Observational Study

Medicine

OPEN

A survey on the impact of IBD in sexual health
Into intimacy

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Abstract

Patients with Inflammatory Bowel Disease (IBD) are at increased risk of psychological and physical burden, including sexual dysfunction (SD). This study aimed to assess the prevalence of SD and to identify its predictive factors, in IBD patients. This unicentric cross-sectional case-control survey (ratio 2:1) included patients followed at the day hospital IBD consultation, in the Gastroenterology department of a tertiary referral center, for 2 years. Participants received anonymous questionnaires, concerning basic characteristics and sexual function, and a questionnaire on anxiety and depression, body image, fatigue, and IBD-specific health-related quality of life (QoL). We analyzed data from 120 IBD patients and 60 healthy controls. Forty-two female (56.8%) and 6 male (14.6%) IBD patients, and 6 women (15%) and 2 males (10%) of the control group presented SD. SD was significantly higher in IBD patients with age between 18 and 30 and 51 and 60 than in healthy controls ($P < .05$) Regarding multivariate analysis, age was a predictive factor for SD in males ($P = .014$), and anxiety and depression ($P = .002$) and fatigue ($P = .043$) in females. SD is a predictor of lower QoL among IBD patients, considering the last 15 ($P < .001$) and 60 days ($P = .001$), regarding univariate analysis. SD ($P = .007$), body image distortion ($P < .001$), and fatigue ($P = .004$) were predictors of low QoL (last 15 days, multivariate analysis). SD was more prevalent in IBD patients than in the control group and impacted negatively the QoL of patients. Age was a predictive factor for SD in men while anxiety and depression, and fatigue were predictive of SD in women.

Abbreviations: BI = body image, CD = Crohn´s disease, HADS = hospital anxiety depression scale, IBD = inflammatory bowel disease, IBDQ = inflammatory bowel disease questionnaire, QoL = quality of life, SD = sexual dysfunction, UC = ulcerative colitis.

Keywords: inflammatory bowel disease, sexual disfunction, sexual life

1. Introduction

Inflammatory bowel diseases (IBD), including Crohn´s disease (CD) and ulcerative colitis (UC), are chronic, progressive, and disabling disorders. IBD may occur from early childhood to late adulthood, although the peak age for CD occurrence is at 20 to 30 years and for UC is at 30 to 40 years.[1] These disorders are characterized by a relapsing course unpredictable flares, hospitalizations, need for surgery, and impairment of the quality of life (QoL) of patients.[1,2]

In this context, patients with IBD are at an increased risk of psychological burden. Conditions like anxiety and/or depression are more prevalent in IBD patients than in healthy individuals.[3] Chronic fatigue, defined as substantial fatigue for more than 6 months, has been reported in 29% of CD and 11% of UC patients.[4] IBD research has also concluded that body image can be impaired in IBD patients, raising concerns regarding their psychological stability, and social and sexual life.[5,6]

In the last decades, with the development of new therapies, strategies and targets, the management of IBD has undergone major advances. QoL and patients´ related outcomes are now of utmost importance from the patient's perspective.[7,8] In IBD, the most used disease-specific QoL questionnaires directed to patients are the Inflammatory Bowel Disease Questionnaire-32 (IBDQ-32) and its short version, the short Inflammatory Bowel Disease Questionnaire. Even though these questionnaires comprise several life areas, they do not fully address aspects related to sexuality, which is an essential topic to evaluate the overall health and well-being of individuals.[9,10]

Sexual dysfunction (SD) is defined as a sexual problem that is persistent or recurring, causing marked personal distress or interpersonal difficulties.[11] In women, SD can be associated to lack of desire, impaired arousal, inability to orgasm, dyspareunia or a combination of all.[11] The most common problems described by men are related to decreased libido, erectile dysfunction, and abnormal ejaculation.[11]

Previous studies showed that SD is more prevalent in IBD patients than in general population,[12–14] with 1 to 2 thirds of patients reporting SD related to IBD diagnosis.[6,13,15] To access the magnitude of SD in the context of IBD, this study evaluated the prevalence of SD and the respective predictive factors in IBD patients, in comparison to healthy controls. Our study

Paula Ministro received consulting fees and support to travel to meetings from the following companies: Abbvie, Falk Pharma, Ferring, Pfizer, Takeda, Janssen.

The authors have no funding and conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Supplemental Digital Content is available for this article.

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How to cite this article: Pires F, Martins D, Ministro P. A survey on the impact of IBD in sexual health: Into intimacy. Medicine 2022;101:52(e32279).

Received: 19 April 2022 / Received in final form: 19 November 2022 / Accepted: 23 November 2022

http://dx.doi.org/10.1097/MD.0000000000032279

was based on the collection of precise data on disease activity and phenotype, past and current interventions, and on the use of validated instruments to measure sexual function and psychological burden.

2. Materials and Methods

2.1. Study population

This study was conducted in the scope of the day hospital IBD consultation, in the Gastroenterology department of a tertiary referral center (Centro Hospitalar Tondela-Viseu), in Portugal.

Between 2017 and 2018, 141 patients, followed at the consultation, were invited to participate by direct contact. The inclusion criteria were age between 18 and 65 years and diagnosis of UC or CD, at least 1 year before the study. A control group of healthy men and women (health professionals) was also invited to participate. The controls should be between 18 and 65 years old and should not present any bowel pathology, like IBD or irritable bowel syndrome. Exclusion criteria, for both patients and controls, were pregnancy and lactation.

2.2. Study design

This study was implemented between 2017 and 2018 and consisted of an unicentric cross-sectional case-control survey (ratio 2:1). All patients and controls received written information about study aims and characteristics. Participants were given anonymous questionnaires to fill and were numbered consecutively, according to the group (patients or controls), to guarantee privacy. Only the medical researchers could access the questionnaires to evaluate specific participants characteristics.

If the questionnaire contained less than 75% of the answers, it was not included for evaluation.

2.3. Instruments

The adopted questionnaires were selected according to their pertinence, after previous validation on the Portuguese population. Men and women of both groups (patients and controls) were given distinct questionnaires. Both groups received questionnaires about basic characteristics and sexual function. IBD patients received also a questionnaire about anxiety and depression, body image (BI), fatigue, and IBD-specific QoL.

2.3..1. Participants' characteristics. This questionnaire was the first to be filled out by the participants and demanded the guidance of researchers. It included basic demographic questions (gender and age), co-morbidities (smoking habits, diabetes mellitus, arterial hypertension, anxiety, depression, or other relevant co-morbidities), and current medication with beta-blockers, antidepressants, or anxiolytics. This questionnaire included also queries for disease characterization: type of disease (UC, CD or IBD unclassified) according to Montreal classification, clinical activity according to Harvey-Bradshaw index for CD (scores > 4) and clinical Mayo score for UC (scores > 1), current medication (mesalamine, corticosteroids, immunosuppressive and biological therapeutics), abdominal and perianal surgery background (with or without ostomy), and biochemical activity (hemoglobin, leukocytes, erythrocyte sedimentation rate, C-reactive protein, iron studies, fecal calprotectin, and biologic drug concentrations and drug antibodies).

2.3..2. Sexual function. Sexual function was assessed by the International Index of Erectile Function in males[16] and with the Female Sexual Function Index in women.[17]

International index of erectile function is a validated 15-item instrument to evaluate male sexual function over the past 4 weeks; each item is scored on a 5 or 6-point Likert scale. It comprises 5 domains (erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction) categorized as: no dysfunction, mild, mild-to-moderate, moderate or severe dysfunction, on the basis of the obtained score. Scores for each domain are variable and the total score ranges from 5 to 75, with higher scores indicating better sexual function. The Portuguese version of this instrument was validated by Pechorro et al[18] As in other studies,[14,19] a total score with the value of more than 1 standard deviation below the mean of a normal group (as reported by Rosen et al[16]) was considered SD (total score less than 42.9).

Female sexual function index is a validated instrument that includes 19 items evaluating female sexual function over the past 4 weeks; each item is scored on a 5 or 6-point Likert scale. It consists of 6 domains (desire, arousal, lubrication, orgasm, satisfaction and pain) and each domain has a maximal score of 6, with the total score to ranging from 2 to 36 points; higher scores indicate better sexual function. The Portuguese version of this instrument was validated by Pechorro et al[20] As in other studies,[14,21] a total score of more than 1 standard deviation below the mean of a normal population (as reported by Rosen et al[14]) was considered to be representative of SD (total score less than 26.55).[17]

2.3..3. Anxiety and depression. Anxiety and depression were evaluated using the 14-item Hospital Anxiety Depression Scale (HADS).[22] HADS consists of 2 subscales (anxiety and depression) with 7 items each, in a total of 14 items. Each item has a 4-point (0–3) Likert type scale, with a total between 0 and 21 for each subscale, and between 0 and 42 for the combined scales (HADS-total). Higher scores indicate greater anxiety and/or depression. A score of 8 or above, on each subscale, indicates the presence of clinical depression or anxiety, according to the used subscale.[23] The Portuguese version of this scale was validated by Pais-Ribeiro et al[24] Although the instrument was created with the objective of evaluating each subscale in separate, the authors (Zigmond and Snaith, 1994) refer that a total score (HADS-total) can be used as a clinical indicator, as long as it is analyzed as an index of emotional disturbance or distress.[25] In this study, we used the cut off value of "greater than or equal to 16" as a measure of general distress; this cut off value was used by López et al[26] and, according to and Miljanović et al,[27] was the value recommended by the original authors (Zigmond and Snaith, 1983).[22]

2.3..4. Body image. The body image scale was applied to evaluate the affective, behavioral, and cognitive dimensions of BI. It is a validated 10-item instrument that uses a 4-point response scale (0 - "not at all" to 3 - "very much"); the final score is the sum of the 10 items, ranging from 0 to 30. Higher scores indicate increased levels of body image-related distress or more body image concerns. The Portuguese version of this scale was validated by Moreira et al.[28]

2.3..5. Fatigue. Fatigue was evaluated through the modified fatigue impact scale. The Portuguese version of this scale was validated in multiple sclerosis.[29] In this study, we adapted the scale for a population of IBD patients.

Modified fatigue impact scale consists of 21 items divided in 3 domains: physical (10 items), cognitive (9 items) and psychosocial (2 items). In the Portuguese adapted version,[29] the scale was restructured and comprises cognitive (11 items) and physical (10 items) domains. Each item is scored from 0 to 4 points, in a total of 84 points. Values lower than 38 reveal absence of fatigue, while values equal to or higher to 38 are indicative of fatigue.[30]

2.3..6. IBD-specific health-related quality of life. To assess the quality of life of IBD patients we used the IBDQ-32. It consists of 32 questions that assess different aspects of QoL related to the previous 15 days, grouped in 4 domains: symptoms

directly related to the primary bowel disturbance, systemic symptoms, and emotional and social function. The original score is obtained according to a Likert scale from 1 to 7 (with 1 corresponding to the worst state of health and 7 to the best state of health). The scores obtained in each domain are added to obtain the patient's global score. A higher score corresponds to better general well-being.[9] The Portuguese version of this questionnaire was validated by Veríssimo (2008).[31] We used a simplified scale with 4 response hypothesis (keeping 1 as the worst, and 4 as the best health status) and evaluated also the QoL related to the previous 60 days.[32]

2.4. Statistical analysis

The statistical analysis was performed using IBM® SPSS®version 23 (SPSS, Inc., Chicago, IL).

Categorical variables are presented as frequencies and percentages, and continuous variables are presented as means and standard deviations, or medians and interquartile ranges for variables with skewed distributions. Normal distribution was checked using Shapiro–Wilk test or skewness and kurtosis. Categorical variables were compared with the used of Fisher´s exact test or the chi-square test, as appropriate.

Differences among the study population were evaluated with the use of Student´s *t* test, Mann–Whitney *U* test or Kruskal–Wallis test, and analysis of variance model, followed by the Tukey-Kramer test, when findings with the analysis of variance model were significant.

Fatigue, anxiety and depression, BI distortion, and SD were analyzed in the overall population and also separately for men and women, in both patient and control groups.

We used simple and multiple linear and logistic regression to identify the variables that contribute to the variability of SD.

Linear regression was used to characterize the relationship between the different domains of female and male sexual function and fatigue, anxiety and depression, body image distortion, clinical activity, and fecal calprotectin. Linear regression was also used to identify the variables that may influence the quality of life of IBD patients (IBDQ-15 and 60).

All reported *P* values are 2-tailed, with a *P* value < .05 indicating statistical significance.

2.5. Ethical considerations

The study was approved by the local ethics committee.

In accordance with the Declaration of Helsinki, written informed consent was obtained after explaining the procedures to each participant. Eighty-five percent of the invited patients gave their consent to participate (n = 120). The participants were able to leave the research at any time without any consequences, and the individuals who decided not to participate received the same treatment offered to participants.

The method of data collection allowed that the integration of the information (characteristics of the population and clinical activity) in the evaluation while assuring data confidentiality.

3. Results

3.1. Study population

A total of 141 IBD patients were invited to participate and 120 (85%) agreed to participate. We analyzed data from 120 IBD patients and 60 health controls. The rate of completeness of inquiries was 95.3% (686/720) (Supplementary Table 1, http://links.lww.com/MD/I120).

Table 1 presents the characteristics of overall study population and also includes data for the female and male subgroups. Most patients were women (63.3%), with a mean age of 41.9 years; 60.8% of patients were diagnosed with CD, 27.5% with UC, and 11.7% had IBD unclassified. Fifteen IBD patients presented comorbidities; 8 women and 7 men. Forty-seven patients (39.2%) had clinical activity, as defined previously. Sixty-four patients (53.3%) presented fecal calprotectin higher than 50 µg/kg. Regarding treatment, 40.0% of the patients were on immunosuppressants and 48.3% were treated with biologics. IBD related surgery was performed in 31.7% of IBD patients; 23 patients were submitted to abdominal surgery (9 men vs 14 women) and 18 to perianal surgery (12 men vs 6 women). Four patients (3.3%) had an ostomy during the time of the study and 5 patients (4.2%) had 1 in the past.

There was a statistically significant difference between the mean age of the 2 groups [t = 2.105, *P* = .037], with IBD patients having a higher mean age than the control group.

There was no association between the sample (i.e., patients or controls) and gender and smoking ($X^2 = 0.194$, *P* = .660; $X^2 = 0.040$; *P* = .841, respectively) (Supplementary Table 2, http://links.lww.com/MD/I121). There was an association between having IBD and the presence of comorbidities ($X^2 = 4.175$, *P* = .041).

In our IBD cohort, 40.7% of IBD patients reported fatigue (38.9% CD and 51.5% UC). In detail, fatigue was reported by 47.8% of patients with active disease and by 37.5% of patients in clinical remission. Also, we found that patients with depression and anxiety had higher fatigue levels than patients without these disorder (78.0% vs 20.8%). The differences between the 2 groups regarding age, gender, CD or UC clinical activity, and previous surgery (perianal or abdominal) were not statistically significant.

Concerning BI, 26.5% of our IBD patients reported a BI index score higher than 10, without statistically differences between age, gender, CD or UC, clinical activity, and previous surgery (perianal or abdominal). BI was not associated with SD (Table 2).

Anxiety and depression were present in 34.5% of patients, with statistically significant differences between age groups (*P* = .042), but not between gender, IBD type, clinical activity, and previous surgery (perianal or abdominal) (Table 2). The mean values of HADS scores by age are shown in Supplementary Table 3, http://links.lww.com/MD/I122.

3.2. Sexual dysfunction

Forty-two IBD female patients (56.8%) and 6 IBD males (14.6%), and 6 women (15%) and 2 males (10%) in the control group presented SD (Table 3).

Comparing with controls, IBD patients presented an OR = 4.66 (CI: 2.03–10.70) (*P* < .001). Women presented an OR = 7.66 (CI: 2.87–20.41) in IBD population and OR = 1.59 (CI:.29–8.69) in control population, when compared with men.

SD was significantly higher in IBD patients with age between18 to 30 and 51 to 60, than in healthy controls (*P* < .05) (Table 3).

3.3. Predictive factors of sexual dysfunction

In the univariate analysis, age (OR = 1.097, *P* = .019) and fatigue (OR = 1.059, *P* = .045) were predictive factors for male SD; only age (OR = 1.135, *P* = .014) persisted as predictive factor in the multivariate analysis (Table 4).

Regarding the female population, age (OR = 1.047, *P* = .035), fatigue (OR = 1.071, *P* < .001), and anxiety and depression (OR = 1.251, *P* < .001) were predictive factors in the univariate analysis, but only anxiety and depression (OR = 1.226, *P* = .002) and fatigue (OR = 1.048, *P* = .043) were confirmed as predictive factors in the multivariate analysis (Table 4). Comorbidities, type of disease, perianal disease, previous surgeries, and clinical active disease were not significant predictors of SD (Table 5).

Table 1

Characterization of the study population.

	Patients (n = 120)	Females (n = 76)	Males (n = 44)
Gender, n (%)			
Female	76 (63.3%)	-	-
Male	44 (36.7%)	-	-
Age, in yrs (mean ± SD)	41.1 ± 13.0	41.9 ± 13.1	39.5 ± 12.8
Comorbidities (AHT, DM, n (%)	15 (12.5%)	8 (10.7%)	7 (16.3%)
Smokers, n (%)	19 (15.8%)	12 (15.8%)	7 (15.9%)
Crohn's disease, n (%)	73 (60.8%)	41 (53.9%)	32 (72.7%)
Montreal, n (%)			
A1	2 (3.0%)	2 (5.7%)	-
A2	59 (89.4%)	33 (94.3%)	26 (83.9%)
A3	5 (7.6%)	-	5 (16.1%)
L1	36 (50.7%)	17 (43.6%)	19 (59.4%)
L2	9 (12.7%)	7 (17.9%)	2 (6.3%)
L3	26 (36.6%)	15 (38.5%)	11 (34.4%)
L4	2 (2.7%)	-	2 (4.5%)
B1	29 (42.6%	16 (44.4%)	13 (40.6%)
B2	22 (32.4%)	12 (33.3%)	10 (31.3%)
B3	17 (25.0%)	8 (22.2%)	9 (28.1%)
Perianal	20 (27.4%)	8 (10.5%)	12 (27.3%)
Ulcerative colitis, n (%)	33 (27.5%)	24 (31.6%)	9 (20.5%)
Montreal, n (%)			
E1	7 (22.6%)	6 (27.3%)	1 (11.1%)
E2	10 (32.3%)	7 (31.8%)	3 (33.3%)
E3	14 (45.2%)	9 (40.9%)	5 (55.6%)
IBD unclassified, n (%)	14 (11.7%)	11 (14.5%)	3 (6.8%)
Treatment, n (%)			
Immunomodulator	48 (40.0%)	31 (40.8%)	17 (39.5%)
Biologic	58 (48.3%)	35 (46.1%)	23 (53.5%)
Previous surgery, n (%)			
Abdominal	23 (19.2%)	14 (18.4%)	9 (20.5%)
Perianal	18 (15.0%)	6 (7.9%)	12 (27.3%)
Ostomy (present and past)	9 (7.5%)	5 (6.5%)	4 (9.1%)
Clinical activity (HBI > 4, CMS > 1)	47 (45.6%)	25 (39.7%)	22 (55.0%)
Hemoglobin, in g/dL (median ± IQR)	13.9 ± 1.5	13.1 ± 1.3	14.5 ± 1.5
Leukocytes, in value/μL (median ± IQR)	6.7 ± 2.8	6.8 ± 2.3	7.7 ± 2.0
Sedimentation rate, in mm/h (median ± IQR)	8 ± 10	11.7 ± 10.1	10.7 ± 22.7
CRP, in mg/dL (median ± IQR)	0.27 ± 0.69	0.66 ± 1.1	1.1 ± 1.9
Ferritin, in ng/mL (median ± IQR)	62 ± 80	72.7 ± 80.9	110.1 ± 122.8
Fecal calprotectin, in μg/kg (median ± IQR)	161 ± 773	374.5 ± 881.9	1096.8 ± 1520.6
Controls (n = 60)			
Gender, n (%)			
Female	40 (66.7%)		
Male	20 (33.3%)		
Age, in yrs (mean ± SD)	36.8 ± 10.6	38.1 ± 11.2	34.3 ± 9.0
Comorbidities (AHT, DM), n (%)	1 (1.7%)	1 (2.5%)	-
Smokers, n (%)	8 (13.3%)	6 (15.0%)	2 (10.0%)

AHT = arterial hypertension, CMS = clinical mayo score, DM = diabetes mellitus, HBI = Harvey-Bradshaw index, IQR = interquartile rate, SD = standard deviation.

Male patients reported that anxiety and depression, and fatigue affected all domains of sexual function (erectile function, orgasmic function, sexual desire, intercourse satisfaction and overall satisfaction); clinical activity negatively impacted erectile function (Table 6). Anxiety and depression, and fatigue affected all the domains of female SD (desire, arousal, lubrification, orgasm, satisfaction, and pain); BI distortion correlated negatively with satisfaction and pain. Disease clinical activity and fecal calprotectin did not impact any domain of sexual function (Table 6).

SD is a predictor of lower QoL among IBD patients considering the last 15 (B = 0.303, $P < .001$) and 60 days (B = 0.268, $P = .001$), regarding univariate analysis. Anxiety and depression (B = –1.197, $P < .001$, B = –1.225, $P < .001$), BI distortion (B = –1.631, $P < .001$, B = –1.603, $P < .001$), and fatigue (B = –0.593, $P < .001$, B = –0.598, $P < .001$) showed to be predictors of lower QoL among IBD patients, according to IBDQ-15 and IBDQ-60 respectively, in the univariate analysis. Regarding multivariate analysis and IBDQ-15, SD ($P = .007$), BI distortion ($P < .001$), and fatigue ($P = .004$) were predictors of low QoL. Considering IBDQ-60, SD ($P = .078$), and anxiety and depression ($P = .256$) have not proven to be predictors of low QoL in multivariate analysis, in contrast to BI distortion ($P < .001$) and fatigue ($P = .006$) (Table 7).

4. Discussion

In this cross-sectional case-control survey, we evaluated the prevalence of SD and identified the respective predictive factors, in an IBD cohort. The obtained results evidenced that SD was more prevalent in IBD patients and in women than in healthy controls and men, respectively. Our study showed that the predictive factors for SD were age, in men, and anxiety and depression, and fatigue, in women. Overall, SD negatively impacted the QoL of patients.

The global frequency of SD in our cohort is in accordance with previous studies that reported values between 45% and

Table 2

Fatigue, distortion of body imaging, and anxiety and depression in IBD population measured by MFIS, BIS and HADS respectively.

	MFIS, n (%)	BIS > 10, n (%)	HADS*, n (%)
Patients	48 (40.7%)	31 (26.5%)	41 (34.5%)
Disease			
CD	28 (38.9%)	18 (25.0%)	25 (34.2%)
UC	17 (51.5%)	10 (31.3%)	13 (39.4%)
Clinical activity			
With clinical activity	22 (47.8%)	13 (28.3%)	18 (38.3%)
Without clinical activity	21 (37.5%)	13 (23.6%)	18 (32.1%)
Age (in yrs)			
18–30	8 (36.4%)	6 (27.3%)	7 (31.8%)
31–40	11 (32.4%)	10 (29.4%)	8 (23.5%)
41–50	8 (30.8%)	4 (16.0%)	7 (26.9%)
51–60	10 (62.5%)	5 (31.3%)	8 (47.1%)
61–65	2 (100%)	2 (100%)	2 (100%)
>66	4 (80.0%)	3 (60.0%)	3 (60.0%)
Gender			
Male	14 (32.6%)	8 (19.0%)	8 (18.6%)
Female	34 (45.3%)	23 (30.7%)	33 (43.4%)
Surgery			
Previous surgery	14 (36.8%)	8 (21.1%)	12 (31.6%)
Abdominal surgery	7 (30.4%)	4 (17.4%)	5 (21.7%)
Perianal surgery	8 (44.4%)	3 (16.7%)	6 (33.3%)
HADS*			
With anxiety and depression	32 (78.0%)	20 (50.0%)	-
Without anxiety and depression	16 (20.8%)	11 (14.3%)	-

*HADS—anxiety and depression were evaluated in patients with fatigue and distortion of body imaging.

BIS = body image scale, CD = Crohn´s disease, HADS = Hospital Anxiety Depression Scale, MFIS = Modified Fatigue Scale, UC = ulcerative colitis.

Table 3

Sexual dysfunction by age and population group.

Group age	Patients, n (%)	Controls, n (%)	*P* value
18–30	7 (33.3%)	1 (5.0%)	**.022**
31–40	8 (23.5%)	3 (13.6%)	.363
41–50	9 (36.0%)	2 (25.0%)	.566
51–60	14 (82.4%)	1 (25.0%)	**.022**
61–65	-	-	-
>66	5 (100%)	-	-

Table 4

Predictors of sexual dysfunction in the IBD population.

				Male		
Predictor	**OR uni**	**CI**	**p**	**OR multi**	**CI**	**p**
Age	1.097	1.015–1.186	**.019**	1.134	1.025–1.255	**.014**
Anxiety and depression	1.119	0.998–1.255	.054	1.216	0.949–1.560	.123
Body image distortion	1.024	0.915–1.146	.678	0.992	0.810–1.215	.936
Fatigue	1.059	1.001–1.120	**.045**	1.036	0.940–1.143	.473
Female						
Predictor	**OR uni**	**CI**	***P***	**OR multi**	**CI**	***P***
Age	1.049	1.005–1.095	.028	1.030	0.977–1.086	.269
Anxiety and depression	1.168	1.078–1.265	**<.001**	1.156	1.037–1.289	**.009**
Body image distortion	1.069	0.995–1.148	.070	0.979	0.876–1.094	.707
Fatigue	1.071	1.034–1.109	**<.001**	1.048	1.001–1.096	**.043**

CI = confidence intervals, IBD = inflammatory bowel disease, OR multi = odd ratio with multivariate analysis, OR uni = odd ratio with univariate analysis, p = *P* value, SD = sexual dysfunction.

63% in IBD women (30% in healthy controls), and between 15% and 25% in men (5% in healthy controls).[12–14] In these studies, women were also more affected by SD than men.[12–14] The reasons for this gender gap in SD prevalence were not completely understood, but the impact of psychological factors as well as cultural aspects of western culture were referred and discussed.[12]

In our cohort, age was associated with SD in IBD men, but not in women. This finding contrasts with data from general population in which it is demonstrated that age is a predictor of SD, in both genders.[33] In this setting, the discussion is limited since data on age from IBD cohorts is scarce.[12,34]

We could not find differences in the frequency of SD between in UC, CD and IBD unclassified patients.

Table 5

Other predictors of sexual dysfunction in the IBD population.

	Male			Female		
Predictor	**OR uni**	**CI**	***P* value**	**OR uni**	**CI**	***P* value**
Comorbidities	3.0	0.430–20.951	.268	4.306	0.477–38.861	.193
Type of disease	1.941	0.506–7.449	.334	0.626	0.331–1.184	.150
Perianal disease	2.889	0.492–16.973	.240	0.538	0.112–2.598	.441
Surgery	2.667	0.430–16.535	.292	0.938	0.322–2.733	.906
Clinical activity	0.389	0.062–2.438	.313	1.223	0.417–3.589	.714
Hemoglobin	0.765	0.458–1.277	.306	0.789	0.494–1.261	.322
Leukocytes	0.801	0.504–1.273	.348	0.949	0.749–1.203	.666
Sedimentation rate	1.004.	0.965–1.045	.834	0.994	0.942–1.049	.839
CRP	0.598	0.170–2.102	.423	1.202	0.781–1.851	.403
Ferritin	0.999	0.986–1.011	.821	1.003	0.993–1.014	.516
Fecal calprotectin	0.999	0.998–1.001	.514	1.000	1.000–1.001	.947

CI = confidence intervals, OR = odd ratio with univariate analysis.

Table 6

Parameters of male and female sexual dysfunction.

	Anxiety and depression			Body image distortion			Fatigue			Clinical activity			Fecal calprotectin		
	B	**CI**	**p**	**OR**	**CI**	**p**	**B**	**CI**	**p**	**B**	**CI**	**p**	**B**	**CI**	**p**
Male															
Erectile function	−0.434	−0.813 (−0.054)	**.026**	−0.070	−0.490 to 0.351	.739	−0.178	−0.332 (−0.024)	**.025**	1.636	0.011–3.260	**.049**	0.01	−0.001 to 0.003	.445
Orgasmic function	−0.177	−0.312 (−0.042)	**.012**	0.011	−0.142 to 0.164	.885	−0.068	−0.123 (−0.012)	**.018**	0.450	−0.122 to 1.022	.116	<0.001	−0.001 to 0.001	.377
Sexual desire	−0.128	−0.206 (−0.050)	**.002**	−0.001	−0.093 to 0.091	.989	−0.043	−0.076 (−0.010)	**.013**	0.295	−0.031 to 0.620	.074	<0.001	−0.001 to 0.001	.206
Intercourse satisfaction	−0.233	−0.402 (−0.65)	**.008**	−0.006	−0.198 to 0.186	.949	−0.091	−0.160 (−0.022)	**.011**	0.654	−0.081 to 1.389	.078	4.506^-5	0.001 to 0.001	.932
Overall satisfaction	−0.116	−0.196 (−0.36)	**.006**	−0.005	−0.097 to 0.087	.910	−0.041	−0.074 (−0.007)	**.019**	0.338	−0.014 to 0.689	.059	3.485^-5	<.001 to 0.001	.894
Female															
Desire	−0.065	−0.095 (−0.035)	**<.001**	−0.029	−0.067 to 0.008	.121	−0.030	−0.042 (−0.017)	**<.001**	0.036	−0.008 to 0.160	.556	<0.001	−0.001 to 0.001;	.232
Arousal	−0.090	−0.140 (−0.040)	**.001**	−0.033	−0.094 to 0.028	.280	−0.044	−0.065 (−0.023)	**<.001**	−0.044	−0.268 to 0.179	.689	<0.001	−0.001 to 0.001	.577
Lubrication	−0.087	−0.145 (−0.029)	**.004**	−0.035	−0.103 to 0.03	.312	−0.040	−0.065 (−0.015)	**.002**	−0.083	−0.336 to 0.170	0.508	<0.001	−0.001 to 0.001	.155
Orgasm	−0.094	−0.151 (−0.037)	**.002**	−0.053	−0.121 to 0.14	.121	−0.046	−0.070 (−0.022)	**<.001**	−0.010	−0.267 to 0.247	0.935	−0.001	−0.001 to 0.001	.181
Satisfaction	−0.088	−.0129 (−0.047)	**<.001**	−0.052	−0.103 (−0.001)	**.044**	−0.035	−0.054 (−0.017)	**<.001**	−0.050	−0.227 to 0.128	0.571	<0.001	−0.001 to 0.001	.317
Pain	−0.144	−0.197 (−0.090)	**<.001**	−0.077	−0.146 (−.008)	**.028**	−.059	−.082 (−.035)	**<.001**	0.027	−0.230 to 0.283	0.832	<0.001	−0.001 to 0.001	.128

B = B value, CI =confidence interval, OR =odd ratio, p =*P* value.

In our cohort, comorbidities, medication, previous IBD related surgery, either abdominal or perianal, and clinical activity were not related to SD. Previous data on those factors are contradictory.[12,13,15,34,35] Concerning disease activity, about a third (39.2%) of our IBD patients had clinical activity (mild to moderate) on medical evaluation, but all of them were ambulatory patients. Nevertheless, it is intriguing that activity was not a factor of impaired sexual life once active IBD symptoms have been described by patients as drivers of SD.[13] Moreover, in patients in clinical remission, the frequency of SD was higher than in healthy controls (48.2% vs 13.3%), which could be due to other IBD associated factors, either biological or psychological.

In our IBD cohort, fatigue was associated with SD in women but not in men. Although fatigue is a common symptom of chronic diseases, its pathogenesis is poorly understood. Explaining models have been based on both physiological and psychological aspects.[36] Fatigue is a common symptom in IBD, with reported rates of substantial fatigue in 52% of CD and 50% of UC patients, and of chronic fatigue (substantial fatigue during > than 6 months) in 29% of CD and 22% of UC patients.[4] Previous data regarding fatigue and sexual function in IBD are scarce and not unanimous.[12,14,15,35,37] However, our findings are in accordance with previous reports in which fatigue was related to active disease and anxiety and depression.[38] The underlying cause for fatigue impact in women sexual function may be driven by psychological aspects, such as stress management, self-esteem, among others, which play a more significant role in women than in men. Ultimately, patients with UC, active disease and anxiety-depression were more affected by fatigue.

IBD can affect BI both direct and indirectly. It has been reported that 66.8% of IBD patients have impaired BI, with higher frequency in women than in men.[6] In the perspective of patients, factors like IBD related symptoms, medications, scars

Table 7

Predictive factors of QoL: univariate and multivariate analysis.

IBDQ-15						
	Univariate analysis			Multivariate analysis		
Predictor	**B**	**CI**	**p**	**B**	**CI**	**p**
SD	0.303	0.158–0.449	**<.001**	0.164	0.047–0.281	**.007**
Anxiety and depression	−1.197	−1.572 (−.823)	**<.001**	−0.134	−0.558–0.289	.531
Body image distortion	−1.631	−2.008 (−1.255)	**<.001**	−1.140	−1.555 (−0.726)	**<.001**
Fatigue	−0.593	−0.743 (−.442)	**<.001**	−0.266	−0.444 (−0.087)	**.004**
IBDQ-60						
	Univariate analysis			**Multivariate analysis**		
Predictor	**B**	**CI**	**p**	**B**	**CI**	**p**
SD	−268	−114–0.421	**.001**	0.114	−0.013–0.241	.078
Anxiety and depression	−1.225	−1.631 (−0.838)	**<.001**	−0.262	−0.718–0.193	.256
Body image distortion	−1.603	−2.010 (−1.197)	**<.001**	−1.044	−1.497 (−0.590)	**<.001**
Fatigue	−0.598	−0.755 (−0.441)	**<.001**	−0.279	−0.474 (−0.083)	**.006**

B = B value, CI = confidence interval, IBDQ-15 = Inflammatory Bowel Disease Questionnaire related to the previous 15 d, IBDQ-60 = Inflammatory Bowel Disease Questionnaire related to the previous 60 d, QoL = quality of life, p = *P* value.

from previous surgeries, and psychological burden can have impact on the relationship with their body and on the manner they experience and think it.[6] In our cohort, BI was not related to SD, neither in men nor in women, but the analysis by sexual function domains showed a negative impact of BI in sexual satisfaction and pain in women.

Anxiety and depression were present in approximately a third of our IBD cohort and were predictive of SD in women but not in men. The analysis of different domains of SD showed that anxiety and depression impacted all domains of the SD scale in women and men. Data on the impact of anxiety and depression in SD by gender is not consensual.[12–14,35] The contradictory results may be related to the heterogeneity of samples and to the application of distinct methodologies, more than to a real gap between genders. In fact, depressed mood was a major driver of low sexual functioning reported as reduced sexual thoughts or desire, problems with orgasm, reduced satisfaction, reduced intercourse frequency and reduced partner satisfaction.[15,35]

SD was a predictor of lower QoL among our cohort along with anxiety and depression, fatigue, and distortion of BI, in accordance with previous reports on the impact of SD in QoL.[39]

Our work presents strengths that deserve to be highlighted. First, we achieved a high rate of complete responses with the possibility of including a significant amount of data in our analysis. Second, the study design enabled data collection with preservation of the cohort´s anonymity and included a control group guaranteeing baseline measurements for data analysis. Moreover, our study collected precise data regarding sample characterization, and clinical and biological disease activity.

Our study presents several limitations that need to be discussed. First, it was a single center study, which might have limited the rate of recruitment. Second, only about 1 third of our patients had clinical activity, at the time of the survey, and all of them were ambulatory patients. These facts could mistakenly exempt activity as a predictor of SD. Furthermore, as it was a non-interventional study, we did not manage to collect data of all cohort on fecal calprotectin, hemoglobin level and C-Reactive Protein, which might have enriched the discussion and supported the obtained results. The control group was composed only of health professionals from different hospital departments and professional groups which is also a limitation. There was a statistically significant difference between the mean age of the 2 groups and an association between having IBD and the presence of comorbidities.

In conclusion, this study highlighted the relevance of SD in IBD patients with evidence of higher prevalence in women and of its overall negative impact in the QoL of patients. In this context, the assessment of IBD patients should focus on all aspects that impact QoL, including sexual function. It is, then, urgent to develop structured strategies to manage SD in IBD patients, as part of a broad strategy to provide tools for the increase of the overall QoL of these patients, in the context of a chronic disease.

Acknowledgments

The authors thank Paula Pinto, PharmD, PhD (PMA—Pharmaceutical Medicine Academy) for providing medical writing and editorial assistance.

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References

[1] Cosnes J, Gowerrousseau C, Seksik P, et al. Epidemiology and natural history of inflammatory bowel diseases. Gastroenterology. 2011;140:1785–94.
[2] Knowles SR, Graff LA, Wilding H, et al. Quality of life in inflammatory Bowel disease: a systematic review and meta-analyses - Part i. Inflamm Bowel Dis. 2018;24:742–51.
[3] Mikocka-Walus A, Knowles SR, Keefer L, et al. Controversies revisited: a systematic review of the comorbidity of depression and anxiety with inflammatory Bowel Diseases. Inflamm Bowel Dis. 2015;22:752–62.
[4] Jelsness-Jørgensen LP, Bernklev T, Henriksen M, et al. Chronic fatigue is more prevalent in patients with inflammatory bowel disease than in healthy controls. Inflamm Bowel Dis. 2011;17:1564–72.
[5] Knowles SR, Gass C, Macrae F. Illness perceptions in IBD influence psychological status, sexual health and satisfaction, body image and relational functioning: a preliminary exploration using structural equation modeling. J Crohn's Colitis. 2013;7:e344–50.
[6] Muller KR, Prosser R, Bampton P, et al. Female gender and surgery impair relationships, body image, and sexuality in inflammatory bowel disease: patient perceptions. Inflamm Bowel Dis. 2010;16:657–63.
[7] Casellas F, Herrera-de Guise C, Robles V, et al. Patient preferences for inflammatory bowel disease treatment objectives. Dig Liver Dis. 2017;49:152–6.

[8] Reuken PA, Grunert PC, Lügering A, et al. Self-assessment of treatment targets in patients with inflammatory bowel disease using a survey. Ther Adv Gastroenterol. 2020;13:175628482097121.
[9] Guyatt G, Mitchell A, Irvine EJ, et al. A new measure of health status for clinical trials in inflammatory bowel disease. Gastroenterology. 1989;96:804–10.
[10] Irvine E, Zhou Q, Thompson AK. The Short Inflammatory Bowel Disease Questionnaire: a quality of life instrument for community physicians managing inflammatory bowel disease. CCRPT Investigators. Canadian Crohn's Relapse Prevention Trial. Am J Gastroenterol. 1996;91:1571–8.
[11] McCabe MP, Sharlip ID, Atalla E, et al. Definitions of sexual dysfunctions in women and men: a consensus statement from the Fourth International Consultation on Sexual Medicine 2015. J Sex Med. 2016;13:135–43.
[12] Rivière P, Zallot C, Desobry P, et al. Frequency of and factors associated with sexual dysfunction in patients with inflammatory Bowel Disease. J Crohn's .Colitis 2017;11:1347–52.
[13] Marín L, Mañosa M, Garcia-Planella E, et al. Sexual function and patients' perceptions in inflammatory bowel disease: a case-control survey. J Gastroenterol. 2013;48:713–20.
[14] Bel LGJ, Vollebregt AM, Van der Meulen-de Jong AE, et al. Sexual dysfunctions in men and women with inflammatory Bowel Disease. J Sex Med. 2015;12:1557–67.
[15] Timmer A, Bauer A, Kemptner D, et al. Determinants of male sexual function in inflammatory bowel disease: a survey-based cross-sectional analysis in 280 men. Inflamm Bowel Dis. 2007;13:1236–43.
[16] Rosen RC, Riley A, Wagner G, et al. The international index of erectile function (IIEF): a multidimensional scale for assessment of erectile dysfunction. Urology. 1997;49:822–30.
[17] Rosen R, Brown C, Heiman J, et al. The female sexual function index (Fsfi): a multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther. 2000;26:191–205.
[18] Santos Pechorro P, Martins Calvinho A, Monteiro Pereira N, et al. Validação de uma versão portuguesa do Índice Internacional de Função Eréctil-5 (IIEF-5). Revista Internacional de Andrologia. 2011;9:3–9.
[19] Hendren SK, O'Connor BI, Liu M, et al. Prevalence of male and female sexual dysfunction is high following surgery for rectal cancer. Ann Surg. 2005;242:212–23.
[20] Pechorro P, Diniz A, Almeida S, et al. Validação portuguesa do índice de Funcionamento Sexual Feminino (FSFI). Laboratório de Psicologia. 2013;7:33–44.
[21] Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. J Sex Marital Ther. 2005;31:1–20.
[22] Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983;67:361–70.
[23] Bjelland I, Dahl AA, Haug TT, et al. The validity of the hospital anxiety and depression scale. J Psychosom Res. 2002;52:69–77.
[24] Pais-Ribeiro J, Silva I, Ferreira T, et al. Validation study of a Portuguese version of the Hospital Anxiety and Depression Scale. Psychol Health Med. 2007;12:225–37.
[25] Snaith, R. P., Zigmond AS. The hospital anxiety and depression scale manual. Windsor: NFER; 1994.
[26] López PM, Ferrandis ED, Vaillo YA, et al. Structural validity and distress screening potential of the hospital anxiety and depression scale in cancer. Int J Clin Health Psychol. 2012;12:435–47.
[27] Miljanović M, Sindik J, Milunović V, et al. Factor structure and cut-off scores of the hospital anxiety and depression scale (HADS) in a Croatian sample of adult patients suffering from advanced cancer. Psychiatr Danub. 2017;29:451–8.
[28] Moreira H, Silva S, Marques A, et al. The Portuguese version of the Body Image Scale (BIS) - psychometric properties in a sample of breast cancer patients. Eur J Oncol Nurs. 2010;14:111–8.
[29] Gomes L dos R. Validação da versão portuguesa da escala de impacto da fadiga modificada e da escala de severidade da fadiga na esclerose múltipla. Universidade do Minho; 2011;1–38.
[30] Azevedo MTQ. Avaliação do impacto da fadiga nas atividades de vida diária em indivíduos com esclerose múltipla. Instituto Plotécnico de Bragança; 2015.
[31] Verissimo R. Quality of life in inflammatory bowel disease: Psychometric evaluation of an IBDQ cross-culturally adapted version. J Gastrointestin Liver Dis. 2008;17:439–44.
[32] Isabel M, Coelho D. Qualidade de Vida e Doença Inflamatória Intestinal Qualidade de Vida e Doença Inflamatória Intestinal. 2010.
[33] McCabe MP, Sharlip ID, Lewis R, et al. Incidence and prevalence of sexual dysfunction in women and men: a consensus statement from the fourth international consultation on sexual medicine 2015. J Sexual Med. 2016;13:144–52.
[34] Ghosh S, Mitchell R. Impact of inflammatory bowel disease on quality of life: results of the European Federation of Crohn's and Ulcerative Colitis Associations (EFCCA) patient survey. J Crohn's Colitis. 2007;1:10–20.
[35] Timmer A, Bauer A, Dignass A, et al. Sexual function in persons with inflammatory Bowel Disease: a survey with matched controls. Clin Gastroenterol Hepatol. 2007;5:87–94.
[36] SWAIN MG. Fatigue in chronic disease. Clin Sci. 2000;99:1–8.
[37] Mahmood S, Nusrat S, Crosby A, et al. Assessment of sexual function among inflammatory bowel disease patients. Am J Gastroenterol. 2015;110:601–3.
[38] Bager P, Befrits R, Wikman O, et al. Fatigue in out-patients with inflammatory bowel disease is common and multifactorial. Aliment Pharmacol Ther. 2012;35:133–41.
[39] Roseira J, Magro F, Fernandes S, et al. Sexual quality of life in inflammatory bowel disease: a multicenter, national-level study. Inflamm Bowel Dis. 2020;26:746–55.