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The prospective effects of self-compassion on depressive symptoms, anxiety, and stress: A study in inflammatory bowel disease

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ABSTRACT

Objective: To date, research with people with inflammatory bowel disease (IBD) has only examined how self-compassion is linked with stress, and have exclusively used cross-sectional designs. This study aims to examine the associations of self-compassion with depressive symptoms, anxiety, and stress in people with IBD over time.

Methods: Participants were 155 adults with IBD who completed the SCS and the DASS-21 at two different times, spaced 9 months apart. The study design is longitudinal: three separate hierarchical regression models were conducted to examine whether self-compassion at baseline predicted depressive symptoms, anxiety, and stress measured at follow-up, while controlling for the effects of baseline IBD symptomatology and the respective outcome.

Results: Participants who had IBD for a longer period of time presented higher levels of self-compassion. Self-compassion at baseline predicted lower follow-up levels of depressive symptoms ($\beta = -0.17$, $p = 0.015$), anxiety ($\beta = -0.15$, $p = 0.032$), and stress ($\beta = -0.26$, $p = 0.001$), even in the presence of baseline levels of IBD symptomatology and the outcome. Isolation (as opposed to common humanity) was the most relevant self-compassion component for explaining higher depression levels, while the mindfulness component was important for explaining lower anxiety and stress.

Conclusions: This study is the first to demonstrate the prospective effects of self-compassion on mental health indicators in IBD. Given these findings, and previous evidence on the high comorbidity of depression and anxiety and frequent self-report of illness shame and self-criticism in this population, compassion-based interventions may be particularly beneficial for improving well-being in people with IBD.

1. Introduction

Comprised of two main forms, Crohn's disease and ulcerative colitis, inflammatory bowel disease (IBD) is a chronic disease characterised by fluctuating and persistent symptoms that impair daily functioning and take a significant toll on physical and mental well-being [1]. The symptom profile and clinical course of IBD includes uncontrollable, unpredictable and painful bowel movements, coupled with flare-ups reflecting increased inflammatory activity [2]. This can cause considerable disruption to psychosocial and daily functioning [3], as evidenced by the high rates of depression and anxiety in IBD. Prevalence rates are estimated at 15% for depression and 22% for depressive symptoms, and 21% for anxiety disorders and 35% for anxiety symptoms [4]. Moreover, functional limitations can contribute to stress that exacerbates IBD symptoms, disease progression [5,6], and psychological disorders [7,8]. Given the complex and mutually reinforcing linkages among stress, mood disorders, and IBD symptoms, and their toll on well-being, understanding the factors that can reduce psychological distress is an important goal for improving quality of life in IBD. To this end, research in recent years has begun to focus on the role of positive psychological factors for promoting adjustment to IBD. For example, gratitude and psychological thriving have been found to longitudinally predict lower levels of depressive symptoms in people with IBD [9,10].

One positive psychological quality that holds promise for addressing

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IBD-related distress is self-compassion. Whether viewed as an enduring dispositional tendency or a momentary state, self-compassion has been defined as taking a kind, connected, and mindful stance towards one's perceived shortcomings and challenges [11]. Research has found that self-compassion reduces shame in non-clinical samples [12], and is robustly linked to lower psychopathology, including depression and anxiety [13], and perceived stress, and better mental health across a number of chronic health conditions [14–18]. Although research on the role of self-compassion for managing IBD-related distress is sparse, initial evidence is promising. In one cross-sectional study, self-compassion was linked to lower stress through greater use of adaptive coping strategies and less use of maladaptive coping strategies, which promoted greater coping efficacy [19].

There are several reasons to expect that self-compassion may be beneficial for reducing distress among people with IBD. Theoretically, self-compassion is conceptualised by Neff [11] to include three distinct bi-dimensional components that work synergistically to down-regulate negative emotions and improve well-being. Self-kindness versus self-judgement involves responding to difficulties and perceived inadequacies with kindness, acceptance, and patience, rather than with self-blame and self-criticism. IBD symptoms, such as loss of bowel control, can contribute to feelings of shame, self-blame, and self-criticism that can be detrimental for mental health [20,21]. Responding instead with self-kindness can promote self-acceptance and diffuse the distress that arises from negative self-evaluations.

Common humanity versus isolation involves recognizing that imperfection and suffering are part of the human condition, rather than feeling isolated because of a belief that one's shortcomings and struggles are unique. Taking this connected perspective may be particular beneficial for people with IBD by reminding them that others with IBD experience similar challenges and struggles with the disease. Indeed, feelings of isolation are common among people with IBD due to the unpredictable and potentially embarrassing nature of IBD symptoms [22]. Taking a common humanity perspective may also reduce the perceived barriers to reaching out to others in times of need, as feelings of helplessness can impair making use of social support, and negatively impact quality of life among those with IBD [23].

The mindfulness component of self-compassion involves being aware of one's suffering and emotional states while not becoming over-identified with the negative feelings associated with facing struggles and short-comings. For people with IBD, taking this balanced perspective may decrease rumination and worry about aspects of their disease that can be frustrating and troubling [24], and in turn reduce IBD-related distress. In addition, taking a mindful approach to emotions can also be beneficial for addressing cognitive fusion, a maladaptive process that involves excessive attachment to internal experiences as being literal representations of reality, rather than viewing them as transient [25]. In one longitudinal study in IBD, both rumination and cognitive fusion were found to be associated with depressive symptoms 9 and 18 months later, and explained the impact of IBD symptoms on depressed mood [26]. Thus, the mindfulness component of self-compassion may be particularly beneficial for reducing depression by addressing tendencies to engage in maladaptive emotion regulation.

These theoretical reasons suggest that benefits of self-compassion for reducing distress (i.e., depression, anxiety, and stress) found in other chronic illness populations may also extend to people with IBD. Yet, to date there have been few studies examining self-compassion in the context of IBD. As noted previously, cross-sectional research has identified a link between dispositional self-compassion and lower stress [19,27], and with lower stress and better medical adherence [28], in people with IBD. To our knowledge, no research has yet examined self-compassion in relation to depression and anxiety in IBD, or examined how self-compassion is associated with distress over time. Addressing this gap not only has important theoretical implications, but also is key for understanding the potential for therapeutic approaches known to increase self-compassion [29] as a means to address depression, anxiety and stress in people with IBD. However, there is some evidence that interventions that focus on constructs related to self-compassion may be effective. For example, mindfulness-based interventions have shown promise for reducing anxiety and depression in IBD [30], and one randomised controlled trial found that acceptance commitment therapy (ACT), which targets cognitive fusion, was effective for reducing stress and depression in IBD [31].

1.1. The current study

The aim of the current study was to extend previous theory and research by examining the prospective associations of self-compassion with anxiety, depression and stress in people with IBD. Previous research in IBD has only examined stress, but not depression or anxiety, and used a cross-sectional design [19,27]. Thus, it is unknown how self-compassion operates in people with IBD over time, whether its link with stress is maintained over time, and whether this is a pertinent process in the context of depressive symptomatology and anxiety in this population. Consistent with self-compassion theory [11] and research with other chronic health conditions [15,16], we hypothesized that self-compassion would be associated with lower stress, depressive symptoms, and anxiety over a 9-month period, and that these associations would hold after accounting for the contributions of IBD symptoms, and measures of each of the distress variables at baseline. Furthermore, we also examined the role of each of the facets of self-compassion for explaining depressive symptoms, anxiety, and stress.

2. Method

2.1. Setting and participants

This study is part of a larger study on the role of variables related to emotion regulation in the well-being of people with IBD. Participants were recruited through the Portuguese Association for IBD (APDI). Members of this association registered as patients were invited by email to collaborate in the study. All participants gave their informed consent before filling a set of validated self-report measures on an online platform. This study comprises two time points, measured 9 months apart: T1 (baseline) and T2 (9 months). This time frame takes into consideration previous evidence suggesting a follow-up over 6 months may be required to register change in outcomes such as depression [10]. This study was conducted prior to the COVID-19 pandemic.

Participants completed T1 immediately after being invited to participate in the study, and were invited to complete another set of questionnaires 9 months later (T2). T1 was completed by 209 participants and T2 by 168. Only the respondents who completed the two time points, that presented complete answers to the measures of this study's interest, and that did not report other severe diseases (e.g., breast cancer, bipolar disorder, diabetes, multiple sclerosis), were included in the present study. No differences were found between completers and non-completers regarding gender ($\chi^2_{(1)} = 0.15$, $p = 0.702$), age ($t_{(192)} = -0{,}15$, $p = 0.126$), time since diagnosis ($t_{(194)} = -0.08$, $p = 0.934$), IBD symptomatology ($t_{(194)} = -0.45$, $p = 0.655$), self-compassion ($t_{(194)} = 0.27$, $p = 0.786$), depressive symptoms ($t_{(194)} = 1.41$, $p = 0.160$), and stress ($t_{(194)} = 0.64$, $p = 0.091$). Anxiety was the only variable in which these groups significantly differed ($t_{(55.91)} = 2.20$, $p = 0.032$), with non-completers presenting higher levels.

The sample for this study includes 155 people diagnosed with IBD, aged between 18 and 75. Table 1 presents the demographic and medical characteristics of the sample.

2.2. Measures

At both time points, participants provided sociodemographic (age and gender) and medical (IBD diagnosis and time since diagnosis) data

Table 1
Sample characteristics ($N = 155$).

Characteristic		Value
Age, M (SD)		36.50 (11.09)
Gender, n (%)	Female	108 (69.68)
	Male	47 (30.32)
IBD diagnosis, n (%)	Crohn's Disease	88 (56.77)
	Ulcerative Colitis	64 (41.29)
	Yet undetermined IBD	3 (1.94)
Time since diagnosis, M (SD)		8.54 (6.79)

and completed self-report instruments. The level of IBD symptomatology experienced in the previous month was assessed with an inventory of IBD symptoms used in previous research [20]. Items assess the frequency of fatigue, abdominal pain, excessive passing of gas, difficulty maintaining or gaining weight, tenesmus, loose stools, nausea, blood or mucus in stools, abdominal bloating, fever, urgency to evacuate, frequent bowel movements, joint pain, involuntary passing of gas or stools, and trouble sleeping due to IBD on a 7-point scale, from 0 (never) to 6 (always). In addition, the following self-report measures were administered:

Self-Compassion Scale (SCS; [11]*; Castilho, Pinto-Gouveia, & Duarte, 2015).* This is a 26-item measure of self-compassion with six subscales: self-kindness, common humanity, mindfulness, self-judgement, isolation, and over-identification. Participants are asked to evaluate each item regarding "how I typically act towards myself in difficult times" using a 5-point scale (1 = Almost Never; 5 = Almost Always). The total score of the scale was used. This score was calculated by summing the mean scores of each subscale (after reverse scoring items from the self-judgement, isolation, and over-identification subscales). Greater scores reveal higher levels of self-compassion. The SCS presented good internal consistencies both in the original ($\alpha = 0.92$) and Portuguese ($\alpha = 0.89$) validation studies.

Depression, Anxiety, and Stress Scales (DASS-21; [32]*; Portuguese validation by Pais-Ribeiro et al.* [33]*).* The DASS-21 is a set of scales with a total of 21 items which assess depressive symptoms ("I felt I wasn't worth much as a person"), anxiety ("I felt scared without any good reason"), and stress (I found it hard to wind down"). Items are meant to reflect the frequency of respondents' symptoms over the previous week, and are rated on a 4-point scale (0 = "did not apply to me at all" to 4 = "applied to me very much, or most of the time"). Higher scores reveal greater levels of distress. The DASS-21 revealed high internal consistency in the original and the Portuguese versions ($\alpha_{Depression} = 0.88$, $\alpha_{Anxiety} = 0.82$, and $\alpha_{Stress} = 0.90$, in the original version; and 0.85, 0.74, 0.81 in the Portuguese version, respectively).

2.3. Data analysis

Statistical analyses were conducted using IBM SPSS (v.25). Descriptive statistics, student's *t*-tests and chi-square tests were performed to analyse differences between participants with different IBD diagnoses on demographic, medical, and outcome variables. Correlations between variables were analysed through Pearson correlation coefficients (Cohen, 1988). Three separate hierarchical regression models were conducted to examine whether baseline levels of self-compassion (entered in step 3) would significantly predict depressive symptoms (model 1), anxiety (model 2), and stress (model 3) measured at the 9-month assessment (outcome variables), while controlling for the effects of baseline levels of the respective outcome (entered in step 1) and any other variables that had significant correlations with the outcome (entered in step 2). These analyses were conducted having each outcome measured at baseline (entered in step 1) as a controlling variable of the model. The six facets of self-compassion were then examined as predictors of each outcome. With this objective, a linear regression model with self-compassion's facets as sole independent variables of each outcome was performed. In a regression analysis, the R^2 value indicates the total of variance in the dependent variable that can be explained by the independent variables; the standardized regression coefficient (β) refers to the magnitude of the effect of the independent variable on the dependent variable; and the F statistic refers to the regression equation's fit to empirical data.

3. Results

3.1. Descriptives

No differences between participants with Crohn's Disease and participants with ulcerative colitis were found regarding age ($t_{(150)} = 1.75$, $p = 0.091$), depressive symptoms ($t_{(150)} = -1.80$, $p = 0.075$), anxiety ($t_{(150)} = -0.44$, $p = 0.663$), stress ($t_{(150)} = -1.90$, $p = 0.059$), and IBD symptomatology ($t_{(150)} = -1.84$, $p = 0.068$). There were differences between the two types of diagnosis for gender ($\chi^2_{(2)} = 11.20, p = 0.004$), and time since diagnosis ($t_{(149.981)} = 3.64, p < 0.001$), with there being a higher proportion of men and a longer time since diagnosis in those with Crohn's Disease.

3.2. Correlation analyses

Correlation results are presented in Table 2. Self-compassion was positively associated with time since diagnosis, indicating that respondents who had lived longer with IBD generally had higher levels of self-compassion. Men also seemed to present higher levels of self-compassion than women. Baseline (T1) levels of all six facets of self-compassion (self-kindness, common humanity, mindfulness, self-judgement, isolation, and over-identification) were correlated with the study outcomes (depressive symptomatology, anxiety, and stress) at follow-up (T2). It should also be highlighted that IBD symptomatology at baseline was significantly associated with depressive symptoms, anxiety, and stress measured at baseline as well as 9 months later.

3.3. Regression analyses

3.3.1. Predicting depressive symptoms at follow-up

Table 3 presents the results of the regression analyses. Depressive symptoms at T1 was firstly entered as the sole predictor of depressive symptoms measured 9 months later (T2). This produced a significant model ($F_{(1,153)} = 128.94$, $p < 0.001$; $R^2 = 0.46$), with depressive symptoms at T1 predicting the level of depressive symptoms at T2 with an effect of 0.68 ($p < 0.001$). In the second step of the analysis ($F_{(3,151)} = 46.54$, $p < 0.001$; $R^2 = 0.48$), IBD diagnosis and IBD symptomatology at T1 were added to the model and presented effects of 0.07 ($p = 0.257$) and 0.14 ($p = 0.021$) on depressive symptoms at T2, respectively. In this step, the effect of depressive symptomatology at T1 decreased to 0.62 ($p < 0.001$). Self-compassion at T1 was added to the model in the final step of the analysis ($F_{(4,150)} = 37.19$, $p < 0.001$), showing an effect of −0.17 ($p = 0.024$) on depressive symptoms at T2, in the presence of the other significant predictors: depressive symptoms at T1 ($\beta = 0.52$, $p < 0.001$) and IBD symptoms at T1 ($\beta = 0.13$, $p = 0.003$). This final model accounted for 50% of the variance of depressive symptoms at T2.

3.3.2. Predicting anxiety at follow-up

In the first step of the analysis, the model included anxiety at T1 as the only predictor, and was significant ($F_{(1,153)} = 78.30$, $p < 0.001$; $R^2 = 0.34$). Anxiety at T1 predicted anxiety measured 9 months later with an effect of 0.58 ($p < 0.001$). IBD symptomatology at T1 was added to the model in the second step ($F_{(2,152)} = 43.69$, $p < 0.001$; $R^2 = 0.37$). Results found that this variable had a significant effect on anxiety at T2 ($\beta = 0.17$, $p = 0.013$), while anxiety at T1 remained a significant predictor ($\beta = 0.53$, $p < 0.001$). In the final step, self-compassion at T1 was added to the model ($F_{(3,151)} = 31.38$, $p < 0.001$), and had a significant effect of −0.15 ($p = 0.032$) on anxiety at T2. Both anxiety at T1

Table 2
Means (M), Standard Deviations (SD), Cronbach's alphas (α), and intercorrelation scores of the study variables at baseline (T1) and follow-up (T2) (N = 155).

	M (*SD*)	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	36.49 (11.02)	–	1																
2. Gender	–	–	−0.21*	1															
3. IBD diagnosis	–	–	−0.11	0.27**	1														
4. Time since diagnosis	8.54 (6.79)	–	0.41***	−0.21**	0–31***	1													
5. IBD symptoms T1	21.92 (10.31)	0.85	−0.05	0.31***	0.13	−0.08	1												
6. Self-kindness T1	2.98 (0.76)	0.83	0.18*	−0.01	−0.15	0.15	−0.03	1											
7. Common humanity T1	3.22 (0.75)	0.68	0.07	0.12	−0.03	0.14	0.07	0.52***	1										
8. Mindfulness T1	3.22 (0.79)	0.84	0.24**	−0.12	−0.09	0.16*	−0.14	0.68***	0.53***	1									
9. Self-judgement T1	2.81 (0.79)	0.85	−0.11	0.17*	0.21**	−0.15	0.23**	−0.41***	−0.20*	−0.41***	1								
10. Isolation T1	2.83 (0.91)	0.81	−0.16*	0.15	0.23**	−0.14	0.22**	−0.50***	−0.34***	−0.52***	0.74***	1							
11. Over-identification T1	2.87 (0.70)	0.84	−0.11	0.20*	0.23**	−0.16	0.24**	−0.45***	−0.26**	−0.56***	0.77***	0.82***	1						
12. Self-compassion (total) T1	50.56 (11.43)	0.92	0.16	−0.17*	−0.23**	0.17*	−0.23**	0.59***	0.39***	0.63***	−0.89	−0.92***	−0.93***	1					
13.Depressive symptoms T1	4.78 (4.69)	0.92	−0.03	0.01	0.16	−0.04	0.32***	−0.38***	−0.24**	−0.48***	0.51***	0.60***	0.60***	−0.63***	1				
14. Anxiety T1	3.75 (3.68)	0.83	−0.01	0.02	0.01	0.00	0.32***	−0.13	−0.16	−0.39***	0.41***	0.35***	0.43***	−0.44***	0.65***	1			
15. Stress T1	7.23 (4.82)	0.92	−0.07	0.17*	0.17*	−0.14	0.31***	−0.39***	−0.22**	−0.51***	0.53***	0.51***	0.59***	−0.61***	0.73***	0.69***	1		
16. Depressive symptoms T2	4.44 (4.45)	0.92	−0.10	0.07	0.18*	−0.07	0.34***	−0.32***	−0.20*	−0.37***	0.40***	0.56***	0.53***	−0.54***	0.66***	0.46***	0.50***	1	
17. Anxiety T2	3.88 (3.89)	0.81	−0.02	0.08	0.14	−0.09	0.36***	−0.16*	−0.16*	−0.33***	0.28***	0.40***	0.40***	−0.39***	0.41***	0.57***	0.39***	0.69***	1
18. Stress T2	7.15 (4.73)	0.90	−0.15	0.18*	0.22**	−0.14	0.38***	−0.41***	−0.21**	−0.48***	0.39***	0.51***	0.55***	−0.55***	0.56***	0.49***	0.58***	0.83***	0.74***

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 3
Hierarchical multiple regression of predictors of depressive symptoms, anxiety, and stress ($N = 155$).

	Depressive symptoms at T2					Anxiety at T2					Stress at T2			
	t	β	R^2	*F*		*t*	β	R^2	*F*		*t*	β	R^2	*F*
Step 1					Step 1					Step 1				
Depressive symptoms at T1	11.36	0.68***	0.46	128.94***	Anxiety at T1	8.85	0.58***	0.34	78.30***	Stress at T1	9.26	0.60***	0.36	85.67***
Step 2					Step 2					Step 2				
Depressive symptoms at T1	9.97	0.62***	0.48	46.54***	Anxiety at T1	7.76	0.53***	0.37	43.69***	Stress at T1	7.76	0.51***	0.42	26.81***
IBD Diagnosis	1.14	0.07			IBD symptoms at T1	2.52	0.17*			Gender	0.00	0.00		
IBD symptoms at T1	2.22	0.14*			–					IBD diagnosis	1.50	0.10		
–					–					IBD symptoms at T1	3.28	0.22***		
Step 3					Step 3					Step 3				
Depressive symptoms at T1	6.77	0.52***	0.50	37.19***	Anxiety at T1	6.37	0.47***	0.38	31.38***	Stress at T1	4.70	0.37***	0.44	25.10***
IBD diagnosis	0.74	0.04			IBD symptoms at T1	2.30	0.16*			Gender	−0.12	−0.1		
IBD symptoms at T1	0.13	2.19*			Self-compassion at T1	−2.16	−0.15*			IBD diagnosis	1.03	0.07		
Self-compassion at T1	−2.29	−0.17*			–					IBD symptoms at T1	3.27	0.22***		
–					–					Self-compassion at T1	−3.27	−0.26***		

*$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

($\beta = 0.47$, $p < 0.001$) and IBD symptoms at T1 ($\beta = 0.16$, $p = 0.023$) remained significant predictors, and the model explained 38% of the variance of anxiety at T2.

3.3.3. Predicting stress at follow-up

In the first step of the analysis, stress at T1 was entered as a predictor of stress measured at T2, and the model was significant ($F_{(1, 153)} = 85.67$, $p < 0.001$; $R^2 = 0.36$). Stress at T1 had a signifcant effect of 0.60 ($p < 0.001$) on the outcome. Gender, IBD diagnosis, and IBD symptomatology at T1 were then added to the model ($F_{(4, 150)} = 52.31$, $p < 0.001$). IBD symptomatology had a significant effect of 0.22 ($p = 0.001$) on stress at T2. Gender ($\beta = 0.00$, $p = 0.999$) and IBD diagnosis ($\beta = 0.10$, $p = 0.137$) were not significant predictors. Stress at T1 remained a significant predictor of the model ($\beta = 0.51$, $p < 0.001$). Self-compassion at T1 was added to the model in the final step of the analysis ($F_{(5,149)} = 25.10$, $p < 0.001$). Stress at T1 ($\beta = 0.37$, $p < 0.001$), IBD symptomatology ($\beta = 0.22$, $p = 0.001$), and self-compassion ($\beta = -0.26$, $p = 0.001$) were significant predictors. The final model explained 44% of the variance of stress at T2.

3.3.4. Self-compassion facets

Self-compassion facets at T1 were then included as predictors of each outcome at follow-up in three separate regression models. In the model with depressive symptoms model ($F_{(6, 148)} = 12.41$, $p < 0.001$), 34% of the variance in this outcome was explained. Isolation emerged as the sole significant predictor, with an effect of 0.40 ($p = 0.002$). There was a non-significant trend towards over-identification explaining depressive symptoms ($\beta = 0.25$, $p = 0.067$).

Only mindfulness emerged as predictor of anxiety with an effect of -0.23 ($p = 0.044$), in a model ($F_{(6, 148)} = 6.62$, $p < 0.001$), that explained 21% of the variance in this outcome. There was a trend towards significance for isolation ($\beta = 0.26$, $p = 0.059$).

Mindfulness predicted lower stress ($\beta = -0.22$, $p = 0.033$), and overidentification predicted higher stress ($\beta = 0.35$, $p = 0.011$), with the overall model explaining 37% of the variance of stress, ($F_{(6, 148)} = 14.28$, $p < 0.001$).

4. Discussion

This study investigated and found evidence supporting the effects of self-compassion on distress levels in people with IBD over time. These findings corroborate and build on previous cross-sectional research on the association of dispositional self-compassion with low stress [19,27,28], and better medical adherence [28], in people with IBD. The findings are also consistent with cross-sectional research on the association of self-compassion with less psychopathology in other chronic medical conditions such as cancer [16,18], HIV [14], epilepsy [34], and arthritis [19,27]. Our findings are also in line with longitudinal research on the protective effects of self-compassion on depression in college students [35] and in people with chronic pain [36], and with meta-analytical results showing compassion as an important explanatory variable in understanding mental health and resilience [13].

The current study also demonstrated that people who have had lived with IBD for a longer period of time had higher levels of self-compassion than those who were diagnosed with IBD more recently. This finding suggests that, with time, individuals may learn to become more accepting of the disease and become more compassionate in how they respond to minor setbacks and difficulties. It is also possible that self-criticism, especially regarding aspects related to the disease, may dimmish over time as new strategies to effectively cope with IBD-related adverse experiences are learned. Consistent with previous research in non-IBD samples (e.g., Yarnell et al. [37]), the current study found that men were more self-compassionate than women. One novel finding of the current study was that respondents with Crohn's Disease were more self-compassionate than those with ulcerative colitis. Nevertheless, the interpretation of this finding needs to take into consideration that the Crohn's Disease group included a higher proportion of men and had been living with their diagnosis for a longer period of time, variables that were independently associated with higher levels of self-compassion.

This is the first prospective study to investigate the effects of self-compassion on depressive symptoms and anxiety in people with IBD, and to study facets of self-compassion in a IBD sample. Findings demonstrated that self-compassion is a relevant process in the determination of depressive symptomatology, anxiety, and stress, as it predicts lower levels of these outcomes measured 9 months later. Importantly, self-compassion was a significant predictor of these outcomes, even while controlling for the baseline levels of each outcome and of self-reported IBD symptomatology, which was also significantly linked to the outcomes (predicting more depressive symptoms, more anxiety, and more stress, findings that are in accordance with previous literature on depressed mood in IBD; Trindade et al. [26,38]).

Self-compassion thus appears to be an important quality for people with IBD to protect against mental health problems. Given the promising effects of compassion-based interventions on mental health in other populations [39–41], such interventions may be particularly beneficial for this population. The effects of reducing depression and stress in chronic inflammatory diseases may also extend beyond the scope of psychological well-being, and even improve disease progression, as there is evidence that depression and stress can exacerbate inflammatory conditions [42], including IBD [43]. In addition, there is evidence that self-compassion, due in part to its association with positive emotions, is linked with more engagement in health-promoting behaviours, which can promote disease management and associated health outcomes [19,27].

Regarding the specific facets of self-compassion, the current findings suggest that the mindfulness component (in opposition with over-identification with thoughts and feelings), may play a role in decreasing stress and anxiety. One possible explanation for this finding is that mindfulness reflects adaptive self-regulation of emotions in response to adverse events, rather than becoming over-identified with them [11]. For example, disease symptomatology, unwanted emotions, or negative self-evaluations, require adaptive emotion regulation, a key quality linked to self-compassion [44]. The impact of these painful experiences on stress and anxiety may be successfully reduced when approached mindfully.

Isolation (as lack of common humanity) was the most important self-compassion component in explaining higher levels of depression. This suggests that individuals with increased depressive symptomatology in particular may benefit from self-compassion training, especially training that focuses on the common humanity component of self-compassion. This component reflects considering one's difficult experiences and personal failings as part of the human condition rather than as being personal, isolating, and shaming [11]. This finding is similar to results from a previous study with a sample of community adults [45], which found that the feeling of being isolated predicted higher levels of depression one year later. The effects found ($\beta = 0.13$) in the previous study were however much smaller than that found in the present study ($\beta = 0.40$). This may be due to differences in the samples studied. People with IBD may be more prone to isolation feelings due to having a stigmatized chronic disease [46], and these feelings, because of their origin, may be more maintained over time and present more impact on psychological functioning. In fact, considering the plethora of difficulties that people with IBD can experience that are detrimental to quality of life and/or mental health, such as perceived stigma [46], decreased body image [47,48], feelings of isolation [22], feelings of shame [22,49,50], feelings of inadequacy, and self-criticism [20], future research should specifically examine the possible mediational effects of self-compassion, and its components, on the relationship between these difficulties and mental health problems. Such research can provide further valuable insights in to the role of self-compassion for creating resilience for mental health issues and promoting healthy psychological

functioning in IBD populations.

The findings from the current study should be considered in the context of several limitations. The use of a Portuguese and online-collected sample may limit the generalization of results to other populations (such as people from other countries/cultures). Further, the sample was predominantly composed of women, who tend to present lower self-compassion scores than men, as noted in the current study and in previous research [37]. As this could have influenced the current results, future studies should attempt at collecting samples with an equivalent distribution of genders or analyse genders separately. Moreover, the use of a IBD symptom inventory that has not been previously validated also limits the interpretation of the results; future research should use well-validated scales such as the IBDSI [51]. The use of only two time points did not allow for the analysis of mediators using latent growth modelling, which would have provided important data on whether self-compassion prospectively mediates the impact of IBD symptomatology on distress. Future studies ought to explore this hypothesis, as well as to replicate this study's findings in larger and culturally different samples, recruited with other methods. Research that analyses how self-compassion may be linked with inflammatory markers relevant to IBD (e.g., calprotectin) would also provide a better understanding of the physiological mechanisms through which self-compassion impacts psychological and physical functioning in IBD. Indeed, an RCT delivering a self-compassion intervention to people with diabetes found that self-compassion significantly decreased depression, distress, and HbA1c, a measure of adaptive blood glucose management (Friis et al., 2016). Research has also shown that self-compassion predicted lower interleukin-6 levels, a marker for stress-induced inflammation, after a psychosocial stressor [52]. It is possible that self-compassion could have similar benefits for disease management and protecting against stress-induced inflammation in IBD.

Compassion-based interventions are particularly useful to address feelings of shame and self-criticism [53,54]. Considering the effects of these experiences on the mental health of people with IBD demonstrated by previous research, and the findings from the present study, self-compassion can be viewed as a beneficial process to address depression, anxiety, and stress in this context. This study provides preliminary evidence that suggests that increasing self-compassion could lead to improvements in mental health in people with IBD, and create an avenue for the testing of the efficacy of compassion-based interventions in this population.

Authors contributions

IAT and FS designed the study, and wrote, edited, and reviewed the manuscript. IAT additionally collected the sample and conducted the study's statistical analyses.

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