

Psychosocial Factors Affecting the Course of Inflammatory Bowel Disease

Stavroula I. Bargiota, Dionysios Sakkas, Thomas N. Hyphantis, Nikiforos V. Angeloopoulos

Abstract— Objective: A five year prospective study of 43 patients with Inflammatory Bowel Disease (IBD), 33 with Ulcerative Colitis and 10 with Crohn's Disease, was conducted with the purpose to investigate the role of psychosocial factors on the course and outcome of the disease.

Methods: Sociodemographic data were collected and the participants were given four psychometric instruments: the Hostility and Direction of Hostility Questionnaire (HDHQ), the Spieberger's trait anxiety (STAI-t), the Spieberger's state anxiety (STAI-s) and the Center of Epidemiological Studies-Depression Scale (CES-D). After the lapse of five years the patients were allocated to three groups according to the degree of severity of their illness (improvement, stability, deterioration).

Results: Patients with IBD, whose condition was evaluated as deteriorated at the end of the follow-up, had initially given much higher scores on the HDHQ subscale of Paranoid Hostility than those with improvement. Patients whose course of illness showed a deterioration, had given significantly higher scores on CES-D scale, on the initial examination. Married patients who showed improvement had a significantly longer duration of marriage than the rest. Older age at the beginning of the disease was significantly related to the improvement of symptomatology than younger age.

Conclusions: Paranoid Hostility and Depressive Symptoms are predictors of more severe course of illness. Married patients with longer duration of marriage had better prognosis. Older patients had better prognosis than younger ones.

Index Terms— Crohn's disease, Inflammatory bowel disease, psychosocial factors, ulcerative colitis.

I. INTRODUCTION

Inflammatory Bowel Disease (IBD) is clinically manifested mainly as Ulcerative colitis and Crohn's disease. Ulcerative colitis (UC), is characterized by recurrent episodes of diarrhea with bleeding mixed with mucus and/or pus. Only the colon is affected and the inflammation is restricted to the mucous. Crohn's disease (CD) is manifested with abdominal pain, fever and diarrhea and the whole gastroenteric system could be affected from a transmural inflammation [1]. The relations between IBD and psychological factors have been under research since the emergence of their psychosomatic approach during the thirties. Numerous investigators suggested an etiological

relationship between these and not infrequently IBD, particularly Ulcerative Colitis, has been characterized and even managed as a psychosomatic illness [2, 3].

This approach, however, was not appreciably fruitful if seen from the viewpoint of the success of relevant psychotherapeutic and/or psychopharmacological interventions. With the passage of time the focus of study was shifted from the search of etiological relationships between psychological factors and IBD, to the impact the physical disease and its treatment have on the psychological status of the patient, his personal and social adaptation and the development of psychiatric morbidity. Actually an increased psychiatric symptomatology, most commonly anxiety and depression, in IBD has been observed by numerous investigators [4-6].

The worth of the psychiatric research in these patients, could rest primarily in the prospect that it may provide with actualities, valuable for a better understanding of the relationship between psychiatric factors and the illness process and the patients' emotional reaction to their illness, with the purpose to promote the planning of more successful therapeutic strategies. There are many retrospective studies regarding the influence of psychosocial factors on the course, physical condition, treatment and psychosocial health of the patient with IBD. The present study was designed with the purpose to investigate possible relationships of psychosocial and demographic factors with the course of the IBD, taking into account the passage of time.

II. METHODS

Forty three patients, 28 men and 15 women, with a confirmed diagnosis of IBD, hospitalized at the Gastroenterological Clinic of the General Hospital of Athens, participated in the study. The study has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) and informed consent was obtained. The privacy rights of the patients were observed. Thirty- three of them suffered from UC (21 males, 12 females) and 10 from CD (3 males, 7 females). Their age varied from 19 to 60 years (mean 33.46, sd 11.84). All patients were informed about the aims and the procedure of the study and agreed to participate. The diagnosis of IND was based on clinical, radiological, endoscopic and histological criteria. The degree of severity of the disease was measured according to the criteria for UC [7] and according to the Best modification of the classical Crohn's Disease Activity Index [8]. The psychiatric investigation of the participants took place a few days before discharge from the

Stavroula I. Bargiota, 2nd Psychiatric Department, Aristotle University of Thessaloniki, Thessaloniki, Greece

Dionysios Sakkas, General Hospital of Athens "G.Gennimatas", Athens, Greece

Thomas N. Hyphantis, Department of Psychiatry, University of Ioannina, Ioannina, Greece

Nikiforos V. Angeloopoulos, Department of Psychiatry, University of Thessalia, Larissa, Greece

hospital by completing four psychometric instruments. Their follow-up lasted five years, through regular visits as outpatients or during a hospitalization at the Gastroenterological clinic, while every 6 months there was a communication by telephone with the patient and information about the course of his disease was collected. At the end of the fifth year the cooperating gastroenterologists evaluated the final degree of severity of the disease. The used psychometric instruments were: the HDHQ (Hostility and Direction of Hostility Questionnaire), the CES-D (Center for Epidemiological Studies- Depression scale), and the Spielberger's trait (STAI-t) and state anxiety (STAI-s) questionnaires.

The HDHQ [9] is an attitudinal measure for a wide range of hostility manifestations, having little implication of aggressive behavior physically expressed. Two dimensions underlie hostility as it is measured by the HDHQ: a readiness to respond with aggressive behavior and a tendency to evaluate persons, including the self, in negative terms. It consists of five subscales in 52 items. Three subscales, Acting-out Hostility, Criticism of Others and Paranoid Hostility are measures of Extraverted Hostility or Extrapunitiveness. Two subscales, Guilt and Self-Criticism are measures of Introverted Hostility or Intropunitiveness. Total Hostility is the sum of the five subscales. The accepted score norms for Total Hostility in normal populations are between 12-16. The HDHQ has been used in Greek normal populations, psychiatric or somatic [10-12].

The CES-D [13] consists of 20 items and investigates depressive symptoms during the last week. For each symptom there is a score between 0-3. The total score varies from 0 up to 60, with the score 16 being regarded as cut-off point. It shows sensitivity in detecting depressive symptoms and can be used in the general population. Reliability and validity for the Greek population have been established [14].

Spielberger's Trait Anxiety Inventory (STAI-t) and State Anxiety Inventory (STAI-s), distinguish anxiety as a condition from anxiety as a personality trait [15]. There have been made several studies in neurotics and healthy people in Greece with these instruments [16-18].

Three degrees of severity during the 5 years of the follow-up (improvement, stability, deterioration) were chosen as dependent variables. Age, gender, marital status, duration of marriage, educational level of the patient and of his/her spouse, psychiatric symptomatology and personality factors were chosen as independent variables. The patient was considered as improved if he/she had two or less relapses of the disease per year, of mild symptomatology, without need of hospitalization, he/she was not operated and did not receive cortisone. The patient was considered as stable if he/she had rather continuous "mild" and "medium" recurrences with remissions, without surgical operations and the use of cortisone was circumstantial. The patient was considered as deteriorated if he/she had often serious relapses, with small mean times free of symptoms, was subjected to surgical operations, had a relapse after the operation, and had serious complications, and received cortisone or immunosuppressants continuously.

III. RESULTS

No statistically significant differences regarding the socio-demographic data between the UC and CD patients were detected with the exception of the age of onset of CD patients which is significantly smaller compared to the age of the onset of UC patients (Table i).

Table 1 Socio-Demographic variables, Age of Beginning and Duration of illness

	Total (n=43) Mean(sd)	UC (n=33) (mean, sd)	Crohn's (n=10) (mean,s d)	p
Age in years	33.46 (11.84)	35.0 (11.5)	28.4 (12.06)	n.s.1 ¹
Years of Education	12.02 (3.64)	12.42 (3.78)	10.55 (2.78)	n.s.1
Age of wife/husband	40.18 (10.1)	40.45 (10.57)	37.5 (2.12)	n.s.1
Years of Educ Of spouse	10.5 (3.84)	10.54 (3.82)	10.0 + 5.65	n.s.1
Duration of Marriage	14.17 (9.9)	14.33 (10.37)	12.5 + 0.7	n.s.1
Age at onset of Disease	29.53 (11.40)	31.72 (11.26)	22.3 + 8.9	0.02 ²
Duration of Disease (years) (until the first interview)	3.66 (3.81)	3.29 (3.64)	4.9 + 4.3	n.s.2
Duration of follow-up (from first interview until 1995)	4.92 (1.12)	4.91 (1.21)	5.0 (0)	n.s.2
Total duration of the disease (until 1995)	6.81 (4.12)	7.36 (4.1)	7.4 (4.33)	n.s.2
Number of children:				n.s.2
1	7 (16.3%)	6 (18.2%)	1 (10%)	
2	12 (27.9%)	11 (33.3%)	1 (10%)	
3	2 (4.7%)	2 (6.1%)	0	

As far as the illness status at the end of follow-up is concerned (Table ii) from the total of 43 patients who took part in the study, 9 (20,9%) showed improvement, 20 (46,51%) stayed stable and 14 (32,5%) showed deterioration. The course of illness seemed to be similar on both diseases, although it seems that CD patients had higher percentages of deterioration.

	Total	Ulcerative Colitis	Crohn's Disease
Improvement	9 (20.9%)	7 (21.2%)	2 (20.0%)
Stability	20 (46.51%)	16 (48.5%)	4 (40.0%)
Deterioration	14 (32.5%)	10 (30.3%)	4 (40.0%)

No significant differences were detected between the UC and CD patients regarding the scores on the HDHQ, CES-D, STAI-t and STAI-s given at the beginning of the study (Table iii). It should be noted that the total hostility (TH) was very high (>20) in both groups. Relatively high levels of depression on CES-D were reported in both groups. A significant difference on the scale STAI-t, between the CD and UC patients is detected. CD patients reported much higher, almost double scores while they don't differ significantly regarding the scores of anxiety as a state (STAI-state).

Table 3 Means and standard deviations of the scores on HDHQ, CES-d and STAI, at the beginning of the study.

	Total(n=43)	UC(n=33)	CD(n=10)	
	mean (sd)	mean (sd)	mean (sd)	t-test
HDHQ-AH	4.7 (0.28)	4.7 (0.34)	4.8 (0.46)	n.s.
HDHQ-CO	7.0 (0.36)	7.2 (0.39)	6.5 (0.87)	n.s.
HDHQ-PH	2.6 (0.25)	2.6 (0.27)	2.9 (0.69)	n.s.
HDHQ-SC	3.8 (0.27)	3.9 (0.34)	3.7 (0.94)	n.s.
HDHQ-DG	2.4 (0.20)	2.4 (0.24)	2.6 (0.37)	n.s.
HDHQ-TI	12.6 (0.85)	12.6 (1.06)	12.6 (1.15)	n.s.

Analysis of variance of the scores on HDHQ, CES-D, STAI-s and STAI-t with the illness status at the end of the follow-up (Table iv) revealed that Paranoid Hostility and CES-D scores are significantly higher in the deteriorated patients.

Table 4 Analysis of variance of the scores on HDHQ, CES-D, STAI-s and STAI-t with the illness status (I: improved, S: stable, D: deteriorated) at the end of the follow-up.

		Total (n=43)		
		Mean (sd)	Sheffe	p
AH	I	5.55 (2.06)	*	ns
	S	4.4 (1.63)	*	
	D	4.64 (2.02)	*	
CO	I	7.33 (2.12)	*	ns
	S	7.25 (2.09)	*	
	D	6.5 (2.95)	*	
PH	I	2.55 (1.13)	*	0.09
	S	2.15 (1.42)	*	
	D	3.43 (2.10)	*	
SC	I	4.22 (1.71)	*	ns
	S	4.05 (1.57)	*	
	D	3.28 (2.05)	*	

DG	I	2.33 (1.58)	*	ns
	S	2.60 (1.14)	*	
	D	2.28 (1.48)	*	
TI	I	13.1 (5.66)	*	ns
	S	13.3 (4.86)	*	
	D	11.1 (6.59)	*	
TE	I	4.33 (4.74)	*	ns
	S	13.3 (4.09)	*	
	D	4.57 (5.88)	*	
TH	I	0.14 (5.19)	*	ns
	S	0.45 (5.12)	*	
	D	22 (8.82)	*	
CES-D	I	3.67 (8.29)	*	0.03
	S	4.80 (5.80)	*	
	D	1.93 (11.1)	* *	
STAI-s	I	2.55 (3.65)	*	ns
	S	3.95 (8.24)	*	
	D	3.28 (12.43)	*	
STAI-t	I	7.55 (7.26)	*	ns
	S	3.05 (6.58)	*	
	D	1.28 (7.21)	*	

Analysis of variance on data regarding Age, Education, Duration of marriage and Illness Status at the end of follow-up (Table v) revealed some interesting features. Age is significantly and positively related to the illness status at the end of the follow-up ($p < 0.001$). Older patients had a significantly better course of illness than younger patients. Also the age of the spouse is related to the course of illness in the sense that spouses of the patients who showed improvement were older than those of the deteriorated. The married patients who showed improvement had a significantly longer duration of marriage than the rest. Of course, age, duration of marriage and the age of spouse are variables depended on each other and found to be significantly related to each other ($p < 0.0004$ in all cases). The most important influence on the course of the disease is depended on the duration of marriage. The educational level is negatively related to the course of the disease. Patients who stayed stable or deteriorated had a higher educational level than those who showed an improvement.

Table 5 Age, Education, Duration of marriage and Illness Status at the end of follow-up (I:improved, S:stable,

		Total (N=43)			
		Mean	(sd)	Sheffe	p
Age	I	45.33	(14.86)	* *	0.001
	S	30.40	(8.44)	*	
	D	30.21	(9.48)	*	
Age of spouse	I	50.57	(10.0)	* *	0.0009
	S	36.0	(6.78)	*	
	D	34.3	(3.38)	*	
Education (Years)	I	9.0	(3.67)	* *	0.01
	S	12.55	(2.93)	*	
	D	13.3	(3.7)	*	
Education of spouse (Years)	I	9.28	(3.4)	*	n.s.
	S	9.90	(4.48)	*	
	D	12.57	(2.76)	*	
Duration of marriage	I	25.14	(10.44)	* *	0.0001
	S	11.66	(3.46)	*	
	D	6.42	(3.86)	* * *	

D:deteriorated). Analysis of variance.

Patients of the present study who who suffered from a severe type of the disease gave significantly higher scores on the CES-D scale not only at the initial psychometric evaluation but also at the end of the follow-up. Depressive symptoms in IBD patients have been reported by many authors [23].

Depression is reported by IBD patients more often than by patients suffering from other chronic diseases. There is evidence that anxiety and depression are more common in patients with IBD and that the symptoms of these conditions are more severe during periods of active disease [24]. Others reported that the severity of anxiety and depression follow the course of the disease on the phases of remission and recurrence [25]. A statistically significant tendency for higher scores on STAI-s scale is also noted by those who suffered severely from the disease at the end of the follow-up.

The high levels of Total Hostility reported by IBD patients have also been reported by other studies. Angelopoulos et al. reported very high levels of Total Hostility in patients with UC both at the active and the non-active phase of the disease [26]. However Leibig et al., studying patients with UC and CD on the phase of remission found them less aggressive than the control group [27]. Keltikangas [28] supported the view that it is the disease and its consequences that increase hostility.

The HDHQ subscale of Paranoid Hostility was significantly higher on the patients who showed deterioration at the end of the follow-up. Since Paranoid Hostility is not a permanent characteristic of the personality but an attitudinal factor it is not clear whether high PH is a consequence of the chronic severe course of the disease and the lack of successful therapy. Paranoid Hostility affects negatively the cooperation between patient and therapist, worsens the relations between him/her and family, can lead to reduction of compliance, worsening of the patient’s condition and prognosis of illness.

As far as age is concerned older patients had a better course of illness. Similar reports were reported from Matsui et al. [29] on 124 patients with UC who were followed-up for 10 years. Concerning CD, small bowel localization, stricturing disease, and young age can be predictors of the disease recurrence. On the other hand, in UC, extensive colitis and older age at diagnosis were not found to predict prognosis [30].

The gender wasn’t found to play any role on the prognosis. Drossman et al. [31] reported a better prognosis of women due to easier reach of medical help. This difference can be due to our different sample, where hospitalized men are the majority (65%) and which obviously is not representative of the disease at the community. Gender has been found to affect health related quality of life in IBD [32].

The educational level is negatively related to the course of the disease. Patients who remained stable or showed deterioration had a higher educational level compared to those who showed an improvement. The duration of marriage was found to be significantly related to the course of the disease. The married patients who showed improvement had a significantly longer duration of marriage than the rest.

The age of the patient, the duration of marriage and the age of the spouse are significantly related to the course of the

IV. DISCUSSION

As far as the age, gender, years of education, duration of marriage and duration of the disease was concerned, no differences between UC and CD patients were observed. The degree of severity of the disease, as it was evaluated at the beginning of the study, was similar in both conditions.

The psychiatric morbidity on IBD varies among studies in a range from 13% to 100% [3, 19-21]. This could probably be attributed to a variety of factors such as: different samples (for example: from the community or from a clinic), evaluation methods, inappropriate comparisons between starting and final diagnoses, the ways the facts are interpreted, etc. On their review of the literature North et al. [22] reported that a 50% of good organised studies failed to find a connection between UC and psychiatric factors, while 50% of them and over 94% of the studies that had a control group showed a positive correlation between psychiatric factors and UC. The outcome of IBD should not be considered as a summing of complications, operations and mortality, but its study requires a consideration of additional factors that influence the course of each disease such as the response to medical and surgical therapy and the psychosocial adaptation of the patient to his/her illness.

disease and these three variables are significantly related to each other. The Multiple Regression Analysis showed that the most important role on the course of the disease is being played by the duration of marriage. This finding justifies the increasing interest on the role the social support and especially the marital life plays on the course and prognosis of physical disorders this forms an interesting prognostic factor. The ability of the spouses to be easily adapted to new situations (diseases) was a major factor on the support of the patient's process of adjustment to his disease. These patients thought that their spouse had a way to care about them with respect, calmness and not with aggression.

The severity of the psychological disorders seems to be related to the severity of the disease. The psychological disorders in patients with CD are a component and not a factor of the disease [33, 34]. The studies seeking for prognostic factors are directed to the search of the role of quality of life (occupation, entertainment, exercise, interpersonal relationships, marriage) on the course of IBD. Quality of life seems to constitute one of the best prognostic factors for future visits to doctors and admissions, compared to factors of the disease that are better as far as the prognosis of surgical operations is concerned.

REFERENCES

- [1] Van Assche, G., et al., *The second European evidence-based Consensus on the diagnosis and management of Crohn's disease: Definitions and diagnosis*. Journal of Crohn's and Colitis, 2010. **4**(1): p. 7-27.
- [2] Drossman, D.A. and Y. Ringel, *Psychosocial factors in ulcerative colitis and Crohn's disease*. Inflammatory bowel disease, 2000. **5**: p. 342-357.
- [3] Levenstein, S., et al., *Stress and exacerbation in ulcerative colitis: a prospective study of patients enrolled in remission*. The American journal of gastroenterology, 2000. **95**(5): p. 1213-1220.
- [4] Filipovic, B.R. and B.F. Filipovic, *Psychiatric comorbidity in the treatment of patients with inflammatory bowel disease*. World journal of gastroenterology: WJG, 2014. **20**(13): p. 3552.
- [5] Mawdsley, J.E., et al., *The effect of acute psychologic stress on systemic and rectal mucosal measures of inflammation in ulcerative colitis*. Gastroenterology, 2006. **131**(2): p. 410-419.
- [6] Mittermaier, C., et al., *Impact of depressive mood on relapse in patients with inflammatory bowel disease: a prospective 18-month follow-up study*. Psychosomatic medicine, 2004. **66**(1): p. 79-84.
- [7] Sc, T. and W. L.J., *Cortisone in ulcerative colitis: final report on a therapeutic trial*. British medical journal, 1955. **2**(4947): p. 1041-1048.
- [8] Best, W.R., et al., *Development of a Crohn's disease activity index*. Gastroenterology, 1976. **70**(3): p. 439-444.
- [9] Caine, T., G. Foulds, and K. Hope, *Manual of the hostility and direction of hostility questionnaire (HDHQ)* University of London Press. 1967, London.
- [10] Pitsavos, C., et al., *Epidemiology of cardiovascular risk factors in Greece: aims, design and baseline characteristics of the ATTICA study*. BMC public health, 2003. **3**(1): p. 32.
- [11] Angelopoulos, N., A. Drosos, and H. Moutsopoulos, *Psychiatric symptoms associated with scleroderma*. Psychotherapy and psychosomatics, 2001. **70**(3): p. 145-150.
- [12] Hyphantis, T., et al., *Personality correlates of adherence to type 2 diabetes regimens*. International journal of psychiatry in medicine, 2005. **35**(1): p. 103.
- [13] Radloff, L.S., *The CES-D scale a self-report depression scale for research in the general population*. Applied psychological measurement, 1977. **1**(3): p. 385-401.
- [14] Fountoulakis, K., et al., *Reliability, validity and psychometric properties of the Greek translation of the Center for Epidemiological Studies-Depression (CES-D) Scale*. BMC psychiatry, 2001. **1**(1): p. 3.
- [15] Spielberger, C.D., *Anxiety as an emotional state*. Anxiety-Current trends and theory, 1972.
- [16] Livadas, S., et al., *Anxiety is associated with hormonal and metabolic profile in women with polycystic ovarian syndrome*. Clinical endocrinology, 2011. **75**(5): p. 698-703.
- [17] Kimiskidis, V.K., et al., *Depression and anxiety in epilepsy: the association with demographic and seizure-related variables*. Annals of general psychiatry, 2007. **6**(1): p. 28.
- [18] Spielberger, C.D. and E.C. Reheiser, *Measuring anxiety, anger, depression, and curiosity as emotional states and personality traits with the STAI, STAXI, and STPI*. Comprehensive handbook of psychological assessment, 2004. **2**: p. 70-86.
- [19] Schwarz, S.P. and E.B. Blanchard, *Inflammatory bowel disease: A review of the psychological assessment and treatment literature*. Annals of Behavioral Medicine, 1990.
- [20] Gomez-Gil, E., et al., *[Relationship between patient's subjective stress perception and the course of inflammatory bowel disease]*. Gastroenterología y hepatología, 2002. **26**(7): p. 411-416.
- [21] Sajadinejad, M., et al., *Psychological issues in inflammatory bowel disease: an overview*. Gastroenterology research and practice, 2012. **2012**.
- [22] North, C.S., et al., *Do life events or depression exacerbate inflammatory bowel disease?: A prospective study*. Annals of internal Medicine, 1991. **114**(5): p. 381-386.
- [23] Kurina, L., et al., *Depression and anxiety in people with inflammatory bowel disease*. Journal of Epidemiology and Community Health, 2001. **55**(10): p. 716-720.
- [24] Graff, L.A., J.R. Walker, and C.N. Bernstein, *Depression and anxiety in inflammatory bowel disease: a review of comorbidity and management*. Inflammatory bowel diseases, 2009. **15**(7): p. 1105-1118.
- [25] Simrén, M., et al., *Quality of life in inflammatory bowel disease in remission: the impact of IBS-like symptoms and associated psychological factors*. The American journal of gastroenterology, 2002. **97**(2): p. 389-396.
- [26] Angelopoulos, N., et al., *Psychiatric factors in patients with ulcerative colitis according to disease activity*. The European journal of psychiatry, 1996. **10**(2): p. 87-99.
- [27] Leibig, T., E. Wilke, and H. Feiereis, *[Personality structure of patients with ulcerative colitis and Crohn disease, a psychological test study in disease remission]*. Zeitschrift für Psychosomatische Medizin und Psychoanalyse, 1984. **31**(4): p. 380-392.
- [28] Keltikangas-Järvinen, L., *'Psychosomatic personality'—A personality constellation or an illness-related reaction?* British journal of medical psychology, 1989. **62**(4): p. 325-331.
- [29] Matsui, T., et al., *[The long-term follow-up study of Japanese patients with ulcerative colitis]*. Nihon Shokakibyō Gakkai zasshi= The Japanese journal of gastro-enterology, 1993. **90**(2): p. 134-143.
- [30] Romberg-Camps, M., et al., *Influence of phenotype at diagnosis and of other potential prognostic factors on the course of inflammatory bowel disease*. The American journal of gastroenterology, 2009. **104**(2): p. 371-383.
- [31] Drossman, D.A., et al., *Health status and health care use in persons with inflammatory bowel disease*. Digestive diseases and sciences, 1991. **36**(12): p. 1746-1755.
- [32] Casellas, F., et al., *Factors affecting health related quality of life of patients with inflammatory bowel disease*. Quality of Life Research, 2002. **11**(8): p. 775-781.
- [33] Guthrie, E., et al., *Psychological disorder and severity of inflammatory bowel disease predict health-related quality of life in ulcerative colitis and Crohn's disease*. The American journal of gastroenterology, 2002. **97**(8): p. 1994-1999.
- [34] Han, S.W., et al., *Predictors of quality of life in ulcerative colitis. The importance of symptoms and illness representations*. Inflammatory bowel diseases, 2005. **11**(1): p. 24-34.