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Gender differences in inflammatory bowel disease:

Explaining body image dissatisfaction

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Abstract

The aim of this study was to examine the role of body image problems in the context of inflammatory bowel disease and to explore gender differences in these associations. A sample of inflammatory bowel disease patients (60 males and 140 females) was collected. Findings from a multi-group analysis show that inflammatory bowel disease symptomatology may impact on body image in both male and female patients through the effect of body-image-related cognitive fusion. Body image difficulties in the context of inflammatory bowel disease should not be a neglected dimension in research aiming at understanding the psychosocial effects of inflammatory bowel disease and by health professionals working with these patients.

Key-words: body image, body-image-related cognitive fusion, gender differences, inflammatory bowel disease, multigroup analysis

Introduction

Inflammatory bowel disease (IBD) is characterized by a chronic, incurable and relapsing inflammation of the intestinal system, caused by a deregulated activation of the immune system (Hanauer, 2006; Marks et al., 2006). IBD comprises two conditions, Crohn's disease (CD, which can involve any area of the gastrointestinal tract) and ulcerative colitis (UC, which is limited to the large intestine and comprises a continuous area of inflammation; Ordás et al., 2012). Although the aetiology is unknown, IBD seems to result from a combination between genetic and environmental factors, and is most prevalent in North America and Europe and in urban areas (Loftus and Sandborn, 2003; Soon et al., 2012). Common symptoms include abdominal pain, diarrhoea, fever, fatigue and weight loss, whose intensity and frequency vary in an unpredictable course between periods of active disease and remission (Lennard-Jones, 1968). There are also frequently reported associated complications such as perianal fistulas, skin rashes, arthritis, ocular inflammation and pulmonary problems.

The effects of IBD on quality of life (QoL) are considered major; it has been extensively showed that patients' mental health, quality of social relationships and perceived physical health may be impaired (e.g. Graff et al., 2009; Janke et al., 2005; Porcelli et al., 1996). Body image is considered a particularly important dimension for IBD patients' well-being but that receives far less attention by clinicians in the healthcare provided to these patients (Muller et al., 2010). In fact, most of the patients with IBD present impaired body image (e.g. Casati et al., 2000; De Rooy et al., 2001; McDermott et al., 2015). This may due to the disease itself and its symptoms (e.g. bloating, weight dysregulation and body shape changes and perianal fistulas), associated extra-intestinal manifestations (e.g. dermatological and osteoarticular complaints) as well as its treatment (oedemas and weight gain due to corticosteroids and immunosuppressants use; invasive

surgery; Dunker et al., 1998; McDermott et al., 2015; Muller et al., 2010; Saha et al., 2015). Body image concerns do not seem to be determined by IBD type as literature reveals the same levels of body image concerns for CD and UC patients (Muller et al., 2008; Saha et al., 2015).

IBD tends to begin in young adulthood (Andres and Friedman, 1999), a time when the construction of intimate relationships and sexuality are particularly important, and concerns with body image tend to increase (Bucchianeri et al., 2013). Body image is a particularly important dimension for women, who tend to over evaluate this aspect in the definition of their attractiveness and personal and social value (Ferreira et al., 2013). There is recent evidence that men may also be similarly affected by evaluations and social expectations about physical appearance. Nonetheless, women still face greater socio-cultural pressures to achieve a specific body type that is socially valued (e.g. thinness; Buote et al., 2011). In fact, female gender is associated with greater body image dissatisfaction in IBD, and 70 per cent of IBD female patients report body dissatisfaction (Muller et al., 2010; Saha et al., 2015). As IBD presents physical and psychosocial challenges throughout life, issues with the body may become especially problematic in this population. A negative body image self-evaluation may result in low psychological health and quality of social relationships (Trindade et al., 2017) and heightened levels of anxiety and depression in IBD (McDermott et al., 2015). Therefore, the study of the psychological mechanisms that may impact the body image of IBD patients is considered of special relevance to better understand this problematic and to shed light on what psychotherapeutic strategies may be important to take into consideration in future intervention studies for IBD patients.

Recent literature has identified body image-related cognitive fusion as a possible relevant process for the determination of body image concerns (Duarte et al., 2016;

Ferreira et al., 2014; Trindade and Ferreira, 2014). Cognitive fusion, a key process of the acceptance and commitment therapy (ACT) model (Hayes et al., 2012), is defined as the entanglement/fusion with the content of internal experiences. When fused, individuals tend to respond to their thoughts as if they were facts or the absolute truth. For instance, in the context of the thought 'I'm not attractive anymore, my body is flawed', if fused, one tends to consider this as a fact that has to be taken seriously and that has behavioural and psychological well-being consequences. On the contrary, if an individual presents some level of cognitive defusion towards that same thought, he or she tends to observe the thought as a simple, transient and subjective product of the mind. It thus can be hypothesized that body-image-related cognitive fusion may have a crucial role on the determination of body image concerns. The aim of this study is thus to analyse whether this maladaptive emotion regulation process mediates the known association between IBD symptomatology and impaired body image and whether there are significant differences in these relationships among genders. This study aims to fill a gap on the understudied effects of IBD on body image and to provide insights for the prevention and treatment of body image concerns in this population.

Methods

Procedures

This study has a cross-sectional nature and is part of a wider investigation which aims to explore the factors that influence IBD patients' physical and psychosocial functioning. After the ethical approval of the research by the Portuguese Association for IBD (APDI), the members of this association registered as patients received an email invitation to participate in the investigation, with detailed information regarding the

study's aims, and the voluntary and confidential nature of the participation. The interested patients accessed a link to an online platform with the informed consent and test battery.

In all, 209 IBD patients accepted to participate in the study, signed the informed consent and filled the test battery. Of these participants, nine patients were excluded for being pregnant or reporting having severe illness other than IBD (such as breast cancer, tuberculosis and fibromyalgia) or psychiatric disorders (bipolar disorder, generalized anxiety disorder and panic disorder).

Participants

The sample comprised 200 Portuguese IBD patients (60 males and 140 females) aged between 18 and 76 years ($M = 35.85$ years; standard deviation (SD) = 10.71 years) and with completed years of education ranging from 6 to 22 ($M = 14.29$; $SD = 2.90$). Concerning socio-economic status, 8.5 per cent of the participants presented a low status, 46 per cent presented a medium status and 26 per cent a high socio-economic status (Simões, 1994). Moreover, 12 per cent were college students, 4 per cent were unemployed and 3.5 per cent were retired; 90.50 per cent resided in an urban region, while 9.50 per cent resided in a rural location. Regarding marital status, 52 per cent were married, 41.50 per cent single, 5.50 per cent divorced and 1 per cent widowed.

Measures

Participants reported demographic and medical data and filled self-report instruments. The medical data concerned the frequency of IBD symptoms present in the last month (e.g. abdominal pain, diarrhoea, fever, weight loss) and number of IBD-related medical complications, number of hospital admissions and undergone surgeries.

Participants also reported their current weight and height (to calculate body mass index (BMI): Wt/Ht2). Furthermore, the following self-report measures were administered:

Cognitive Fusion Questionnaire Body Image. The Cognitive Fusion Questionnaire Body Image (CFQ-BI) is a 10-item self-report scale that measures body-image-related cognitive fusion (e.g. 'I tend to get very entangled in my thoughts concerning my body or body image'; 'I get very focused on distressing thoughts about my body image'; Gillanders et al., 2014; Ferreira et al., 2014). Participants rate each item on a 7-point scale. In the original study, the CFQ-BI presented a Cronbach's alpha of .97 and good temporal, discriminant, convergent and divergent validities. In this study, the CFQ-BI presented a Cronbach's alpha of .97.

Body Image Scale. The Body Image Scale (BIS) measures affective (e.g. feeling self-conscious of the body), behavioural (e.g. difficulty at looking at the naked body) and cognitive (e.g. dissatisfaction with appearance) dimensions of body image (Hopwood et al., 2001; Moreira et al., 2010). It has been widely used in cancer patients and has been specifically validated for IBD patients (McDermott et al., 2015). The scale presents 10 items which are rated on a 4-point Likert scale (0: not at all; 3: very much), with higher scores corresponding to increasing levels of body image dissatisfaction or concern. The BIS presented good psychometric properties in its original (α = .93) and Portuguese (α = .93) validation studies. In this study, the BIS presented a Cronbach's alpha of .91.

Analytic Strategy

Data analyses were performed using the SPSS software (v.21 SPSS; Armonk, NY: IBM Corp.), and the path analysis was conducted using the AMOS software (v.21 SPSS;

Armonk, NY: IBMCorp.). Preliminary data analyses were performed to evaluate data's adequacy for further analysis. Descriptive and frequency analyses were conducted to analyse the sample's characteristics by gender. Independent samples t-test analyses were also conducted to explore the differences between samples concerning the studied variables. Furthermore, the relationships between the studied variables were analysed performing Product-moment Pearson correlation coefficients (Cohen et al., 2003). A multi-group path analysis was conducted to estimate whether body-image-related cognitive fusion (mediator variable) would mediate the relationship between IBD symptomatology and BMI (independent, exogenous variables) and body image dissatisfaction (dependent, endogenous variable). Path analysis is a specific form of structural equation modelling (SEM) that allows for the simultaneous examination of direct and indirect effects between multiple exogenous and endogenous variables, while controlling for error (Kline, 2005). The maximum likelihood estimation method was used to estimate the significance of the regression coefficients and the model fit. To evaluate model fit, the following indices were used: chi-square (χ2) with a nonsignificant value indicating a very good model fit; the comparative fit index (CFI) and the Tucker Lewis index (TLI), with values superior than .95 indicating very good fit; the root-mean square error of approximation (RMSEA; with 90% confidence intervals (CIs)), with nonsignificant values below .05 indicating very good fit and the standardized root mean square residual (SRMR), with values inferior than .08 suggesting acceptable model fit (Hu and Bentler, 1999). The significance of the indirect effects was analysed through the Bootstrap resampling method, with 5000 Bootstrap samples and 95 per cent bias corrected CIs. The effects are considered significant if zero is not included in the CI range (Kline, 2005).

To examine the model invariance between male and female patients, the following steps were followed. First, the hypothesized model was tested in the total sample (with both groups combined; N = 200) to determine whether the model was viable. The model fit was then analysed for both groups separately. Next, the unconstrained model (i.e. the model in which the paths were free to vary between groups) was estimated and the differences in significant/nonsignificant pathways between the groups were analysed. The model fit for the constrained model (i.e. the model in which the paths were constrained to be equal across the groups) was then assessed. The unconstrained and constrained models were compared through the chi-square difference test. The critical ratio differences were calculated to examine the statistical significance of the differences between both groups (Byrne, 2010; Kline, 2005; Tabachnick and Fidell, 2007).

Results

Descriptive statistics and comparison between genders

Medical variables

Regarding diagnosis, 55 per cent of the total sample had CD, 42 per cent had UC, while the rest (3%) reported being under the diagnostic process (IBD-unknown). Furthermore, 41 per cent of the sample reported presenting one or more medical complications associated with IBD (M = 1.41; SD = 0.77), such as osteoarticular complaints (20.5% of the total sample), anorectal pathology (8%) and respiratory complaints (7.5%). The number of hospital admissions varied between 0 and 23 (M = 2.10; SD = 3.54) and the number of surgeries between 0 and 10 (M = 0.51; SD = 1.31).

The most reported associated complications by males were perianal fistulas and respiratory problems (e.g. sinusitis), while female patients mostly reported osteoarticular complaints (e.g. osteoporosis, arthritis), dermatological problems (e.g. psoriasis) and duodenal ulcers. Further medical characteristics of the sample are presented in Table 1, which presents the means of number of associated medical complications, number of hospital admissions and number of surgeries, for each gender. Table 1 also shows that significant differences were found between genders regarding number of surgeries ($t_{(66.87)}$ = 2.46; p = .016), with male patients presenting higher number of surgeries than female participants. IBD symptomatology also presented significant differences between genders ($t_{(198)}$ = −4.66; p < .001), with female patients reporting significantly higher levels of symptomatology. Number of associated medical complications ($t_{(198)}$ = −1.05; p = .295) and number of hospital admissions ($t_{(198)}$ = 1.09; p = .277) did not present significant differences between genders.

Body image variables

Regarding BMI distribution among genders, results showed that 1.7 per cent of the male participants presented a low BMI (< 18.5), 55.6 per cent presented a normal BMI (18.5‑24.9), 41 per cent were overweight (BMI: 25‑29.9) and 1.7 per cent presented obesity (BMI ≥ 30). Concerning the female participants, 13.6 per cent presented a low BMI, 67.1 per cent presented a normal BMI, 12.9 per cent were overweight and 6.4 per cent presented obesity (BMI ≥ 30). These distributions reflect the BMI distribution of the Portuguese population (Poinhos et al., 2009).

Significant differences were found between genders concerning BMI ($t_{(198)}$ = 3.02; p = .003), with male participants reporting higher levels of BMI in comparison with females (Table 1). Furthermore, significant differences were also found for body-image-

related cognitive fusion ($t_{(141.078)} = -2.74$; $p = .007$) and body image dissatisfaction ($t_{(136.375)} = -3.72$; $p < .001$), as female patients revealed significantly higher levels in these variables.

--------------------------------------- Please insert Table 1 here --

Correlations

Results from the correlation analyses (Table 2) demonstrated that in both groups (male and female patients), IBD symptomatology was revealed to present positive correlations with body-image-related cognitive fusion and body image dissatisfaction, which were positively linked with each other. These correlation magnitudes were higher in the female group.

--------------------------------------- Please insert Table 2 here --

Path Analysis

The values of skewness and kurtosis were examined to analyse data's univariate and multivariate normality. The skewness values ranged from 0.17 to 1.27, and the values of kurtosis ranged from −0.12 to 1.32. Results thus indicated that the distribution of the data was normal (Kline, 2000). Moreover, the values of the variance inflation factor (VIF) corroborated the suitability of the data (VIF < 5).

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Results of the model conducted for both genders combined ($N = 200$) indicated that the model accounted for a total of 48 per cent of the variance in body image dissatisfaction (as measured by BIS). Two path coefficients were nonsignificant (the paths from BMI to body image dissatisfaction, and the path from BMI to body-image-related cognitive fusion) and were removed. The nested model presented a good fit to the empirical data: $\chi2_{(2)} = 3.58$, p = .167; CFI = .99; TLI = .98; RMSEA = .06, 90 per cent CI = .00–.17, $p = .311$; SRMR = .05.

The model was then tested for male and female patients separately. The model tested for male patients accounted for 48 per cent of the variance in body image dissatisfaction and presented a poor model fit: $\chi2_{(3)} = 16.60$, $p = .001$; CI = .90; TLI = .80; RMSEA = .18, 90 per cent CI = .10–.27, $p = .005$; SRMR= .09. The model tested for female patients accounted for 59 per cent of variance in body image dissatisfaction and presented a good model fit: $\chi2_{(2)} = 4.61$, $p = .100$; CFI = .98; TLI = .94; RMSEA = .09, 90 per cent CI = .00–.22, $p = .181$; SRMR = .07.

Next, we tested an unconstrained model in which all paths were allowed to vary between the two groups. Results showed that the data presented an excellent model fit: $\chi2_{(4)} = 5.40$, $p = .249$; CFI = .99; TLI = .98; RMSEA = .04, 90 per cent CI = .00–.12, $p = .474$; SRMR = .01. For male patients, the direct path from IBD symptomatology to body image dissatisfaction was nonsignificant. For female patients, all paths were significant. We then tested a constrained model (i.e. a model in which the direct path coefficients were constrained to be equal across both groups) and results indicated a very good model fit: $\chi2_{(7)} = 7.34$, $p = .395$; CFI = 1.00; TLI = 1.00; RMSEA = .02, 90 per cent CI = .00–.09, $p = .688$; SRMR = .04. The unconstrained and constrained models were then compared, and results indicated that the model is invariant between the groups: $\Delta\chi2_{(3)} = 1.94$, $p = .395$. Results of critical ratio differences indicated that the parameters

coefficients in the path between IBD symptomatology and body image-related cognitive fusion did not present a statistically significant difference ($Z = .085$, $p = .932$); for both female patients ($b = .31$, $p < .01$) and male patients ($b = .31$, $p < .01$), this was a significant path. The path from body image-related cognitive fusion to body image dissatisfaction also did not present a statistically significant difference ($Z = .085$, $p = .932$); this path was significant for both female ($b = .36$, $p < .001$) and male ($b = .35$, $p < .001$) patients. Furthermore, although the path from IBD symptomatology to body image dissatisfaction was significant for women ($b = .12$, $p < .001$), whereas for men it was not ($b = .04$, $p = .513$), this path did not reveal a statistically significant difference ($Z = 1.34$, $p = .182$).

The indirect effects were also examined for both groups (Figure 1). For male patients, it was revealed that IBD symptomatology did not present a direct nor indirect effect on body image dissatisfaction. An indirect effect of .20 (through body-image-related cognitive fusion) was estimated but did not achieve significance (95% CI = −.03 to .43, $p = .079$). For female patients, results demonstrated that IBD symptomatology besides presenting a direct effect on body image dissatisfaction also presented an indirect effect of .18 (95% CI = .06–.30, $p = .008$) on this outcome through the mechanisms of body image-related cognitive fusion. In female patients, the total effect of IBD symptoms on body image dissatisfaction was thus of .38.

Discussion

This study examined whether body image-related cognitive fusion would mediate the effect of IBD symptomatology on body image dissatisfaction. Furthermore, we were particularly interested in exploring gender differences in these associations, given that little attention has been paid to the effect that IBD symptoms present on male patients' body image. In line with previous research (e.g. Buote et al., 2011; Ferreira et al., 2013),

results showed that there were significant differences between men and women regarding body image dissatisfaction, with women presenting higher scores. Also, there were also found significant differences between men and women in body-image-related cognitive fusion levels, that is, the tendency to get entangled with the content of body image-related internal experiences (e.g. cognitions, emotions, memories), viewing them as reality instead of transitory and subjective mental events (Ferreira et al., 2014; Gillanders et al., 2014; Hayes et al., 2012). There is a large body of evidence that women tend to present increased body image dissatisfaction due to socio-cultural pressures to achieve a realistic specific body type (e.g. a thin and fit body; Buote et al., 2011; Grogan, 2008). Historically, men have been less exposed to these pressures and tend to present a more positive body image. Therefore, our study goes in line with this body of literature; nonetheless, recent research shows that body image dissatisfaction is increasing in men (Dakanalis et al., 2016) and that this should not be a neglected aspect in men's mental health.

IBD is a challenging health condition that involves not only severe physical implications but also presents a toll on mental health (e.g. Graff et al., 2009; Janke et al., 2005). In particular, IBD symptoms are associated with poorer body image (Trindade et al., 2017). Our study extends prior research by showing that IBD symptoms (such as abdominal pain and bloating, sudden body weight fluctuations, urgent evacuations) are significantly associated with increased body image dissatisfaction and with the tendency to become fused with these negative body image evaluations, in both women and men. Body image difficulties have a particular pernicious impact on patients' psychosocial functioning (e.g. McDermott et al., 2015; Trindade et al., 2017); therefore, understanding the mechanisms that may explain body image difficulties in women and men with IBD merits greater attention. The path analysis presented in this study aimed at clarifying the

effect of IBD symptomatology on body image dissatisfaction considering the mediator role of body image-related cognitive fusion. Prior research highlights that body-image-related cognitive fusion is a key process in explaining body image difficulties and its consequences (Duarte et al., 2016; Ferreira et al., 2014; Trindade and Ferreira, 2014). Our results revealed that the tested model is invariant between men and women. In women, results indicated that IBD symptomatology presented a direct effect on body-image-related cognitive fusion and body image dissatisfaction. Body-image-related cognitive fusion in turn was also significantly associated with this outcome, and mediated the indirect effect of IBD symptoms on body image dissatisfaction. These findings seem to confirm IBD physical symptomatology impacts on women's evaluations about their physical appearance. This suggests that for women the experience of adverse symptomatology, that may cause impairment in their daily lives and social relationships, go beyond their impact on physical health, influencing how they relate to their physical appearance. Moreover, the tendency to become overly focused on evaluations, judgements and other internal experiences related to body image seems to play an important role on the way IBD physical symptoms impact on body dissatisfaction.

In the male sample, IBD symptomatology also predicted increased body-image-related cognitive fusion which in turn presented a direct effect on body image dissatisfaction. IBD physical symptoms presented an indirect effect of .19 on body image dissatisfaction, through the effect of body-image-related cognitive fusion. Nevertheless, this effect did not reach statistical significance ($p = .079$) which may be due to the reduced sample size ($n = 60$). Although this finding should be explored further in studies with larger samples, it suggests that IBD symptomatology also seems to impact on body image in male patients. Thus, body image difficulties in the context of IBD should not be a

neglected dimension in research aiming at understanding the psychosocial effects of IBD, as well as by physicians and mental health professionals working with these patients.

Nevertheless, some limitations should be considered during the interpretation of these findings. The size of the male sample may be the main issue of this article due to its likely influence on the nonsignificant indirect effect of body-image-related cognitive fusion on the relationship between IBD symptoms and body image dissatisfaction. This model (for male patients) presented 10 parameters, which may suggest 100 participants as the recommended sample size for the conduction of this analysis. Future studies should thus replicate this study using larger samples. Also, the use of samples from different cultures could also be useful. The methods of recruitment (through a patients association) and data collection (through an online platform) may have caused the present sample to be more educated than the general population of IBD patients. These methods may indeed have several limitations, including a sampling bias and an underrepresentation of the population. Nonetheless, this data collection method may have facilitated self-disclosure regarding body image difficulties (due to the non-personal contact with the research team and the privacy and security an online survey provides). Finally, given that the cross-sectional nature of this study does not allow causal conclusions, it seems important that future research would also focus on the longitudinal examination of the studied relationships.

This study might provide important treatment directions by emphasizing the potential role of body-image-related cognitive fusion as a process influencing the link between IBD symptoms and its effects on body image in women and men with IBD. Cognitive fusion is a process targeted by ACT, and therefore, intervention programmes based on this approach might be useful to decrease IBD patients' body dissatisfaction

(e.g. defusion exercises commonly used in ACT but specifically targeting body image cognitions; Sandoz and DuFrene, 2014).

Informed Consent

All procedures were in accordance with the ethical standards of the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients that participated in the study.

Conflict of Interest

The authors declare no conflict of interest.

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Table 1

Means (M), Standard Deviations (SD), and comparison between male patients (n = 60) and female patients (n = 140) concerning medical features, body image variables, psychological quality of life, and physical quality of life

	Males		Females		t	p
	M	*SD*	*M*	*SD*		
Medical variables						
n. of surgeries	.97	2.01	.31	.79	2.46	*
n. of hospital admissions	2.52	3.89	1.92	3.38	0.79	n.s.
n. of associated complications	.48	.70	.62	.91	-1.05	n.s.
CD symptomatology	19.30	10.89	27.78	12.13	-4.66	***
Body image variables						
BMI	24.23	3.10	22.34	4.39	3.02	**
Body image cognitive fusion	20.30	11.28	25.51	14.41	-2.74	**
Body image dissatisfaction	5.12	5.94	8.79	7.34	-3.72	***

*Note. * p < .05; ** p < .01; *** p < .001.*

Table 2

Intercorrelation scores on self-report measures and self-reported medical data for male patients (n = 60; bottom side of the table) and female patients (n = 140; superior side, in bold)

	1.	2.	3.	4.	5.	6.	7.
1. Associated complications	-	**.25****	**.10**	**.25****	**.25****	**.10**	**.16**
2. Hospital admissions	.10	-	**.44*****	**.09**	**.05**	**.03**	**.09**
3. Surgeries	.18	.44***	-	**-.14**	**.04**	**-.16**	**-.24****
4. IBD symptoms	.14	.15	-.13	-	**.07**	**.26****	**.38*****
5. BMI	-.03	.01	-.14	-.02	-	**.16**	**.19***
6. Body image cognitive fusion	.09	.34*	-.01	.29*	.10	-	**.75*****
7. Body image dissatisfaction	.23	.38**	.15	.26*	.07	.69***	-

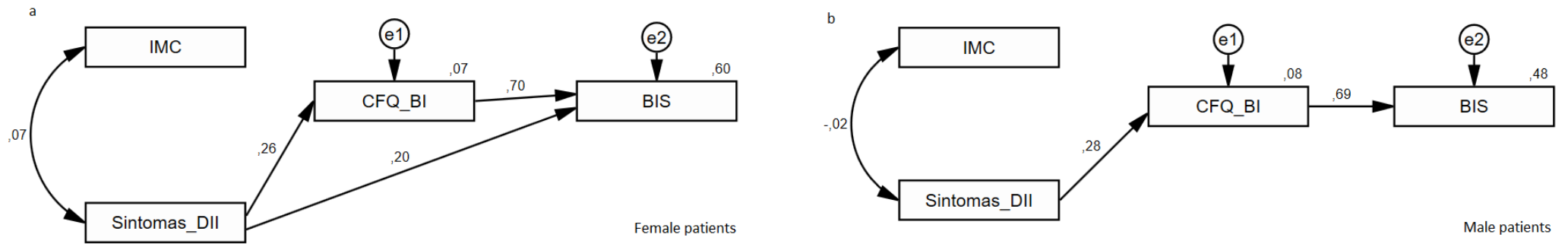*Note.* * $p < .05$; ** $p < .01$; *** $p < .001$.

Fig. 1 Parameter estimates for the multi-group path analysis, Standardized regression weights and squared multiple correlations for female participants are represented in Fig. 1a (n = 140); for male participants, in Fig. 1b (n = 60). All paths are significant at the p < .05 or p <