ORIGINAL ARTICLE

Personality dimensions and type D personality in female patients with ulcerative colitis

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Aim: Psychological factors such as personality traits may affect the adjustment capacity and Quality of Life (QOL) in Ulcerative Colitis (UC) patients. Type D personality has some similarities with general personality traits of UC patients. The aims of this study were to compare NEO personality profile and type D personality between healthy normal group and UC patients; and to determine the possible relationship between type D personality and QOL in UC patients. **Materials and Methods**: The sample of study comprised of 58 UC patients and 59 healthy control subjects (from their family members). All participants were requested to fill out NEO-FFI, Type D personality (Ds14) Scale and WHO-Quality of Life Questionnaire. **Results**: The findings indicated that UC patients scored higher in neuroticism (P<0/01); lower in extraversion (P<0/01) and openness (P<0/05) than healthy controls but their differentiation were not significant in agreeableness and conscientiousness. The findings showed that 59% of UC patients and 33% of the control subjects had type D personality; and the differences in frequency of type D between the two groups were significant (P<0/05). The mean QOL scores of type D personality in UC patients was significantly lower than patients without type D personality (F= 7/55, P<0/01). Type D personality could better predict QOL of UC patients than NEO dimensions. **Conclusions**: Differences were observed between UC patients and their healthy family members, in terms of personality factors. Type D personality may be regarded as an important factor that may bring about some adverse effects in QOL among UC patients.

Key words: Colitis, personality, quality of Life, ulcerative

INTRODUCTION

Ulcerative Colitis (UC) is one of two main and common types of Inflammatory Bowel Disease (IBD) that is usually a chronic and disabling disease with unknown etiology. In these diseases an unpredictable course is one of the central characteristics that describe the patients with UC.[1] Recently the incidence and prevalence of IBD, especially UC, has been increased in countries which had rarely been reported, including Iran.[2] To date, there is no certain cure for IBD and treatment is aimed at managing the inflammatory responses during flares and maintaining remission with a focus on adhering to therapy.[3] The chronic course of UC together with consequent complications, as well as, frequent physician visits and the medication side effects or surgery may lead to considerable impairments in patient's quality of life.[4-6]

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In this line many investigators[6-8] studied the factors affecting QOL in these patients and showed that psychological disturbance (e.g., anxiety and depression) has contributed to poorer QOL in these patients. It has proposed that psychological well-being and QOL of these patients may be influenced by psychological factors, like personality traits particularly neuroticism.[9,10] Yet some patients with IBD believed that their own personality is a major contributor to the development of their disease.[11] However little is known about personality characteristics of UC patients.

Initially, based on psychodynamic theory it was assumed that specific psychological features were associated with and necessary for the development of a particular disease such as UC.[12] For example the proposed antecedent conflict that requires certain obligation coupled with unwillingness or inability to do so, may results in developing UC. This hypothesis because of its deficiencies, had become unpopular by the 1960s, and was replaced by biopsychosocial model of disease.[12] Recently based on this model researchers have investigated personality traits of UC patients and suggested that neuroticism and difficulty in describing feelings towards others (alexithymia) were higher in these patients than control subjects and that these traits could predict poorer QOL in them.[9,10,13,14] However no

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information is available about the other personality traits in these patients and no certain personality type matches this disease to date.[15]

During the last 15 years, a new personality construct, type D or "distressed" personality, has been proposed.[16,17] Type D personality encompasses two main personality traits: 1) Negative Affectivity (NA) and 2) Social Inhibition (SI). Negative affectivity which is defined as the tendency to experience negative emotions across various times and situations,[17,18] is closely related to neuroticism. Having high score in this trait, point out to more feelings of dysphoria, anxiety, irritability, anger, and a negative view about self and the external world.[19] Social inhibition refers to the tendency to inhibit the expression of emotions in social interactions. Individuals with high SI score tend to avoid expressing negative emotions because of their fear of disapproval or getting no reward from the others.[19]

Individuals with type D personality experience more worry, distress, anxiety, depression, low self-esteem and negative affect.[16,20] It also have been suggested that type D personalities are at increased risk for a variety of adverse health outcomes such as vital exhaustion, poor QOL, increased risk of cardiovascular reactivity and infarction in Coronary Artery Disease.[21,22] However there is little known about type D personality in patients with other non-cardiac diseases. Hansel *et al.*,[23] reported that this personality type is associated with poorer health-related quality of life (HRQOL) in patients with functional gastrointestinal disorders. Sararoudi B *et al.*,[24] showed that 40/7% of patients among 194 consecutive IBS patients had type D personality and showed that negative affectivity may be seen as a significant predictor for HRQOL in patients with IBS. On the one hand neuroticism and alexithymia in IBD patients which is suggested by some reports,[9-11] are corresponds to NA and SI, and on the other hand the findings that having type D personality may be associated with greater cortisol reactivity to stress, and increased level of Tumor Necrosis Factor (TNF)α[25] resulting from immune dysregulation response can be proposed as plausible pathogenesis of UC.

Type D personality questionnaire and NEO-FFI investigate the personality from two different perspectives. The type D, is conceptualized as a discrete type, and is in essence bimodal, distinguishing type D_s from non-type D_s. However, the FFI proposes a dimensional representation of traits, suggesting that subject's' trait scores vary along a continuum.[26] Assessing personality with type D typology has person-centered approach and with five factor model has variable-centered approach to personality assessment which either helps to better understanding the personality.

Since, there is huge body of literature about five factor dimensions of personality in various populations that facilitates subjective comparisons, and helps better understanding of the personality profile of UC patients, the first aim of this study was to investigate personality dimensions of UC patients through comparison of these dimensions with normal subjects. Because of close similarities between components of type D personality and immune features of UC patients, the second aim of the present study was to compare the frequency of this personality type between UC patients and normal people. In addition, many researchers reported type D personality as a significant predictor of adverse health outcomes in many diseases.[20-23] Since type D personality questionnaire, based on personality traits is able to distinguish type D from non-type D in UC patients, while NEO-FFI is based on personality dimension, both of them were used to assess personality thoroughly, and to identify if UC patients with type D personality may need more professional helps; and this was the third aim of the study.

MATERIALS AND METHODS

This study was a case-control study in examining personality profiles, type D personality, QOL and the relationship between type D personality and QOL in patients with UC. The study was done between January 2010 and June 2011 and the study design was approved by the ethical committee of Isfahan University of Medical Sciences with research project number 115943.

Participants: the sample was composed of 117 individuals: 58 female UC patients, and 59 normal subjects. UC patients were recruited from an outpatient gastroenterology clinic affiliated with Isfahan University of Medical Sciences during March 2009 to September 2011.

Inclusion criteria were: 1) being female 2) receiving the diagnosis of UC based on endoscopic investigation, and histologic criteria were checked by gastroenterologist (the last author) 3) between 18-69 years old 4) being able to read and write 5) willingness to participate in the study. Patients were excluded if: 1) had a major psychiatric disorder, 2) were unable to read and write or were not agree to be participated in study. The first exclusion criterion was evaluated based on the patient's medical profiles and their self-report of pre-existing disorders. In order to control the genetic factors and global stress levels in the family which have been shown to influence on the incidence of UC, the healthy normal group were selected from healthy siblings of UC patients and matched with them in sex and age. In addition normal subjects did not have a major psychiatric disorder or gastrointestinal disease.

The procedure was as follow: At first patients were visited by a gastroenterologist and the diagnosis based on endoscopic and histologic 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 patients were agree to continue and were orally consent to participate in the study, then they were asked to complete three questionnaires including type D personality scale (DS14), NEO-Five Factor Inventory (NEO-FFI) and WHO Quality of Life (QOL) questionnaire. At the same time another set of questionnaires were given to each patient and she was asked to get her healthy sister completed them. All the patients were asked to bring their own, and their sister's completed copies of questionnaires in the next visit to gastroenterologist.

Materials

DS14: The Persian version of DS14 was used for measuring type D personality. This scale contains 14 items, providing a brief measure of both NA and SI domains. Each of NA and SI domains was constituted of seven items. The items were answered on a five-point Likert scale from 0 (false) to 4 (true). Therefore scores of NA and SI range from 0-28. Seres *et al.*,[27] and Hansel *et al.*,[23] suggested a predetermined cut-off point equal or greater than 10 on both subscales to identify those with a type D personality. Denollet[28] reported that NA and SI subscales were internally consistent ($\propto$=0.88 and $\propto$=0.86, respectively) and stable over three-month period (test-retest r=0.72 and r=0.82, respectively). An Iranian study[29] confirmed two-factor structure of Persian version of DS14. The NA and SI subscales had good test-retest reliability over a two-month period (test-retest r=0.86 and r=0.77, respectively). The Cronbach's alpha coefficient was 0.84 and 0.86 for NA and SI in order.

NEO-FFI: NEO-Five Factor Inventory is a 60-items version of the NEO-PI-3 which was developed by McCray and Costa.[30] It provides a quick, reliable and accurate measure of the fine 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 comprised: Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness. The answer format is a five-point Likert-type scale. Answers ranging from strongly disagree (0) to strongly agree (4). It should be noted that 23 of 60 items were reversed keyed. The internal consistencies of each domain were reported N=0.79, E=0.79, 0=0.80, A=0.75, C=0.83.[29] Strong psychometric properties have been reported for Persian version of NEO-FFI in a survey of an Iranian population of all universities across the country.[31]

WHO QOL Instrument-Brief form: 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 from 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[32] are tested and reported to be suitable. All items are rated on a five point scale (1-5).

Statistical analysis

Data analysis was performed using the SPSS ver. 19 (SPSS Inc., Chicago, IL, USA). Initially, test of normality was performed for checking the normality of distribution for all variables. The normality of distributions of scores for all the variables was not rejected and therefore, parametric statistics could be used for data analysis. Multivariate analysis of variance (MANOVA) was used for the comparison of QOL, NEO personality dimensions, NA and SI between the UC patients and the healthy normal group. The frequency of type D personality between UC patients and healthy normal group was also compared using chi-square test. Then ANOVA test was applied to define the association between type D personality and QOL in UC patients. P=0.05 was defined as the level of statistical significance.

RESULTS

Our sample was comprised of 58 UC patients and 59 normal participants. All participants were female and their average age was 35.06 ± 10.97 for UC patients and 30.50 ± 6.96 for the control group. 77.6% in the patient group and 54.2% in the normal group were married. 25.9% of UC patients and 40.02% of the normal group had a history of university education [Table 1].

In NEO-FFI, the differences between two groups were significant for Neuroticism, Extraversion and Openness. There was no significant difference between Agreeableness and Conscientiousness in UC patients and normal group. Table 2 show mean scores and standard deviations for five personality factors in UC patients compared to the normal group. UC patients had significantly higher levels of Neuroticism, Extraversion and Openness compared to controls (P<0.01, P<0.01 and P<0.05 respectively).

The scores for QOL, and NA subscales of type D personality were significantly different between the two groups. While UC patients had significantly lower mean scores in QOL compared the normal group, the mean scores of NA were significantly higher than the normal group in this patients. There was no significant difference between the two groups in SI scores. Table 3 shows mean scores and standard deviations for QOL, NA and SI in UC patients and the normal group.

Denollet[28] recommended a cut-off point of 10 on both subscales to classify subjects as type D personality. In this study using a median split of NA and SI scores among participants and Roc curve, the 11.5 score obtained for cut-off point in this sample. Applying this cut-off point score, 59% of UC patients and 33% of normal group were classified as type D personality. The differences of frequencies of type D between the two groups were significant based on chi-square analysis ($P<0.05$). A logistic regression analysis was conducted to predict belonging to patient group using classifying as type D personality as predictors.

A test of the full model against a constant only model was statistically significant, indicating that the predictor as a set reliably distinguished between patients and normal subjects (chi square = 10.56, P <.001 with df = 1).

EXP (B) value indicates that when belonging to patient group is raised by one unit (one person) the odds ratio is 3.22 times. Therefore if the subject is in type D group the odds becoming a patient will be one to 3.22 that is the chance of becoming a patient will be 3.22 times more than a healthy person [Table 4].

The correlation between subscales of type D questionnaire and NEO-FFI dimensions are shown in Table 5. NA was strongly correlated with Neuroticism (r=0.78; $P<0.01$) and correlates negatively with Extraversion (r= -0.52; $P<0.01$), Agreeableness (r= -0.51; $P<0.01$) and Conscientiousness (r= -0.19; $P<0.05$). SI was negatively correlated to Extraversion (r= -0.57; $P<0.01$), Agreeableness (r= -0.30; $P<0.01$) and Conscientiousness (r= -0.34; $P<0.01$) and positively correlated with Neuroticism (r=0.37; $P<0.01$).

In the UC patient group, the mean score of QOL for type D patients was 52.59±12.02 and for the normal group was 61.09±9.51. In order to compare the mean score of QOL between type D personality patients and patients without type D, an ANOVA test was performed. The results of ANOVA test showed a significant difference between two groups in QOL (F=7.55, $P<0.01$) and the mean scores of QOL were higher in patients without type D.

Regression analysis was used to examine whether NEO personality dimensions or type D personality can better predict QOL of UC patients? Findings reported in Table 6 shows that among dimensions of NEO-FFI only Neuroticism and Extraversion could significantly predict the QOL (std β= -0.49, $P<0.001$ for N; and std β= -0.26, $P<0.01$ for E; R^2=43). Type D personality could significantly predict the QOL (std β= -0.53, $P<0.001$; R^2=58).

DISCUSSION

Although emotional states and personality traits may affect the physiology of the gut[33] and influence experiencing and interpreting the symptoms,[12] the main personality dimensions or certain personality types and their relationship with QOL of UC patients have been minimally explored. The present study has intended to compare type D personality and its subscales between UC patients and a healthy control group and then to investigate the QOL scores between type D patients and those without type D personality. Also the relative worthiness of NEO dimensions and type D personality questionnaire in predicting QOL of these patients was compared in this study.

The Big Five Personality Factors model represents a dimensional account of the structure of normal personality traits. The present findings showed that UC patients scored significantly higher on Neuroticism than the

Table 1: Sociodemographic variables of women with UC patients and normal subjects

	UC patients (N=58)	Normal subjects (N=59)	*P* [a]
Age (mean±SD)	35.06±10.97	30.50±6.96	<0.01
Married, % N	54.2	77.6	<0.05
Education, % N	-	-	<0.05
Middle school education	27.6	1.7	-
High school education	36.2	13.6	-
University education	25.9	40.02	-

P[a]: *P* are values results of independent-samples *t*-test for age and show the results of Chi-square test for marital status and level of education

Table 2: Mean±SD scores of five personality factors measured by NEO-FFI in UC Patients compared to normal group

Neo-dimensions	UC patients	Normal group	*P*
Neuroticism	25.05±7.62	20.49±7.93	0.01
Extraversion	26.86±6.98	30.20±5.84	0.01
Openness	24.77±4.37	26.57±4.05	0.05
Agreeableness	31.15±5.15	31.94±5.17	0.407
Conscientiousness	34.67±6.41	34.23±6.12	0.708

Table 3: Mean±SD scores of QOL, NA and SI in UC patients compared to normal group

	UC patients	normal group	*P*
Quality of life	55.67±11.95	60.61±11.51	0.05
Negative affectivity	16.24±6.90	11.76±6.57	0.0001
Social inhibition	10.56±6	8.72±6.66	0.12

Table 4: Variables in the equation

		variables in the equation					
		B	S.E.	Wald	df	*P* value	Exp(B)
Step 1	Having or not having type D personality	1.17	0.37	9.83	1	0.002	3.22
	constant	-0.59	0.26	5	1	0.025	0.55

Table 5: Correlation between subscales of type D questionnaire and NEO-FFI dimensions

Type D Subscales	Neo dimensions				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Negative affectivity	0.78**	-0.52**	-0.05	-0.51**	-0.19*
Social inhibition	0.47**	-0.57**	-0.16	-0.30**	-0.34**

**Correlation is significant at 0.01 levels; *Correlation is significant at 0.05 levels

Table 6: Regression parameters of NEO-FFI and Type D personality predicting QOL of UC patients

	QOL	
	std β	*P*
Neuroticism	-0.49	0.001
Extraversion	-0.26	0.01
Openness	-0.01	0.76
Agreeableness	0.001	0.99
Conscientiousness	0.13	0.07
R^2	0.43	0.001
Type D personality	-0.053	0.001
R^2	0.58	0.001

normal group. Neuroticism indicates individual differences in the tendency to experience negative emotions such as anxiety, anger, and feeling of guilt.[34] According to Costa and McCrae,[35] elevated scores on this dimension represent emotional instability with overwhelming negative emotions. Findings of this study were consistent with the findings of previous studies.[9-11,36] Eyneck believed that neuroticism is a function of the activity of limbic system and researches showed that a high score on this trait is associated with a more sympathetic nervous system reactivity and more sensitivity to environmental stimulation.[37] Because of close relationship between intestinal nervous system and part of central nervous system through the gut-brain axis[13] and probable autonomic disturbances in IBD patients,[38] the intestinal nervous system is highly sensitive to emotional states. As a result, negative emotions cause some changes in the gastrointestinal motor, sensory and secretory functions[12] and thereby exacerbate the bowel symptoms in neurotic UC patients.

The present study also indicated that UC patients compared to the healthy control group scored lower in extraversion. Although there is no preexisting study in this area, this finding is not far from expectation. The result of Zarpour and Besharat[39] also confirmed this finding with IBS patients. Extraverted individuals typically are assertive, talkative and sociable and have an ability to develop interpersonal interests and social interactions.[40] These features help them cope well with stressful experiences; rely on active thinking resources and strong social support networks. However previous studies showed that IBD patients utilize more passive coping strategies,[41,42] it appears that their concerns and worries about their body image, loss of control of the bowel and feeling dirty restrict their social relationships.

Openness to experience is another dimension that differs significantly between UC patients and controls. This dimension has not been already studied in UC patients before. Openness typically is associated with divergent thinking and openness to internal feelings and new ideas and situations. Perhaps patient's mental preoccupation with the disease, its consequences, and prognosis result in the lack of thought flexibility and real limitations that may be related to bowel symptoms such as faecal incontinence, which in turn restrict patient's openness to new experiences in new situations.

The current study also showed no significant differences between UC patients and controls in Agreeableness and Conscientiousness. Agreeableness describes some humane characteristics like altruism, nurturance and caring.[42] Conscientiousness reflects being careful, responsible and planning carefully. This dimension is typically associated with hard-working and achievement-oriented.[43] It appears that in Iranian culture the development and shaping of these two dimensions may be more affected by a person's value system and social learning, particularly incentives that are presented by parents and other family members. Since, the healthy control group in this research was selected from the patients' family members, there were some similarities between them in social learning and therefore perhaps lack of differences in characteristics such as Agreeableness and Conscientiousness can refer to those similarities.

In another part of the present study, findings showed that two groups were significantly different in Negative Affectivity (NA) but not in Social Inhibition (SI). Since NA is positively correlated with neuroticism,[27] and previous studies, showed high neuroticism scores in IBD patients, this finding is not far from expectation. Perhaps lack of differences in the two groups in SI can be attributed to the fact that SI shows increased vulnerability to interpersonal stress and failure to adapt.[44] However UC patients may partly withdraw themselves from others but this is not so severe that entirely inhibit them from social networks. In this line some researchers[42,45] suggested that perceived social support was not different between UC patients and controls.

The correlation pattern between type D personality components and NEO dimensions indicated that NA was preliminary related to Neuroticism, with substantial negative correlations with Extraversion, Agreeableness and

Conscientiousness. This pattern for SI was very similar for Agreeableness and Conscientiousness, but this subscale was correlated most strongly with Extraversion (negatively) and Neuroticism. These findings and correlations were consistent with DeFruyt and Denollet's[26] study. These authors believed that although it seems that Neuroticism and Extraversion are regarded as the core features of type D personality, type D scales were not identical to standard N and E measures. They suggested that the FFI-Type D relationships do not discredit the type approach that is predominant in the study of health and diseases. In addition, Pederson and Denollet[46] found that type D has a unique prognostic value. A head to head comparison confirmed that type D personality, but not the combination of high Neuroticism/low Extraversion (by the NEO-FFI), predicted major adverse clinical events in a group of 230 Coronary Heart Disease patients. This finding was also replicated in the present study. The result also showed that among NEO dimensions only N and E could significantly predict QOL of UC patients, while R^2 and standard coefficients regression of type D in predicting QOL was higher and revealed that type D could better predict this variable than NEO dimensions.

Another finding of this study showed that 59% of UC patients versus 33% of the healthy control group were classified as type D personality and the frequency of type D personality was significantly higher in UC patients than in controls. It seems plausible to interpret the findings of this study as expected, if we look at the two components of type D, and also at the differences between two groups. Finally the results showed that type D patients had lower QOL scores. This finding is in line with those of previous studies on type D personality and impaired QOL in patients with cardiovascular disorders,[20] chronic pain,[47] gastrointestinal symptoms[23] and IBS patients.[24] The current findings also confirm the results of the studies have reported that this personality type may be concomitant with adverse health outcomes and especially result in poor QOL in patients.

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 has limited investigating the mediational or moderational relations. Second, this study was performed only on female UC patients while perhaps considering males may result in different findings. Third, cross-sectional nature of the study limits any conclusions about causality in the field of personality types and UC symptoms.

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