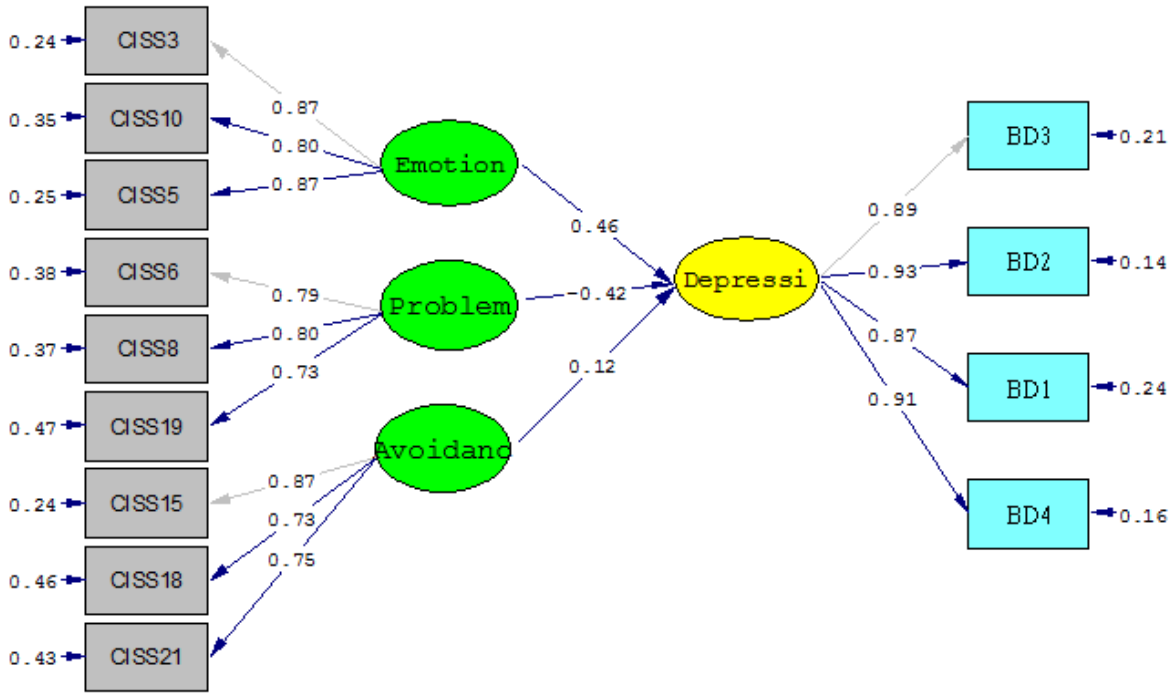

Figure 2: Sectional structural relationship between coping strategies and depression

Table 1: Model Indices of Goodness of Fit

SRMR	RMSEA	AGFI	GFI	IFI	NFI	CFI	Chi/df	Df	χ^2	P
0.05	0.04	0.83	0.89	0.99	0.97	0.99	1.62	59	96	**0.0013**

2) Illness perception, directly predicts coping strategies in patients with inflammatory bowel disease.

The model holds an acceptable goodness of fit, but the path from Illness perception to avoidance strategy is not significant (T = -1.47). Illness perception has a positive correlation with emotion-focused variance and determines 64% of it; meaning the more negatives the perception, the more the patient applies emotion-focused strategies. Illness perception has negative correlation with problem-focused strategies and determines -40% of it; it also has negative correlation with avoidance variance predicting -11% of it. Hence when the negative perception intensifies, the patient exploits more of problem-focused and

avoidance-focused strategies. Therefore illness perception in patients with inflammatory bowel disease, predicts coping strategies specifically emotion-focused strategies significantly.

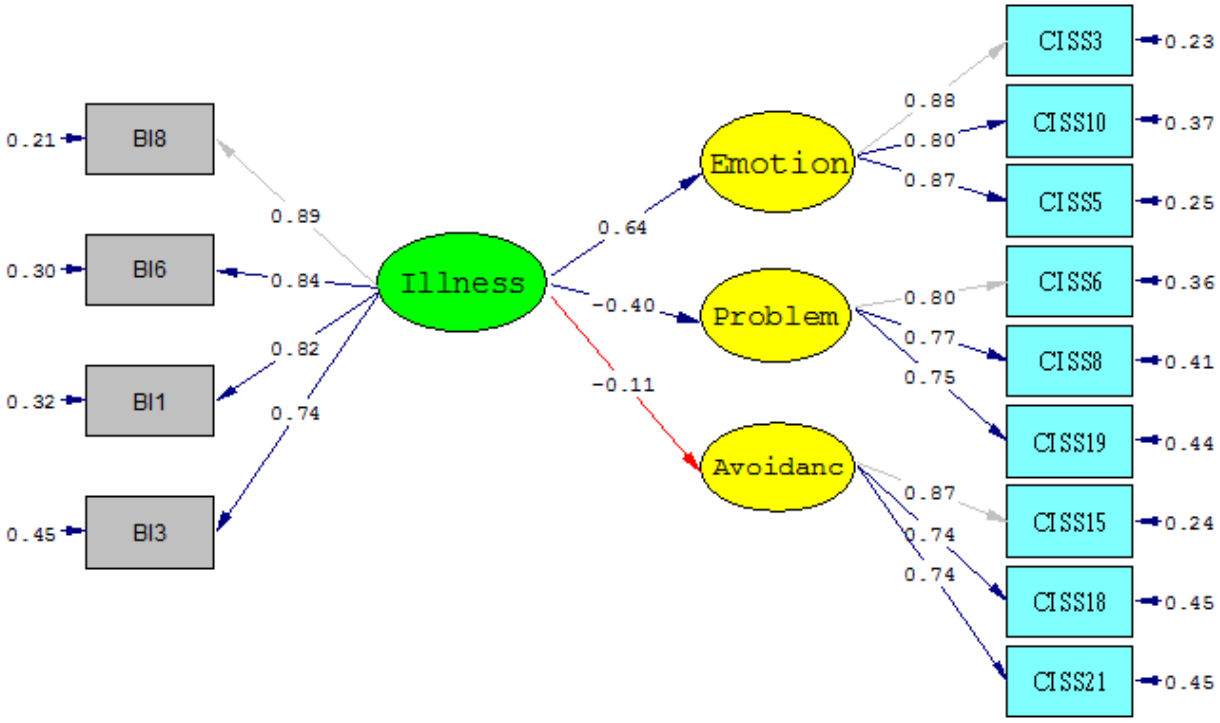

Figure 3: Sectional structural relationship between illness perception and coping strategies (the red line means related path is not significant)

Table 2: Model's Indexes of Goodness of Fit

SRMR	RMSEA	AGFI	GFI	IFI	NFI	CFI	Chi/df	Df	χ^2	P
0.07	0.04	0.88	0.92	0.99	0.97	0.99	1.5	62	93	**0.0059**

3) Personality type D can directly predict Illness perception in patients with inflammatory bowel disease.

The model holds an acceptable goodness of fit, but the path from Personality type D to Illness perception is not significant (T = -1.04). As the coefficient correlations are indicated on the paths, Negative emotion personality type D has a positive correlation with illness perception variance and determines 56% of it; meaning the more negatives the emotion, the more the patient applies negatives the perception. Altogether, results indicate that Negative emotion have significant impact on Illness perception in patients with inflammatory bowel disease**.**

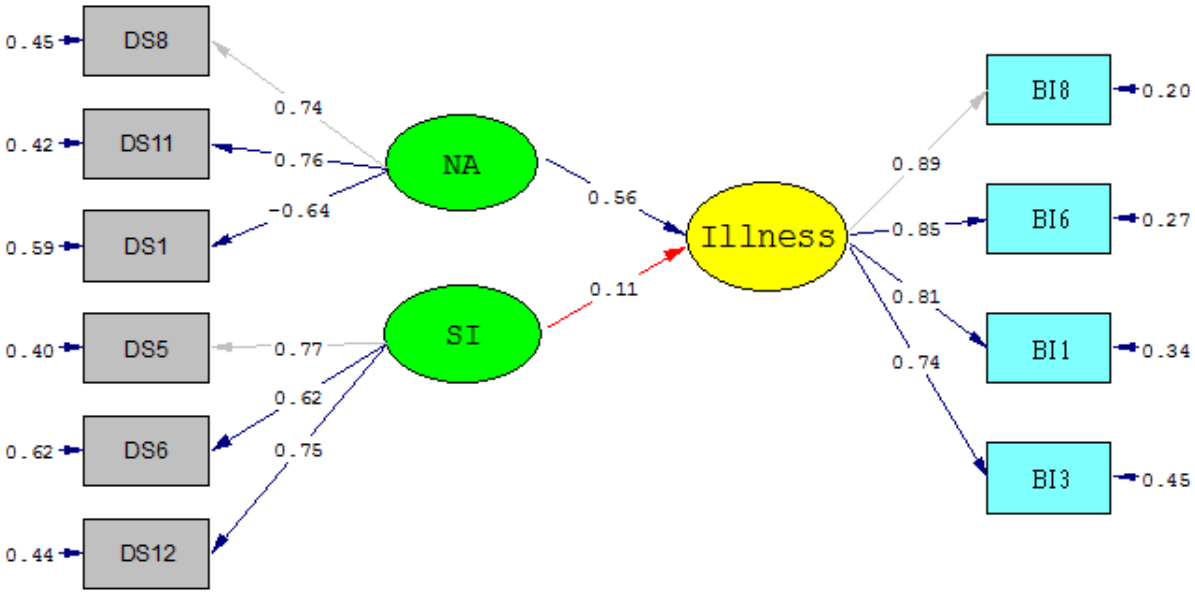

Figure 4: Sectional structural relationship between Personality type D and illness perception (the red line means related path is not significant)

Table 3: Model's Indexes of Goodness of Fit

SRMR	RMSEA	AGFI	GFI	IFI	NFI	CFI	Chi/df	Df	χ^2	P
0.03	0.05	0.93	0.96	0.99	0.97	0.99	1.75	32	56	**0.0052**

4) Personality type D can directly predict depression in patients with inflammatory bowel disease.

The model holds an acceptable goodness of fit, but the path from Personality type D to depression is not significant (T = 0.09). As the coefficient correlations are indicated on the paths, Negative emotion personality type D has a positive correlation with depression variance and determines 69% of it. Other than that the direction of correlation is positive; meaning the more Negative emotion, the more intensifying the depression.

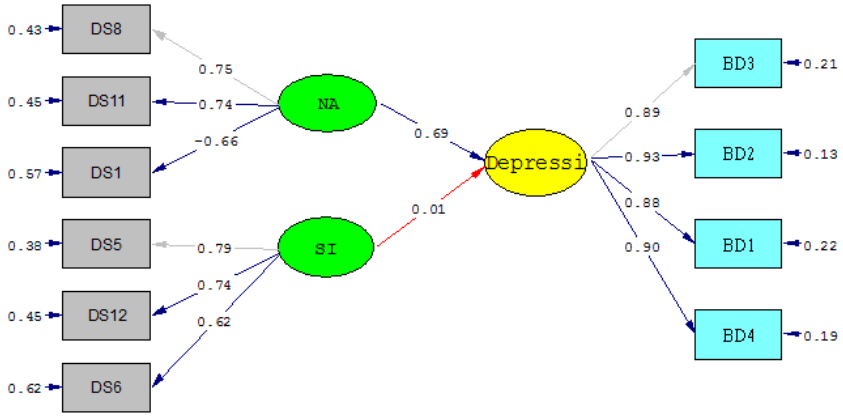

Figure 4: Sectional structural relationship between **Personality type D** and **depression** (the red line means related path is not significant

Table 4: Model's Indexes of Goodness of Fit

SRMR	RMSEA	AGFI	GFI	IFI	NFI	CFI	Chi/df	Df	χ^2	P
0.03	0.04	0.89	0.94	0.99	0.98	0.99	1.5	32	48	**0.029**

5) In examining the whole model, it was concluded that, **Negative emotion of D-type Personality can directly and through Illness perception and coping strategies, predict depression in patients with inflammatory bowel disease.**

This model proved to have a very acceptable goodness of fit. Negative emotion of Personality type D can directly and through Illness perception and coping strategies, predict depression in patients with inflammatory bowel disease. Negative emotion of Personality type D is able to directly determine 66% of depression variance, predict 46% of it through emotion-focused strategies and -32% of it by problem-focused strategies. Estimation of indirect impact of Negative emotion equals 23% and illness perception, equals 33 %. As a matter of fact, more Negative emotion is resulted by utilizing more negative disease perception and much of emotion-focused strategy and less usage of problem-focused strategies, which leads to intensifying depression. Overall, the results suggest that in the baseline, Negative emotion of Personality type D can strongly and directly predict depression; and it›s partial impact on depression after CHD in patients undergoing CABG and PCI, is imposed through illness perception and coping strategies specifically emotion-focused strategies.

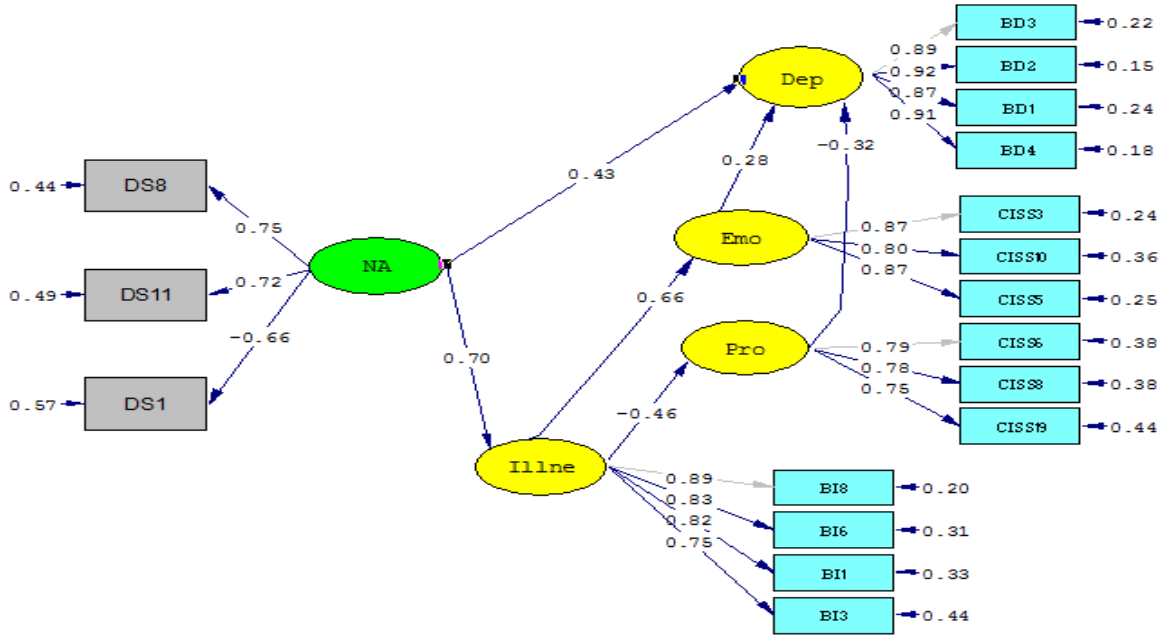

Figure 5: Examining the whole model

Table 5: Model's Indexes of Goodness of Fit

SRMR	RMSEA	AGFI	GFI	IFI	NFI	CFI	Chi/df	df	χ^2	P
0.07	0.05	0.81	0.86	0.99	0.97	0.99	1.77	113	201	**0.001**

Conclusion

This study was designed to examine the goodness of fit and explain the structural model of depression on the basis of Type-D personality and the mediating role of illness perception and coping strategies. The results of this study showed a significant relationship between Type-D personality and depression after diagnosis of IBD and supported the mediating role of illness perception and coping strategies in the relationship between Type-D personality and depression in IBD Patients. These findings are consistent with the results of relevant studies (30). According to Seligman's theory, the unpredictability of the disease causes a negative perception of one's self-control and self-sufficiency (31), making individuals helpless and vulnerable to depression (32, 33, and 34). Diagnosis of IBD is typically associated with an unpredictable and chronic disease which, in turn, may result in frustration, stool incontinence, fatigue, body-image problem, and the fear of sexual dysfunction, social isolation, and embarrassment, necessitating appropriate coping and adaptation strategies (13). On the other hand, the person diagnosed with IBD goes through various adaptation stages: 1) initial evaluation of impacts on life, 2) emotional reactions, such as distress, grief, and sometimes guilt, 3) exhibiting a behavioral response like seeking social support. 4) Various degrees of denial and or disease acceptance may occur. This is a very complex process, which may be affected by different factors including the severity of the disease, perception of the disease, hospital records, and age of onset (35, 36). Various studies have suggested that people with IBD typically use passive coping strategies. This patient are less likely to use problem solving and positive reappraisal, and more avoidance and escape coping strategies (34). Another study (14) showed a correlation between maladaptive coping strategies and depression after IBD diagnosis. A study (8) showed that people with IBD use passive coping strategies more than active strategies such as reappraisal. This study showed a significant correlation between the use of passive coping strategies (emotional focused) and depression and a negative correlation between depression in IBD patients and the use of problem-focused coping strategies. These findings are consistent with previous studies. A study (12) showed a significant positive correlation between the perception of the disease, the severity of the illness, and the severity of complications with depression in IBD. The present study showed a significant positive correlation between illness perception and depression among the participants. Consistent with the present study, the findings of Sajadinejad, Asgari, Molavi, Kalantari, and Adibi (8) showed that patients with ulcerative colitis had higher depression, anxiety and perceived stress scores than the control group. They used emotion-focused strategies and had poorer psychological adjustment. The results also showed a higher frequency of Type-D psychological adjustment among IBD patients than the normal population. On the other hand, a growing number of studies have been conducted on the interactions between the brain - bowel and the impaired function of brain - bowel axis since the past decade (37, 38). A study showed that the emotional state and personality traits may affect bowel function and influence how symptoms are experienced (39); in addition, psychological techniques can improve the bowel symptoms by modifying the mood and emotion. These methods also help patients with digestive disorders (40, 41). A study (42) on Type-D personality in the general population showed that it is a predisposing factor for psychological disturbances, which affect physical and mental health and cause diseases. Another study by Mahvi-Shirazi et

al. (43) compared the mental health status of people with irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD) with that of normal people. The results showed that the level of mental health of people with IBS and IBD was lower than those of normal people in all dimensions and the overall index of symptoms (44). The results of the present study are consistent with the studies on the Type-D personality of patients with IBD (37, 38). In addition, personality is a factor that may affect the adoption of coping strategies (37). A study showed that individuals with Type-D personality tend to use passive and maladaptive coping strategies, which are associated with higher levels of perceived stress and exhaustion symptoms (45). Studies have also shown that the Type-D personality has a negative correlation with mental health status. Adults with Type-D personality experience more depression and anxiety symptoms than individuals without this personality (46, 47 and 48). According to existing literatures, people adopting problem-focused strategies benefit from higher mental health and show fewer signs of anxiety and depression. The more patients use problem-focused strategies, the more they are able to control their illness. Moreover, the more the IBD patients use a problem-oriented approach, the more they are able to deal with their illness and suffer from a lower level of depression. People with Type-D personality generally feel sad, and anxious, disable, and see the world full of imminent problems (49). It may be justified that this personality type affects people's perception of their illness, that negative perception of illness can provoke catastrophic thoughts about pain. In general, a higher rate of depression can be seen after the diagnosis of IBD. Therefore, such patients need to adopt more emotion-focused strategies to cope with the stress of illness.

The present study had some limitations. The participants were selected only from patients with IBD in Qom and thus the results cannot be generalized to a broader populations.. The lack of control over demographic variables, such as age and education level, was another limitation of the present study. Therefore, future studies are recommended to consider these limitations and other variables, such as socioeconomic class, the role of Type-D personality, mediating role of disease perception, and coping strategies in depression after the diagnosis of IBD.

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