



# People with Inflammatory Bowel Disease Prefer Cognitive Behavioral Therapy for Fatigue Management: A Conjoint Analysis

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## Abstract

**Background** Psychological interventions are a promising area for fatigue management in patients with inflammatory bowel disease (IBD). However, most interventions trialed to date have been pilots with limited direct input from patients about the type of intervention they want. Thus, this study aimed to explore patient preferences for a psychological IBD fatigue intervention.

**Methods** An international online cross-sectional survey was conducted with adults with self-reported IBD. A conjoint analysis was employed to elicit, through a series of forced-choice scenarios, patient preferences for a fatigue intervention. For this study, the attributes manipulated across these forced-choice scenarios were type of intervention, modality of delivery, and duration of intervention.

**Results** Overall, 834 people with IBD were included in analysis. Respondents ranked the type of psychological intervention as most important for overall preference (with cognitive-behavioral therapy (CBT) preferred over the other approaches), followed by modality of delivery, but placed very little importance on how long the intervention runs for. Patients with IBD appear to most strongly preference a short online CBT intervention for managing their IBD-related fatigue.

**Conclusion** This study helps provide therapists and program developers clear direction on patient preferences when it comes to developing new psychological programs that address fatigue in IBD.

**Keywords** CBT · Conjoint analysis · Fatigue · Inflammatory bowel disease · Psychological interventions

## Introduction

Inflammatory bowel disease (IBD) is a gastrointestinal condition in which the immune system responds in an exaggerated way to gut bacteria; a process triggered by environmental factors in a genetically susceptible host

[1]. Of the many debilitating symptoms of IBD, fatigue is thought to be biopsychosocial in nature. A review by van Langenberg and Gibson [2] conceptualized fatigue as an overwhelming sense of tiredness and exhaustion that impacts mental, physical, and cognitive capacity. As such, the experience of fatigue is associated with a significant

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reduction in quality of life [3–5] that impairs daily activities and work capabilities [6]. While fatigue is most common in periods of active disease, 41–48% of patients in remission still experience debilitating levels of fatigue [2, 7]. This may be explained by sub-clinical active inflammation [8], chronic pain, medication, life stressors, physical inactivity, sleep disturbances (including pain and nocturnal diarrhea), malnutrition, micronutrient deficiencies and psychological comorbidities such as depression [2, 9].

Despite the often psychological nature of fatigue, the potential value of adjunctive interventions to target psychological comorbidities has only been tested more recently. A systematic evaluated the efficacy of psychological interventions for IBD fatigue and established that while the evidence base is small, the findings are promising for CBT, as indicated by improvements in fatigue impact and severity scores [10]. However, fatigue impact worsened by 6 months and severity worsened by 12 months [11]. Further, while the research thus far best supports CBT, the findings of one-small trial are not compelling to ensure CBT is the best form of psychotherapy for people with IBD. Growing interest in Acceptance and Commitment Therapy (ACT) and mindfulness may indicate new directions for exploration, as both are growing in popularity within chronic illness populations and different healthcare settings [12, 13]. However, presently neither have been explored within the IBD-population. Therefore, determining what psychological interventions to pursue to improve IBD fatigue is still relatively unknown, as many emerging promising psychological interventions are yet to be explored.

A new direction is to consider a patient-centered approach and consider patient preferences to develop new interventions for IBD fatigue. Considering the broader psychotherapy literature, a recent qualitative meta-synthesis of 22 studies emphasized the importance of involving end-users in discussion with regards to the decisions made in developing psychological interventions [14]. Findings indicate the potential to enhance access, acceptability, and engagement in psychological interventions in primary care settings. Further, an additional systematic review ( $k = 49$  studies), outlined the benefit of measuring patient perceptions after having exposure to a hypothetical intervention [15]. From the results, it was theorized that evaluating end-user perspectives to develop interventions that people want may enhance intervention outcomes. As such, involving patients with IBD into the development of future fatigue interventions by evaluating their preferences toward psychotherapy may enhance future interventions. Therefore, this study aimed to use a conjoint analysis to evaluate patient preferences for a psychological intervention to manage fatigue in patients with IBD.

## Materials and Methods

### Design

The data from this study are derived from a large international mixed-methods online survey run in April 2020.

### Participants

People with a self-reported diagnosis of Crohn's disease, ulcerative colitis or IBD unclassified who were aged 18 years or older were recruited via IBD-related social media.

### Conjoint Analysis

A conjoint analysis was developed to understand consumer preferences toward a service or product on the basis that consumers base their preference on the sum of the attributes of that service or product [16, 17]. That is, in the present study, respondents were asked what features they would like in a potential intervention to manage their fatigue. Based on the theoretical underpinnings of conjoint analysis by Hair et al., (2010), a psychological intervention for IBD fatigue includes different attributes that in combination make it more or less desirable to patients with IBD.

### Intervention Feature Selection

For this study, the attributes chosen were type of intervention, modality of delivery and duration of intervention and are shown in Table 1. Levels of attributes were determined by published literature. The type of intervention was determined by the relevant systematic review [10], and emerging interventions in the IBD space [18, 19].

**Table 1** Attributes and levels for conjoint analysis

Attributes	Levels
Type	Cognitive behavior therapy Acceptance and commitment therapy Solution focused therapy Mindfulness
Modality	Online Face-to-face Blended
Length	4 weeks 6 weeks 8 weeks 10 weeks 12 weeks

The description of intervention was expressed in lay terms to account for the possibility that respondents were not familiar with any of the interventions chosen for this analysis. These descriptions were checked by members of the research team who are qualified psychologists) and are presented in Table 2 and an example scenario is presented in Fig. 1. Modality of intervention was determined by the different designs that have been explored in the IBD literature [20]. Duration of intervention was based on meta-regression exploring length of psychological interventions and efficacy [21].

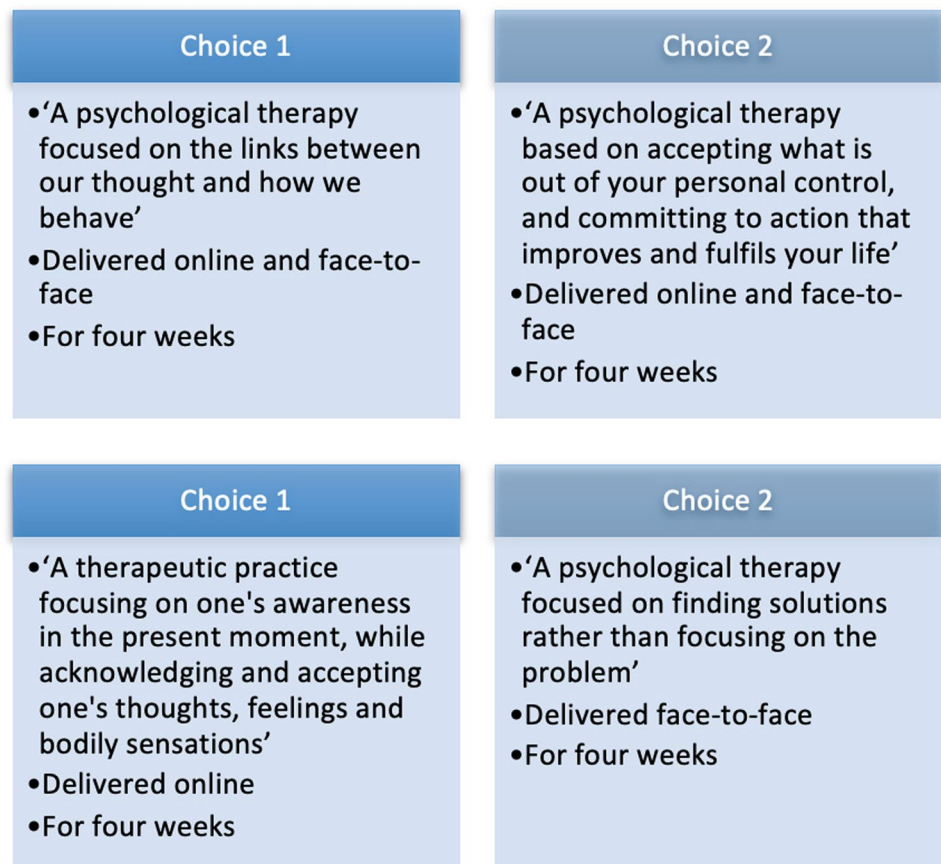
### Deriving Scenarios

The next step of a conjoint analysis is to derive the fixed-pair scenarios made up of each of the chosen attributes that will be presented to respondents. To do this, we determined the number of possible product profiles to be presented to the respondent which will encompass all of the attributes in each possible combination [16]. In this study, the total number of unique product profiles derived from the chosen attributes would be (4 × 3 × 5) 60. To limit respondent fatigue, a fractional factorial design was instead used, that provides a smaller subset of profiles (from this maximum of 60) that samples all attribute levels in a combination that ensures the attribute levels presented are always unique when presented

**Table 2** Lay description of included psychological intervention

	Description
Cognitive behavior therapy	‘A psychological therapy focused on the links between our thoughts and how we behave’
Acceptance and commitment therapy	‘A psychological therapy based on accepting what is out of your personal control, and committing action that improves and fulfills your life’
Solution focused therapy	‘A psychological therapy focused on finding solutions rather than focusing on the problem’
Mindfulness	‘A therapeutic practice focusing on one’s awareness in the present moment, while acknowledging and accepting one’s thoughts, feelings, and bodily sensations’

**Fig. 1** Example of fixed-pair scenario presented in survey



to the respondent. For example, that a balanced combination of types of intervention and length of intervention are still presented to respondents to elicit their true preference.

## Evaluation

There is a range of outcomes which inform participant preference. Broadly, two values are calculated for this purpose. The *utility* value, which corresponds to the multinomial coefficients (i.e., different number of options) for each attribute in much the same way that a linear regression equation would be evaluated, and the *preference weight*, which represents the relative likelihood of selecting a level (i.e., online intervention delivery) as either positive (more likely) or negative (less likely). The relative proportion of the preference for each attribute (i.e., type of intervention, modality, and duration) is calculated from the range of preferences across all attributes (i.e., all levels of the attributes). Finally, goodness of fit is evaluated through MacFaddens Pseudo  $R^2$  [17], which, if significant, allows us to reject the null hypothesis that our model is no different to random chance.

## Measures

### Demographics

Respondents answered questions related to their age, gender, education level, marital status, and employment status. Respondents also answered questions related to their health status, including IBD subtype, year of diagnosis, smoking status, antidepressant use, and opioid use.

### Disease Activity

Respondents answered a single item to give an overall indication of their disease activity using the Manitoba Inflammatory Bowel Disease Index (MIBDI) [22]. The MIBDI shows a high degree of sensitivity for classifying individuals' disease status, and is considered a valid brief tool in this context.

### Psychological Measures

Respondents answered questions on their psychological symptoms using the Depression, Anxiety, and Stress Scale (DASS) short form [23]. Normal levels of symptoms range from 0 to 9 for depression, 0 to 7 for anxiety, and 0 to 14 for stress symptoms. Indicators of significant presentation of depression, anxiety, and stress were calculated by filtering to respondents which scored above "Mild" on the DASS cut-off points as determined by Gomez [24]. Respondents were also

presented with a single question "have you tried any type of psychological therapy before" which used a yes/no response.

## Fatigue

The Fatigue Symptom Inventory [25] interference subscale was used to provide an overall measure of how much patients fatigue interfered with their lives. Items were presented using an 11-point rating scale ranging from 0 (*no interference*) to 10 (*extreme interference*). Scores are summed to provide an overall measure of fatigue interference.

## Survey Procedure

Respondents accessed the survey via Qualtrics through an online link shared via social media such as patient support groups. After responding to a series of questions pertaining to demographics, health and disease characteristics, psychological symptoms, and fatigue; they were presented with a series of fixed-pair scenarios with instructions to pick which option was more desirable. Additionally, respondents rated their strength of preference for each attribute corresponding to each scenario choice they made.

## Analysis

Data pre-processing and descriptive statistics were obtained using SPSS 26 software [26]. Originally there were 842 respondents to the survey, though > 2% provided incomplete data and were removed from the dataset, leaving a final sample of 834. We employed a multinomial logit model conjoint analysis to determine preferences of people with IBD for a psychological intervention to manage fatigue. The conjoint analysis was run using the mlogit package [27] in R studio [28]. Our analysis includes three main effects; intervention types (*CBT, ACT, Mindfulness, Solution-focused*), modality of intervention (*Face to face, online, blended*), and Duration of intervention in weeks (*4, 6, 8, 10, and 12 weeks*). The attribute levels CBT and Face-to-Face were used as reference levels while duration was treated continuously. Based on the power formula suggested by Marshall, Bridges [29], we elected not to run subgroup analyses as it was determined we required a minimum of  $N=500$  for conjoint analyses in the health sciences.

## Results

### Demographics

There were 834 respondents included in the analysis. The majority of respondents had Crohn's disease (68%), followed by ulcerative colitis (30%) and then IBD unclassified (1%).

The mean age of respondents was 36 years (SD = 11.21) and the majority were female (63%). At the time of the survey, 59.8% had significant levels of depression, 57% had significant levels of anxiety, 51.2% had significant levels of stress and 50% had tried some sort of psychotherapy before. Further demographics and disease characteristics are presented in Tables 3 and 4.

### Results from Conjoint Analysis

Findings from the multinomial logit model are found in Table 5 and presented visually in Fig. 2. The model was a good fit of the data;  $\chi^2(11) = 1459.1$ ,  $p < 0.001$ , McFadden  $R^2 = 0.35$ . CBT was the most preferred intervention type. ACT was the second most preferred level of the attribute with a small statistically significant negative estimate. The estimates for mindfulness and SFT were both negative, demonstrating they were rarely chosen by participants. The estimated standard deviation for the ACT and Mindfulness estimates were significant indicating heterogeneity of preference.

For the modality of intervention attribute, online interventions were the most favored by participants, and both face-to-face and blended modality designs were significantly disfavoured. Our preliminary analyses suggested that intervention duration was linearly associated with preference, and so duration was treated as a continuous variable. The estimate for duration of intervention was negative and significant, indicating that participants preferred shorter interventions.

The relative importance of each attribute was calculated using the estimated coefficients from the random parameters logit model and shown in Fig. 3. Intervention type was the most important with 56 percent relative importance. This indicates that intervention type had the most influence on participant choice. Modality of intervention was the second

most important at 35 percent. Duration of intervention was the least important attribute to participants at 7 percent.

### Discussion

This study explored patient preferences toward the development of a psychological intervention to manage IBD fatigue. The main findings from the analysis indicate that patients with IBD preferred an online CBT intervention for as few weeks as possible. The analysis also determined that the type of intervention was the most important attribute to patients with IBD.

CBT was the most preferred intervention by respondents. It is possible that this is because CBT is so commonly used in psychotherapy [30] and more than half of our survey respondents had tried psychotherapy before, potentially making them familiar with CBT. ACT was the next preferred option demonstrating that respondents tended to select ACT when CBT was not offered. In contrast, participants demonstrated a significant negative preference for SFT and mindfulness meaning they were rarely chosen if either CBT or ACT was offered. It is unclear why respondents never seemed to preference mindfulness or SFT. When considering SFT, it is possible that respondents were unfamiliar with the description and therefore were more positively biased toward CBT. However, mindfulness is a type of psychological therapy that is increasing in its popularity for outcomes such as sleep and anxiety [31, 32]. As the description of mindfulness presented to the participants included 'while acknowledging and accepting one's thoughts, feelings and bodily sensations', it is possible that this was unappealing to people with IBD as their condition can produce unpleasant sensations such as pain and urgency that respondents were not interested in focusing on [33]. However, a recent RCT of mindfulness in patients with Crohn's disease reported

**Table 3** Disease classifications

	IBD Total (N=834)
Diagnosis, n (%)	
Crohn's disease	572 (68.6%)
Ulcerative colitis	254 (30.5%)
IBD unclassified	8 (1%)
Years since diagnosis, M year(SD)	12.6 (9.06)
Manitoba Index, n (%)	
Constantly active, giving me symptoms every day	153 (18.3)
Often active, giving me symptoms most days	168 (20.1)
Sometimes active, giving me symptoms on some days (for instance 1–2 days per week)	196 (23.5)
Occasionally active, giving me symptoms 1–2 days per month	103 (12.4)
Rarely active, giving me symptoms on a few days in the past 3 months	78 (9.4)
I was well in the past 3 months, what I consider to be remission or absence of symptoms	136 (16.3)

**Table 4** Patient demographics and health characteristics

	IBD Total (N=834)
Age, M (SD)	36.73 (SD=11.21)
Gender, n (%)	
Male	132 (15.8)
Female	697 (83.6)
Other	4 (0.5)
Married, n (%)	501 (60.1)
Employed full-time, n (%)	233 (40.7)
Education, n (%)	
Less than Year 12	62 (7.4)
Year 12 or equivalent	150 (18)
Vocational degree	135 (16.2)
Tertiary degree	405 (48.6)
Country of residence, n (%)	
Australia	573 (68.7)
United Kingdom	78 (9.4)
USA	137 (16.4)
Canada	28 (3.4)
Europe	8 (1.0)
New Zealand	8 (1.0)
South Africa	1 (0.1)
United Arab Emirates	1 (0.1)
Smoking status, n (%)	
Current smoker	69 (8.3)
Former smoker	236 (28.3)
Antidepressants, n (%)	
Yes	237 (28.4)
No	539 (64.6)
Opioids, n (%)	
Yes	105 (12.6)
No	648 (77.7)
Fatigue, M (SD)	34.99 (15.78)
Depression, M (SD)	6.57 (4.83)
Anxiety, M (SD)	4.97 (3.88)
Stress, M (SD)	8.12 (4.27)
Tried Psychotherapy, n (%)	
Yes	421 (50.5)

a reduction in fatigue scores [18] making it worthwhile to explore why it was so unpopular in our sample and to develop strategies to promote it. Further, recent evidence has supported the use of yoga for people with IBD, which encompasses similarities to mindfulness through its use of breathing exercises and focus on posture. As evidence has demonstrated yoga has promising effects on improving QoL [34], exploring yoga as an alternative to mindfulness may offer insight into patient preferences in regard to psychological and mind–body interventions.

In regard to the modality of intervention, participants were most interested in participating in online interventions

**Table 5** Multinomial logit model estimates

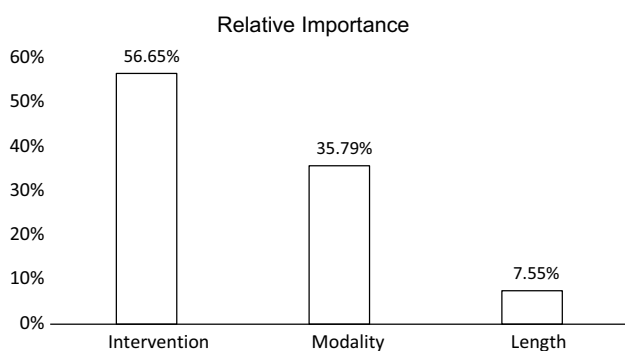
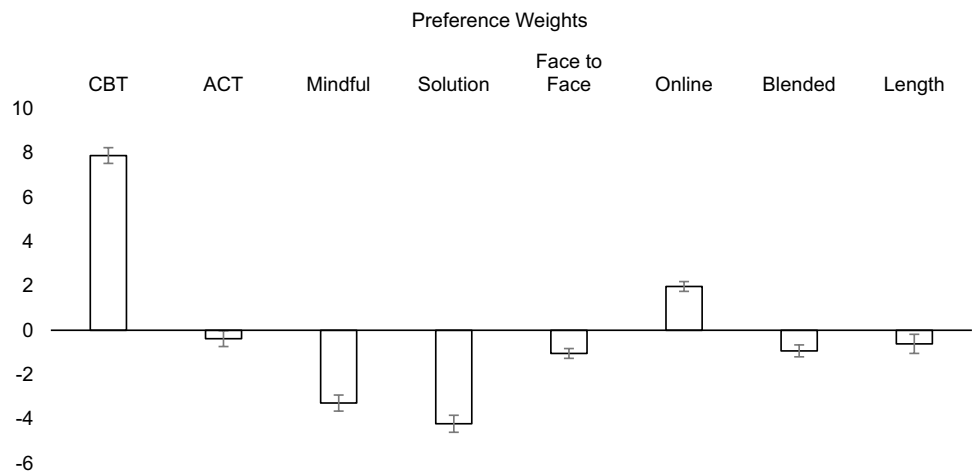
	Estimate	SE	Z	p
CBT (REF)	7.886	0.181		
ACT	− 0.379	0.181	2.092	0.036
ACT SD	− 0.006	2.733	− 0.002	0.998
Mindfulness	− 3.286	0.185	− 17.766	<.001
Mindfulness SD	1.292	0.158	8.189	<.001
Solution-focused	− 4.221	0.196	− 21.549	<.001
Solution-focused SD	− 0.037	1.060	− 0.035	0.972
Face to Face (REF)	− 1.047	0.113		
Online	1.977	0.113	17.514	<.001
Online SD	0.053	0.879	0.060	0.952
Blended	− 0.930	0.137	− 6.772	<.001
Blended SD	1.588	0.199	7.994	<.001
Length	− 0.613	0.220	− 2.787	0.005
	− 0.006	1.350	− 0.005	0.996

Null model − 2ll = − 2773.3, Full model − 2ll = − 1321.4

and rejected both the options of face-to-face and blended intervention designs in comparison to an online design. A RCT evaluating the use of online CBT for patients with IBD found that online CBT may be helpful for QoL but not in patients with depressive symptoms and it was prone to attrition [35]. However another RCT comparing face-to-face CBT with online CBT in IBD found no difference between the types of delivery. In this later RCT study, it was also noted that patients with greater need (such as those with fatigue) may respond more favorably to CBT [20]. While this evidence collectively does not directly demonstrate how beneficial online CBT in patients with IBD, it does indicate some promise for patients who would really benefit from an online intervention such as those with fatigue. Interestingly, these findings were collected at the beginning of the first global lockdown during the COVID-19 pandemic. It is unknown how the stay-at-home order may have influenced patient preference to online services. Regardless, it is worthwhile exploring how online psychological interventions may benefit patients with IBD fatigue levels.

Rather than comparing the duration of intervention dichotomously, duration was treated continuously in analysis. Findings indicate that when presented with each fixed-pair scenario, patients always preferred the shorter intervention regardless of the combination of durations presented. While informative, this may pose a challenge for clinicians in the development of an intervention as a meta-regression found a small significant association between number of psychotherapy sessions and efficacy [21] whereby the effect size was predicted to increase by a very small amount with each additional session. However, interestingly when examining the association between number of weeks of the intervention and effect size, longer duration resulted in a small decrease

**Fig. 2** Participant preference weights for levels of attributes



**Fig. 3** Relative Importance of Fatigue Intervention Attributes

in effect size, potentially indicating that longer intervention duration can lower patient adherence. The authors also performed a sensitivity analysis using CBT only, and the negative significant relationship between number of weeks and efficacy remained [21]. Therefore, it may be that future interventions should aim for brief forms of psychotherapy with multiple sessions a week.

When weighting each of the attributes for relative importance, participants rated the type of intervention as the most important, followed by modality. In contrast, duration was awarded very little importance by participants, indicating that they are willing to be flexible when it comes to the duration of intervention but less so on the type and how it is delivered. Due to the amount of importance attributed to type of intervention, it may worth exploring why respondents preferred CBT so strongly in comparison to the other descriptions.

**Clinical Implications**

The type of psychological intervention that people with IBD seem to preference most for managing their fatigue is a short online CBT intervention. A benefit of CBT is that

it demonstrates efficacy in improving outcomes (such as depressive symptoms and quality of life) in a short number of weeks [21]. However, as only one eight-week CBT intervention has been trialled for IBD fatigue to date [11], it is unclear what minimum number of weeks is required to see a benefit in IBD fatigue. Additionally, the use of online CBT interventions in IBD is becoming more popular, with recent studies investigating its feasibility in improving pain in IBD [36]. This may be a beneficial avenue of further exploration given the strength of patient preference.

**Limitations**

A limitation of the present study is the convenience sampling used which relied on a self-reported IBD diagnosis, with no objective measure to indicate disease activity. As such, it is unclear how present disease status may have impacted intervention preference. In line with this, there was no measure of sleep, which may have also contributed to the respondents' present fatigue status. Further, there is a gender bias in our sampling as predominately females responded to the survey. As females are more likely to engage in psychotherapy than male patients [37], we are missing a significant proportion of the IBD population in this sample. Consequently, we cannot be certain of the preferences of males with IBD or explore how to increase their engagement in a psychological intervention for IBD fatigue. There is also likely a bias in the recruitment of this study as half of those who responded were already familiar with and therefore likely open to the use psychotherapy. Further, while the descriptions of each of the psychotherapies were approved by the registered psychologists on the research team, it is possible that the descriptions were written in a way to bias a preference toward CBT as most desirable because the description was familiar to the respondent. As a result, respondents may not have the familiarity to understand what the other interventions entail. As we did not ascertain what previous

experience respondents had with psychotherapy, we are unsure how this may bias our results. As the description of each form of psychotherapy was kept brief and limited to the lay-person description, it is unclear whether respondents understood what sort of features are encompassed within each form of psychotherapy therefore we have no way to ascertain if these features influenced preference. Future studies should explore what feature of psychotherapy are most desirable to those with IBD to influence future intervention development. We also failed to ascertain potential preferences for group therapy versus individual therapy, as group therapies are effective in improving patient coping and adaptation while increasing social support and social integration in chronic illness populations [38].

It is also important to note that preference for a type of psychological intervention does not mean that intervention will be effective. The most important limitation of the study is that the conjoint analysis is run on combinations of attributes that we decided (based on experience and knowledge of past research). It cannot generalize to other treatment types that were not considered and therefore means a different pattern of response may emerge if different attributes were selected. Building on this, this study was also unable to run sub-analyses on how different patient features (such as demographic factors and IBD sub-type) to determine how these factors may be drivers of preference. It is important for future studies to explore these factors specifically to better inform intervention development.

## Future Directions

To address the limitations of the present study, a replication study should be conducted with the additional element of psychoeducation to explain what each of the different types of psychotherapies involves and to determine whether CBT is the true preference of those with IBD. Additionally, qualitative interviews with a rich sample should be conducted to better understand patient preferences and how to best develop an intervention in line with patient preferences to which a future pilot RCT can be built upon.

## Conclusion

Based on the presented attributes, patients with IBD appear to most strongly preference a short online CBT intervention to manage their IBD fatigue. This study helps provide direction for where future research into the development of a psychological intervention for fatigue should be guided.

**Author's contribution** CE, AMW, and MFT developed the study. PG advised on the clinical implications in the development of the research.

LO offered expertise in the clinical interventions investigated in the study. CE ran the study, collected the data, and wrote the main manuscript. AMW supported CE in the completion of the study, offering feedback on the main sections. DS, MFT and CE ran the main data analysis, with DS developing the relevant figures and assisting in the interpretation of findings. All authors provided feedback and contributed to the finalisation of the manuscript.

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## Declarations

**Competing interests** The authors declare no competing interests.

**Ethical approval** The study was approved by the Deakin University Human Ethics Advisory Group in November 2019. Participants were informed that consent would be implied by the continuation of the survey.

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