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Anxiety in close relationships is higher and self-esteem lower in patients with irritable bowel syndrome compared to patients with inflammatory bowel disease

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The authors declare that they have no competing interests.

Abstract

Background: Previous research has suggested an interaction between personality factors and inflammatory bowel disease (IBD) as well as irritable bowel syndrome (IBS). We therefore aimed to elucidate differences in psychological and coping functioning between patients with IBD and IBS, and to assess the relationship of disease activity with these functions. **Methods:** Seventy-four patients with IBD (mean age 43 ± 17 years, range 18-82 years) and 81 patients with IBS (mean age 37 ± 12 years, range 21-66 years) completed the questionnaires; Rosenberg Self-Esteem Scale, Toronto Alexithymia, Experiences in Close Relationships, and Sense of Coherence. Disease activity was evaluated either by the Harvey-Bradshaw index, the Simple Clinical Colitis Activity Index, or the Visual Analogue Scale for Irritable Bowel Syndrome. **Results:** The study revealed that patients with IBS had higher degree of anxiety in close relationships than patients with IBD ($p=0.003$), and lower self-esteem ($p=0.001$). No other statistical differences between the whole groups IBS and IBD or between subgroups were seen. **Conclusions:** The fact that patients with IBS seem to have higher levels of anxiety in relationships and lower self-esteem could influence the way the patient deal both with the disease and how the communication with health care professionals works out. A higher awareness of the importance of past negative life events should be taken into consideration. Whether the disease or the personal traits are the primary event should be addressed in future research.

Key words: Attachment in adult, attitude to health, IBD, IBS, physician-patient relationship, psychological illness behaviour, self-esteem

Introduction

There has been a debate whether the psychological profile may play a major role in the pathogenesis of the symptoms or not in inflammatory bowel diseases (IBD), i. e. Crohn's disease (CD) and ulcerative colitis (UC), and functional gastrointestinal disorders, i. e. irritable bowel syndrome (IBS) [1]. The underlying causes of IBD and IBS, as well as the prognosis for the patients, differ. However, some similarities between the diseases are at hand. The aetiologies of IBD and IBS are still unknown, but it seems that stressors, as life events and chronic stress, as well as the individual and genetic background of the person can modulate intestinal disease activity through complex psycho-immunologic mechanisms, both on a systemic and on a gut mucosal level [2, 3, 4]. The enteric nervous system (ENS) regulates the motility, exocrine- and endocrine functions and microcirculation of the gastrointestinal tract [5]. There is a rich interconnection between ENS and the central nervous system. Therefore, sensory and secretory functions, as well as gastrointestinal motility and perception of pain, can be affected by psychological and emotional stress directly or indirectly through this so-called brain-gut axis [6, 7]. Stress is a person's response to hostile environment, and the cardiovascular, neuroendocrine, immune- and gastrointestinal systems are the first systems to experience functional deviations [2].

In patients with IBD and IBS, stress has been reported to increase the disease activity [8, 9] and chronic sustained stressors are probably more important than acute stress events [10]. Changes in gastrointestinal inflammation may be mediated through changes in the hypothalamic-pituitary-adrenal axis function, alterations in bacterial-mucosal interactions, through mucosal mast cells or through mediators such as corticotropin-releasing factor [3, 11]. Similar associations can be seen in patients with IBS [11], where studies have shown higher levels of psychological stress and an increased number of mast cells in patients with

IBS compared to healthy volunteers [12, 13]. Anxiety and depression are stress-related disorders [2], and patients with IBD and IBS correspondingly show a high frequency of both [14, 15, 16]. However, differences between the groups have been seen. Patients with CD have higher frequencies of these illnesses than patients with UC, even in disease remission [17, 18, 19]. Even constipation-predominant IBS patients seem to be more psychologically distressed than diarrhoea-predominated IBS patients [20, 21]. Anxiety and depression have also been linked to a more severe disease manifestation in IBS [14, 15, 22, 23, 24], and to perception of poor quality of life [25, 26].

Alexithymia, one of several personality dimensions, is characterized by difficulty to identify, perceive, and express emotions, difficulty in distinguishing between feelings and the bodily sensations of emotional arousal, lack of fantasy and an externally orientated cognitive style [27]. Alexithymia is associated with low social support and poor responses to stress [28]. This personality dimension has shown to play a role in the perception of the symptoms of IBD and IBS, but has not been shown to be influenced by the level of disease activity in patients with IBD [29]. Another study has shown that frequency of bowel movements increased with anxiety, somatization and alexithymia [16].

Patients use different coping strategies to manage difficult events, illness, and other stressors, and these can have adaptive or maladaptive effects on health status. It seems that more severe IBD disease can be linked to the use of avoidant coping strategies, characterized by the effort to escape instead of having to deal with a stressor, and poor psychological adjustment.

Avoidant coping is directly related to increased self-blame, which in turn leads to poor adjustment [30], and patients with IBS have also reported higher levels of self-blame than patients with IBD [31]. There is a connection between depression and passive coping

strategies for patients with IBD and IBS [32], but there are differences within these groups. Patients with CD seem to have more immature defence mechanisms [33], and maladaptive coping strategies associated with decreased quality of life compared to patients with UC [25].

Even if IBD and IBS are gastrointestinal conditions showing similar symptoms, and the signs of these conditions often overlap [34], patients with IBS have a higher level of anxiety as a personality trait [35], and have a more dysfunctional attitude compared with IBD patients [36]. Health care providers also perceive the group of patients with IBS differently when handling them in clinical practice [37]. We therefore aimed to elucidate differences in psychological and coping functioning between patients with IBD and IBS, and to assess the relationship of disease activity with these functions.

Materials and methods

Subjects

To be included in the study, the participants should have IBD or IBS, be older than 18 years and be able to comprehend the Swedish language well enough to answer questionnaires. The patients were all treated at the Division of Gastroenterology at the Skåne University Hospital in Malmö, Sweden. All patients were given information, oral and written, in accordance with the Declaration of Helsinki, and they had to give written informed consent before inclusion. The Ethics Committee at Lund University approved the study (2010/386).

In patients with IBD, the diagnosis was based on established criteria, i.e. findings in endoscopy, histology, laboratory parameters, and/or clinical appearance. From September to

October 2010, 111 patients fulfilling the inclusion criteria were asked to participate. They were recruited either when visiting the out-care facility for a check-up, or when they were treated as in-patients at the hospital ward. The patients had the option to either complete the questionnaires at the clinic or to return them via mail in a pre-paid envelope. Patients who did not return the completed forms within three weeks of joining the study were reminded twice by phone. Patients who failed to send in the questionnaires within two weeks of receiving the second phone call were excluded from the study. Of the 111 patients that matched the inclusion criteria, 74 patients (49 with CD and 25 with UC) were finally included in the statistical analyses (Figure 1), 40 men and 34 women ranging from 18 to 82 years of age, mean age 43.2 ± 17.0 years (Table 1).

All patients with a confirmed diagnosis of IBS according to the Rome II or III criteria [1, 38, 39] who had visited the Division of Gastroenterology between January 2005 and December 2010 were invited to participate in the study. The patients were identified by searching for the ICD-10 classification of the specific codes for functional gastrointestinal disorders. A total of 417 patients were initially identified and all medical records were scrutinized. After studying the records, 265 patients remained who fulfilled the inclusion criteria. They were sent a letter with written information, informed consent and study questionnaires. Of these, 81 patients (11 men and 70 women) returned their questionnaires (Figure 1). Mean age was 37.5 ± 12.3 years, range 21-66 years. Forty-seven of the patients had mixed IBS, 21 diarrhoea-predominated IBS and 13 constipation-predominated IBS (Table 1).

Questionnaires

The test package used in this study is a composition of applicable questionnaires; Rosenberg Self-Esteem Scale (RSES), the Toronto Alexithymia Scale (TAS-20), the Experiences in Close Relationships (ECR-36), and the Sense of Coherence (SOC-13). These four

questionnaires correlate to each other, and illustrate different aspects of how a patient may relate to life. To the best of our knowledge, they have not been combined prior when comparing patients with IBD and IBS.

The Rosenberg Self-Esteem Scale

The RSES was developed to evaluate self-image. It is a commonly used scale when assessing global self-esteem [40], and the scale has been used world-wide [41]. It consists of 10 assertions (5 negative and 5 positive) related to overall feelings of self-worth or self-acceptance, and patients rate the level of agreement on a four-point Likert scale (1 strongly disagree to 4 strongly agree). Total scores range from 10 to 40 points, with a high score indicating a high level of self-esteem [42]. High self-esteem entails self-respect and a personal value for the individual. Contrary, having low self-esteem means that the person feels inadequate, unworthy, and has low self-respect [43]. The RSES has been shown to be a reliable and internally consistent test measurement [41, 44].

The Toronto Alexithymia Scale

The TAS-20 is a 20-item self-report questionnaire that measures the characteristics of alexithymia. All items are rated on a five-point Likert scale, ranging from 1 to 5. The total scores range from 20-100 points, with a higher score indicating a higher degree of alexithymia [45]. The TAS-20 is a reliable and validated instrument used for assessing alexithymia [45, 46, 47, 48]. The Swedish version of the TAS-20 was used [49, 50].

The Experiences in Close Relationships

Human beings are born with an attachment behaviour that motivates them to seek proximity attachment in times of need. Attachment in adults can be measured in terms of two independent attachment-related dimensions, anxiety and avoidance [51]. Anxiety reflects the

degree to which a person worries to being rejected or abandoned by their partners, or that the partner will not be available in times of need. Avoidance covers the extent to which a person distrusts the partner's good will and therefore strives to maintain independence and emotional distance, and to what degree the person is feeling comfortable with closeness and emotional intimacy [52]. The ECR has 36 statements describing the individual's typical feelings in close relationships and consists of the anxiety subscale and the avoidance subscale (18 items each). Each item is scored on a 7-point Likert scale from 1 (not at all) to 7 (very much), and higher scores indicating more anxiety and avoidance. Data on reliability and validity for the ECR in English are considerable [53]. Translation into Norwegian, back-translation into English and final correction of the Norwegian version was performed in accordance with standard procedures [54]. The Norwegian version has been validated and further translated into Swedish [55].

The Sense of Coherence

Sense of coherence (SOC) is a theoretical framework explaining a way to see the world that helps a person cope with stressful situations and events. Three components have been emerged: Comprehensibility (the ability to understand what happens), manageability (to what extent the person were able to manage the situation), and meaningfulness (the ability to find meaning in the situation) [56]. The concept SOC is proposed to explain successful coping with stressors. The higher score, the more successful coping and better health outcomes, and consequently, the person assumes to deal with stress better than persons which exhibit a low degree of SOC. In order to evaluate the patients' SOC, the Swedish version of Antonovsky's SOC-13 questionnaire was used [57]. The SOC-13 is a shortened version based on the original survey of 29 questions. Every item is scored on a Likert scale ranging from 1-7 points, thus the total score range from 13 to 90 points. The SOC-13 scale has been shown to be reliable, valid and cross-culturally applicable when evaluating how people manage stress

and stay healthy [56, 58], but tends to increase with age [58]. SOC is mostly higher among men than women [59].

Disease activity

To measure disease activity in CD patients, the Harvey-Bradshaw index (HBI) [60] was used over a period of three days. The scale contains five clinical parameters: general well-being (0 to 4 points), abdominal pain (0 to 3 points), number of liquid stools per day (1 p/each), abdominal mass (0 to 3 points) and extra intestinal complications (1 p/each). Since the study did not include a medical examination, the question about abdominal mass was excluded.

The Simple Clinical Colitis Activity Index (SCCAI) [61] was used to evaluate exacerbations in UC patients. The scale measures the activity of the disease over the last three days and consist of six items: Bowel frequency during daytime (0 to 3 points) and night time (0 to 2 points), urgency of defecation (0 to 3 points), blood in stool (0 to 3 points), general well-being (0 to 4 points) and extra colonic manifestations (1p/each).

For patients with IBS, 6 items concerning physical symptoms in the Visual Analogue Scale for Irritable Bowel Syndrome (VAS-IBS) was used: Abdominal pain, diarrhoea, constipation, bloating and flatulence, vomiting and nausea, and the intestinal symptoms' influence on daily life. [62]. The patients' estimated their concerns on a visual analogue scale (VAS) from 0 - 100 mm where 0 represents very severe problems and 100 represents absence of problems. This questionnaire has formerly been developed and psychometrically tested for patients with gastrointestinal symptoms without organic reasons, but has also been used on other patients with gastrointestinal symptoms [62, 63].

Statistical analyses

First, the distribution was tested using a one-sample Smirnov-Kolmogorov test. The data from the sub-scale for avoidance in the ECR-36 and the RSES did not follow the Gaussian distribution norm, why the non-parametric statistical Spearman's rank correlation test and Mann Whitney U test were chosen for these calculations. Pearson's correlation test and Student t test were used for calculations on anxiety, TAS and SOC-13. Subgroup analyses for IBS were performed by Kruskal-Wallis test or Anova test. The IBS patient group was younger than the IBD group, and male patients were more frequent in IBD than in IBS. As SOC-13 was associated to gender, and the subscale anxiety in the ECR-36 was negatively, and SOC-13 and RSES were positively correlated to age, multiple logistic regression was used to calculate for an association with patient group (dependent variable). Independent variables were respective test (sub-scale anxiety in the ECR-36, TAS-20 or SOC-13), gender (female/male) and age (years). Variables for all four tests were then age-standardized using a linear regression model into which age was added as a covariate and the variables were expressed as z-scores. Differences between patient groups were performed on the z-scores. Correlation tests were used to examine whether disease activity correlated to personality traits. Values are given as median (interquartile range (IQR)), mean \pm standard deviation (SD) or odds ratio (OR) and 95% confidence interval (CI). A difference was considered statistically significant if $p \leq 0.05$. The analysis were performed in the Statistical Package for the Social Sciences, SPSS® version 18.0 software (SPSS Inc., Chicago, Illinois, USA).

Results

Patients with IBD (n=74) were older than the patients with IBS (n=81) ($p=0.014$), and the majority of the IBD patients were male (49/74), whereas the majority of IBS patients were female (70/81). However, there were no differences seen between the two groups of patients

regarding educational degree or employment (data not shown). When correlating disease activity with the RSES, TAS-20, ECR-36, and the SOC-13, there were no statistical significant correlations between HBI and the four questions among patients with CD, or between SCCAI and the four questionnaires among patients with UC (data not shown). In the IBS group, a correlation between the item vomiting/nausea in the VAS-IBS and the RSES ($r_s=0.234$, $p=0.035$), and SOC-13 ($r_s=0.360$, $p=0.001$) were found. However, there was not any correlation between vomiting and age ($r_s=0.108$, $p=0.337$) or gender ($p=0.795$).

Absolute values and z-scores for RSES, TAS-20, ECR-36 and SOC-13 can be seen in table 1. There were no statistical differences in the scores between subgroups (data not shown), why only calculations between the whole groups IBD and IBS are described. The scores in SOC-13 and TAS-20 were higher in the IBS group, but no statistical significant differences were seen when adjusted for gender and age (SOC-13 OR=0.967, 95% CI=0.952-1.002, $p=0.069$, TAS-20 OR=1.025, 95% CI=0.993-1.057, $p=0.123$).

The only differences between the IBD- and the IBS patient groups were seen in the ECR-36, and the RSES (self-esteem). When comparing the scores for the subscale anxiety in the ECR-36 between the IBD and IBS patients, patients with IBS seemed to have more anxiety in close relationships than IBD patients when adjusted for gender and age (OR=1.027, 95% CI=1.006-1.049, $p=0.011$). When comparing z-scores, the IBD patients scored -0.259 ± 1.047 , compared to IBS patients 0.223 ± 0.898 , $p=0.003$. The subscale avoidance did not differ between these patient groups (data not shown). The z-score in the RSES was lower among the IBS patients compared to the IBD patients ($0.657(-0.024-1.136)$ and $0.991(0.475-1.352)$, respectively, $p=0.001$).

Discussion

The layout of the study is unique in comparison to previous research done on the connection between IBD, IBS and psychological factors. The used psychological test battery is a composition of appropriate questionnaires that have not been combined prior to this study. Patients with IBS have earlier reported more anxiety in general and higher levels of stress, than patients with IBD [35, 64]. This study showed that patients with IBS also have more anxiety, specific in close relationships, as well as lower self-esteem. Character and well-being are believed to play a determinate role in decision-making, and choosing to be involved in a study is no exception. When conducting research one should remember that participant's character might be skew. However, the patients with IBS have all been referred from primary care, so one may assume that the most difficult patients to treat are included in this study [65, 66]. The question remains whether the anxiety and self-esteem among the patients in our study are present prior to symptom development, or secondary. Attachment and social learning behaviour grounds early in childhood, and childhood stress can contribute to the symptoms of IBS [67]. This strengthens the hypothesis around the connection between the mind and the body, where biological, psychological, and social factors all contribute to symptom generation and affect the clinical outcome of IBS [39, 68]. Other studies have shown that patients with IBS to a higher extent have a history of sexual, physical and childhood abuse than patients with IBD [31, 69, 70, 71], as well as social stress caused by, for example marital separation or death of a close relative [72]. These aspects have not been investigated in our study, although such incidents might be explanations in general to why patients with IBS perceive anxiety in close relations, and have bad self-esteem.

Patients with IBS often hide their symptoms from others, and only occasionally talk with their family about their IBS-related symptoms [73]. In our society, gastrointestinal problems are a

taboo subject, and maybe patients with IBS feel shame due to the uncontrollability of their symptoms, especially since IBS is not an organic disease contrary to IBD. Instead, the patients with IBS may search for support and understanding among health care professionals.

Inflammatory bowel diseases are considered as primary organic diseases in which the role of psychological and stress factors is secondary to the disease itself, whereas IBS - in the absence of an identifiable organic cause - is regarded to be more in the 'mind' than in the body of the patient [39, 68]. Patients with IBS have a more help-seeking behaviour than patients with IBD in general, and put themselves sometimes in a destructive or hostile doctor-patient relationship, in which doctors may begin to consider them as “difficult” and be less likely to offer support [71]. Patients with IBS may experience their symptoms worse than what health care professionals consider reasonable from a pure medical point of view. We have recently shown that IBS patients experience their symptoms as severe as dysmotility patients that are dependent on nutritional support and opioid analgesics [63]. However, these findings could be the result of selection bias, since anxious IBS patients with severe symptoms in high extent are referred to gastroenterology clinics [65, 66]. Patients with IBS treated in primary care in general have lower prevalence rates of psychiatric disorders and distress than patients with IBS in hospital gastroenterology clinics [38, 74]. An anxious attitude and life-stress in combination with physical symptoms have powerful influences on the course of the disorder, and may affect the patients' approach to their environment [10]. Nevertheless, IBS patients have been shown to perceive that health care providers exhibit more stigmatizing attitudes toward them, compared to IBD patients [75]. The reason to this may be the functional nature, and lack of organic changes and consistent medical treatments in IBS [76, 77]. These factors, stigmatizing attitudes and the functional nature of the disease, may contribute to the unwillingness for IBS patients to talk with their family about their symptoms [73], and may also influence their self-esteem. Not to be taken seriously, undermines a person's self-esteem

[43]. The RSES is used worldwide, and self-esteem is shown to correlate to neuroticism, extraversion and romantic attachment styles [41]. Taken together, our results of both low self-esteem and high anxiety in relationships in the same patient group are not surprising, and the two psychological functions probably reinforce one another.

Other factors to consider when discussing anxiety and self-esteem in relation to the environment are personality characteristics [78], and coping strategies [79]. However, a comprehensive personality assessment was not performed, and the only assessed dimension was alexithymia. In the present study, no difference in alexithymia between the IBS- group and IBD group was found, and the scores were overall low. However, compared to controls, the frequencies of alexithymia seems to be consistently higher both among patients with IBD and IBS in other studies [16, 29, 49]. The patients in our study were older, but personality characters are considered stable in adulthood [80, 81, 82]. Coping strategies are used to manage conflicts and illness, but not one coping strategy has been proven effective for all patients with IBD or IBS, [79]. In our study, there was no difference between the patient groups according to coping strategies, which is in line with another study [83].

The fact that we did not find any statistical differences more than in two aspects (more anxiety and lower self-esteem) between patients with IBD and IBS could be due to a lack of statistical power linked to the small sample size. On the other hand, since the differences found were highly significant and in line with previous studies on personality traits in IBS, it is probable that these observations are really true. Taken together, the observed cognitive differences between patients with IBD and IBS are essential for health care professionals to know about. The findings in this study emphasize that patients with IBS are feeling more unsecure in closeness with other persons, but further research is needed, and ideas how

patients with IBS can be supported to avoid the sometimes counterproductive doctor-patient relation is desirable.

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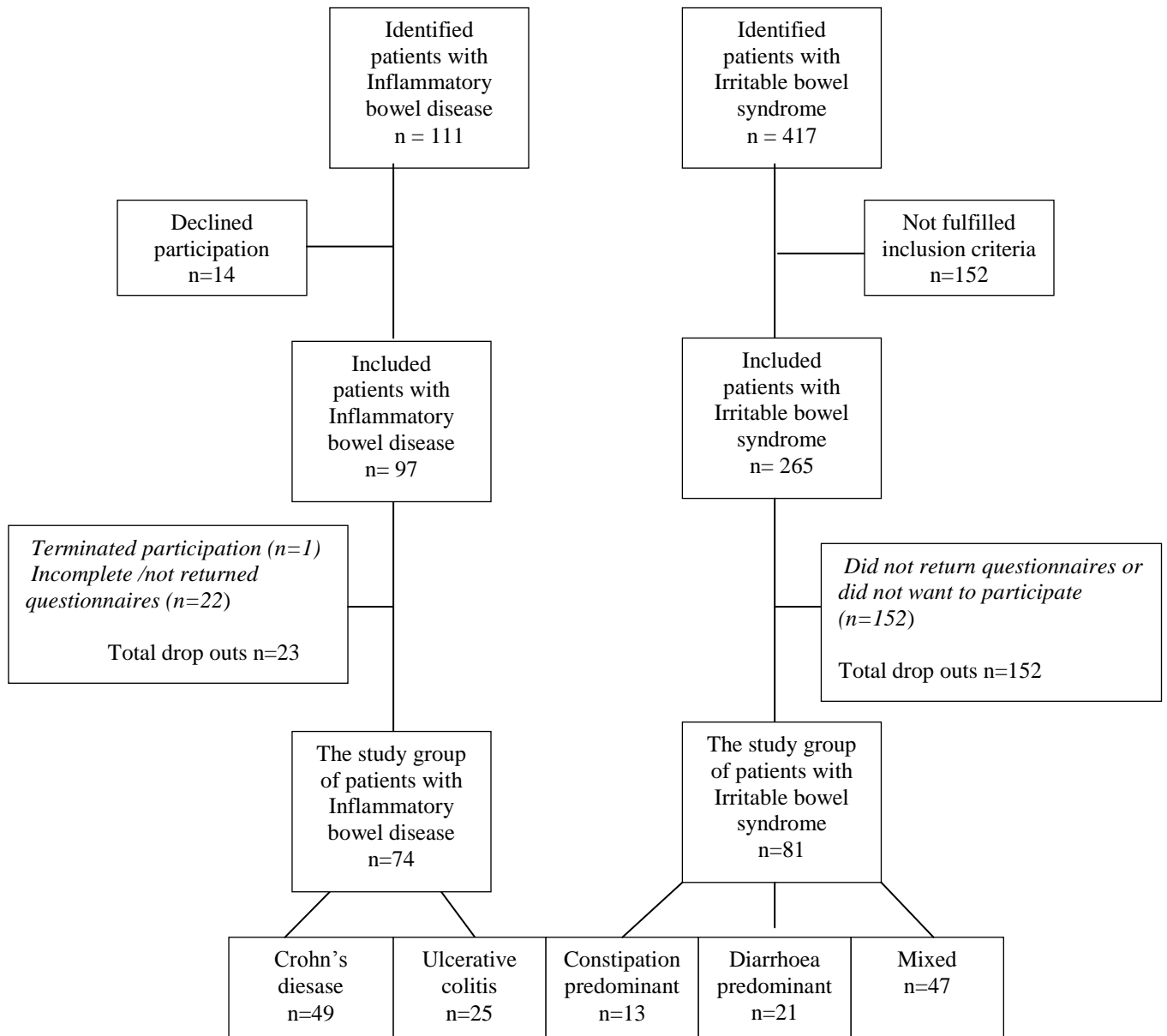


Figure 1 Patient enrolment

Table 1 Demographics and scores from the Rosenberg Self-Esteem Scale (RSES), the Toronto Alexithymia Scale (TAS-20), the Experiences in Close Relationships (ECR-36), and the Sense of Coherence (SOC-13) in patients with Inflammatory bowel diseases (IBD) and Irritable bowel syndrome (IBS). Z-scores and absolute scores (median and interquartile ranges) are given.

	Inflammatory bowel disease (IBD) n=74	Crohn's disease (CD) n=49	Ulcerative colitis (UC) n=24	Irritable bowel syndrome (IBS) n=81	Constipation- predominant (C-IBS) n=13	Diarrhoea- predominant (D-IBS) n=21	Mixed (M-IBS) n=47
Sex							
Women	34	26	7	70	12	20	37
Men	40	23	17	11	1	1	9
Age							
Mean±SD	43.2±17.0	44.1±17.6	41.7±16.3	37.5±12.3	34.9±10.5	33.5±10.5	40.0±13.1
Range	18-82	18-82	18-77	21-66	21-53	21-60	21-66
Rosenberg Self-Esteem Scale (RSES)							
Z-score	0.99 (0.47-1.35)	1.00 (0.35-1.35)	0.99 (0.51-1.38)	0.66 (-0.02-1.13)**	0.40 (-0.12-1.17)	0.53 (-0.23-0.99)	0.76 (0.14-1.13)
Absolute score	33 (28-37)	34 (28-38)	33 (29-37)	30 (24-36)	29 (24-36)	30 (22-34)	30 (26-36)
Toronto Alexithymia Scale (TAS-20)							
Z-score	38.56 (30.06-46.06)	37.06 (29.06-47.06)	38.56 (30.56-44.06)	40.06 (32.56-49.56)	46.06 (35.06-56.56)	37.06 (29.56-42.56)	42.06 (36.06-50.06)
Absolute score	42 (34-50)	41 (33-51)	42 (34-48)	44 (36-54)	50 (39-60)	41 (34-46)	46 (40-54)
Experiences in Close Relationships (ECR-36)							
Anxiety subscale – Z-score	-0.42 (-0.90-0.22)	-0.47 (-0.93-0.31)	-0.41 (-0.98-0.09)	0.04 (-0.43-0.98)*	0.56 (-0.87-1.23)	-0.13 (-0.76-0.65)	0.08 (-0.30-0.98)
Absolute score	46 (35-57)	44 (34-57)	47 (37-57)	57 (46-74)	68 (41-79)	54 (43-70)	57 (47-73)
Avoidance subscale – Z-score	-0.01 (-0.83-1.00)	-0.05 (-0.81-0.62)	0.32 (-0.82-1.36)	-0.33 (-0.61-0.34)	-0.45 (-0.64-0.24)	-0.38 (-0.78-0.00)	-0.22 (-0.48-0.65)
Absolute score	50 (35-68)	49 (36-62)	55 (36-75)	45 (40-58)	68 (41-79)	54 (43-70)	46 (42-64)
Sense of coherence (SOC-13)							
Z-score	0.40 (-0.49-0.90)	0.33 (-0.49-0.95)	0.44 (-0.30-0.83)	-0.13 (-0.96-0.64)	-0.38 (-1.14-0.26)	-0.18 (-0.66-0.71)	0.10 (-1.07-0.07)
Absolute score	69 (58-78)	71 (58-78)	68 (60-77)	60 (47-72)	57 (46-63)	60 (50-70)	62 (47-73)

Comparisons were made between the groups IBS and IBD. Mann Whitney U test (RSES) and Student t test (anxiety). *= $p<0.01$, **= $p<0.001$

