

Irritable Bowel or Irritable Brain? Cognitive Behavioural Therapy for Irritable Bowel Syndrome: A Review and Recommendations for Clinical Practice

Tran L^{1,2*} and Martin E¹

¹School of Medicine, Deakin University, Geelong, Victoria, Australia

²Department of Medicine, South West Healthcare, Warrnambool, Victoria, Australia

*Corresponding author:

Liem Tran,
School of Medicine, Deakin University, Geelong,
Victoria, Australia; Tel: +61 423 153 918;
E-mail: liem.tran@sa.gov.au

Received: 09 Feb 2022

Accepted: 21 Feb 2022

Published: 28 Feb 2022

J Short Name: JJGH

Copyright:

©2022 Tran L, This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and build upon your work non-commercially.

Citation:

Tran L, Irritable Bowel or Irritable Brain? Cognitive Behavioural Therapy for Irritable Bowel Syndrome: A Review and Recommendations for Clinical Practice. Japanese J Gastro Hepato. 2022; V8(8): 1-7

Keywords:

Irritable bowel syndrome; Psychotherapy; Cognitive behavioural therapy; CBT, IBS

1. Abstract

Irritable Bowel Syndrome (IBS) is a chronic gastrointestinal disorder commonly seen in general practice. IBS has been described as a disturbance of the brain-gut axis where psychological stressors, such as stressful life events and anxiety, may affect the onset and development of this condition. Despite the availability of different management options, current treatments for IBS are unsatisfactory. Pharmacological treatments have been shown to reduce symptoms for only a small proportion of IBS patients and can cause unwanted side effects. Given the recent shift in increased attention to the brain-gut axis, psychological treatments, such as Cognitive Behavioural Therapy (CBT), have demonstrated improvements in IBS-related symptom severity, psychological distress and quality of life. The purpose of this paper is to undertake a review of the evidence for CBT in patients with IBS. Further discussion on future implications and clinically-relevant recommendations relating to CBT for researchers, clinicians and patients with IBS are also made. A comprehensive literature search was conducted in three databases (Medline, Embase and Web of Science) to identify relevant data from CBT studies conducted in adults with IBS. There is a large body of research to support the delivery of CBT for adults with IBS. However, the usefulness of these results is potentially limited by poor methodological quality within the literature, including small sample sizes and poor control conditions. Despite evidence supporting the efficacy of CBT in IBS, the therapy is associated with barriers to access including limited availability of services, lack of appropriately-trained clinicians, high costs and time demands. Future research directions should concentrate on increasing CBT accessibility for patients with IBS and

improving training resources to allow more healthcare providers to deliver this intervention competently.

2. Introduction

Irritable Bowel Syndrome (IBS) is a chronic and disabling gastrointestinal disorder that causes unexplained abdominal pain or discomfort, with altered bowel disturbances resulting in diarrhoea, constipation or both [1, 2]. As a leading contributor to global disease burden, IBS affects around 20% of the adult population worldwide, but this is likely an underestimate as very few IBS sufferers seek medical attention [3]. IBS incurs a global economic burden of almost \$1 billion USD, which is comparable to other common chronic diseases, such as heart disease and diabetes [4, 5]. IBS is associated with a reduced quality of life, poor social functioning and increased psychological comorbidities, such as depression and anxiety [6]. Furthermore, the onset of IBS commonly occurs in young adulthood, a period that is critical for developing social relationships and education, causing significant psychosocial impact [3].

There is no widely accepted management approach for IBS [7, 8]. Patients with IBS often complain of feeling hopeless and frustrated at the lack of effective management strategies for the condition [2, 9]. The current treatment of IBS relies on lifestyle changes, including dietary modifications and pharmacological therapy [3]. However, many patients who undergo routine conventional therapies fail to find complete symptomatic relief and suffer ongoing symptoms [3]. Despite the common use of IBS prescription medications by clinicians, the evidence for their efficacy is weak and associated with medication-related adverse effects [10].

Psychological treatments have been studied extensively and have demonstrated efficacy for the management of mood and psychiatric disorders [11, 12]. Recent literature has suggested that psychological therapies could be used as a treatment for IBS [13, 14]. Given how closely the gut and brain interact, IBS has often been thought of as a disorder of the brain-gut axis; this will be further explained in the next section. The brain-gut hypothesis of IBS has led to an increased understanding about how psychological factors, such as anxiety and stress, may elicit IBS-related symptoms [15]. Psychological therapies, particularly Cognitive Behavioural Therapy (CBT), may have a role in targeting dysregulated brain-gut signals and reducing IBS symptoms by focusing on changing the patient's patterns of unhelpful and maladaptive thoughts and behaviour [16]. To date, international IBS guidelines do not provide conclusive recommendations for the use of psychological therapies as part of the standard of care in IBS [17]. This critical review will explore current evidence available on the role of psychological therapies, particularly CBT, in patients with IBS as part of an up-to-date synthesis of the current literature. Findings from this review may serve to inform clinical practice and future research directions in IBS management.

3. Methods

Electronic searching of three databases (Medline, Embase and Web of Science) was conducted from inception to July 2021. These databases were included due to their comprehensive repository of peer-reviewed medical literature pertinent to the topic. The search strategy was developed in consultation with an academic librarian and included search terms related to the population of interest (irritable bowel syndrome) and intervention (cognitive behavioural therapy). Studies that related to the role of cognitive behavioural therapy as treatment for IBS were selected for inclusion as part of the review. Due to resource limitations and translation bias, only English language publications were included. Reference lists of studies identified for inclusion were also checked for additional potentially-relevant studies that may have been missed in the electronic search.

4. The Role of the Brain-Gut-Axis in Ibs

Although the aetiology of IBS is complex and remains largely unknown, evidence has recently emerged in support of the biopsychosocial model of IBS [18]. This model suggests that the onset and exacerbation of IBS result from interactions between biological and psychosocial factors, rather than a single, linear cause-effect relationship [15]. Furthermore, the close relationship between the gut and brain may also explain the high prevalence of common psychological disorders, such as depression and anxiety, in patients with IBS compared to the general population [4, 19, 20]. The physiological mechanisms that may underpin this relationship are collectively known as the 'brain-gut axis' [20].

The brain-gut axis is the neurohormonal signalling that takes place between the brain and the enteric nervous system, which is located in the gastrointestinal system or 'gut' [20]. A growing body of literature

has shown that brain structures closely linked to emotion can influence and disturb the brain-gut axis leading to altered bowel motility, an immune reaction and visceral hypersensitivity all contributing to the experience of symptoms in IBS [4, 19, 20]. The gastrointestinal system directly communicates with the brain through key nerve signals and neurotransmitters such as noradrenaline and serotonin, providing a bi-directional link between the brain and gut microbiota [21, 22].

Various biopsychosocial models related to IBS have been proposed, with some emphasising the crucial function of psychological stressors, especially stress and anxiety, in the aetiology of IBS [18, 23]. Despite the significant psychological burden associated with IBS and the impact of the patient's psychology on the disease course, psychological distress is often underdiagnosed and undertreated in IBS patients resulting in poor disease management [4, 24]. Some researchers suggest that the altered bowel function associated with IBS itself may be the cause for the development of psychological distress, as fear of IBS flare-ups can cause patients to experience a range of distressing emotions, such as anxiety and depression [4, 25]. Similarly, social and psychological factors, such as stressful life events or childhood trauma, may alter the development of IBS by conditioning psychosocial development leading to brain-gut dysregulation, heightened symptom perception and/or worsened illness behaviours, such as isolation and decreased medication adherence [18]. There is a need for further research to clarify the role of psychological and social influences in the development of IBS. Given that IBS is a disorder along the brain-gut axis, it is unlikely that IBS treatments which entirely target physiological mechanisms and fail to address psychological factors will achieve adequate IBS symptom control [21, 26].

5. Psychological-Based Interventions

Recent research suggests that psychological therapy aimed at stress reduction, learning healthy coping strategies and reducing avoidance behaviours, such as poor medication adherence, may improve psychological wellbeing in addition to disease-specific outcomes in IBS [27]. Furthermore, psychological therapies have been effective in reducing symptoms in a wide range of chronic health conditions, from asthma to inflammatory bowel disease [28, 29]. Psychotherapy options utilised in these conditions included self-help, CBT, gut-directed hypnotherapy, mindfulness-based therapy, and relaxation therapy [27-29]. Over the last 20 years, a substantial body of research, including large scale trials, has been carried out on the effectiveness of psychological therapy for functional gastrointestinal disorders, such as IBS [30, 31]. Indeed, the results of various meta-analyses have indicated that psychological therapies are useful at reducing IBS-related symptoms in a significant number of patients and that these treatment effects are sufficiently long-lasting over time [13, 30]. A recent meta-analysis included 41 trials with 4,072 patients and assessed the impact of different psychological treatments with a mix of control treatments for IBS [13]. It was shown that psychotherapy treatments, particularly

CBT and gut-directed hypnotherapy, decreased IBS symptoms whilst the long-term efficacy of these treatments remained significant compared to the control groups. Another systematic review compared mental health and social functioning outcomes between psychotherapy intervention groups and control groups in patients with IBS [32]. All psychotherapeutic options, which included CBT, psychodynamic therapy and gut-directed hypnotherapy, were more effective in the intervention group compared to the control group in terms of improving quality of life and social functioning in IBS patients [32].

6. Cognitive Behavioural Therapy for Ibs

Cognitive Behavioural Therapy (CBT) is a broad term used to describe many different psychological techniques that focus on identifying the patient's own dysfunctional thought processes and how their behaviour patterns may contribute to their current symptoms or feelings [33]. A patient with IBS may complain that some ele-

ments of their condition are embarrassing, upsetting or difficult to manage [9]. Whilst this response might be a genuine physiological reaction in some instances, these patients often have an exaggerated or prolonged stress response compared with the actual physiological threat manifesting in increasing anxiety, worry or pain [15, 18]. This is worsened by the fact that many IBS patients have inadequate coping skills and personal resources, which leads to poor daily functioning and worsening IBS symptoms [34]. In daily life, this might mean that a person changes their behaviour, such as by avoiding social activities or not taking their medication, due to illness or discomfort [35]. This can lead to what many authors label as the 'cycle of worry' whereby perceived physical symptoms are misinterpreted, which maintains and perpetuates the negative behaviour patterns (Figure 1) [36]. In CBT, the therapist aims to disrupt this vicious cycle and help patients learn to change unhelpful behaviours, such as avoidance and isolation, that may manifest in IBS symptoms [27].

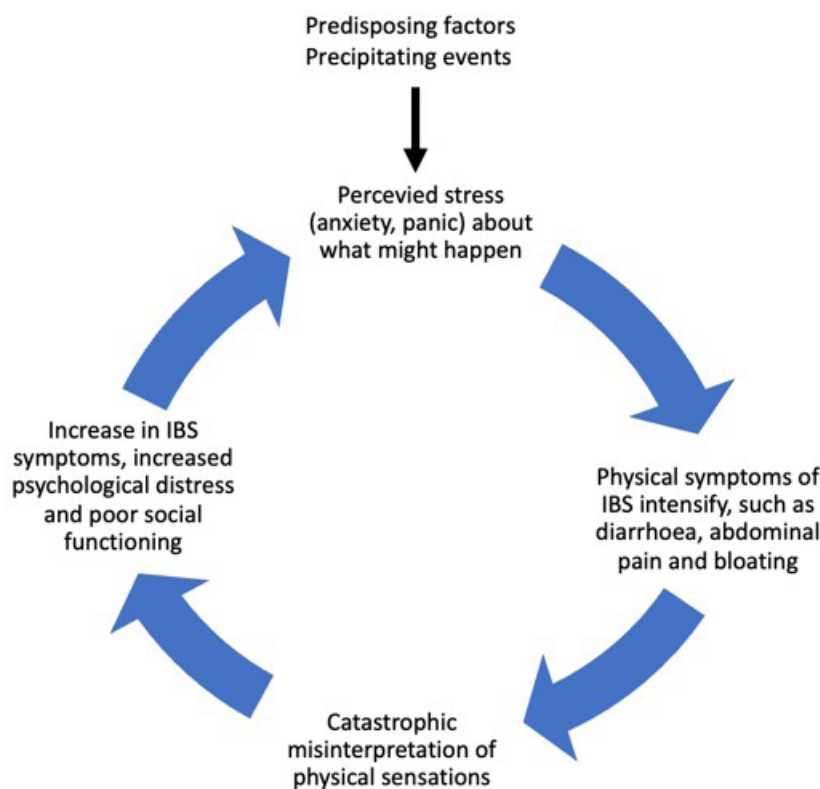


Figure 1: IBS Cycle of Worry

CBT should be adapted to an individual's presenting problem and as a result, interventions described as 'CBT' cannot be assumed to be equivalent entities [37]. The framework for the majority of CBT consists of psychoeducation, stress reduction, cognitive reframing and/or exposure therapy [38]. CBT might vary in regard to the mode of delivery (e.g. face-to-face, online), frequency (daily, weekly, fortnightly), treatment duration, the person delivering the CBT (e.g. psychologist, doctor, social worker), the setting (e.g. hospital, general practice, community clinic) and whether the therapy is delivered in a group or individual format [37, 38]. In most randomised trials, IBS patients receive CBT for around 6-12 sessions; however, the optimal length

of treatment is not yet fully known [13].

CBT differentiates itself from other psychological therapies by being the most empirically researched form of psychotherapy for IBS [13, 39]. However, there is a paucity of primary research on the use of CBT in IBS compared to other health disorders, such as depression and anxiety [3]. In randomised studies, CBT has demonstrated significant benefits with respect to IBS symptoms, such as reduced pain and improved bowel function, in comparison with placebo-control groups [40-43]. Recent meta-analyses have shown benefits associated with CBT that include improvements in symptom control, quality of life and mental health and these benefits remain at long-term

follow-up [44-46]. While the most recent systematic review found evidence that CBT had a beneficial effect, the review included some studies with poor methodological quality, such as poor blinding and high risks of bias, which may have diluted the positive effects in the review [13]. Adverse events were notably underreported by authors in most studies in the review [13]. This is concerning as it could suggest an underestimation that these events occur and could lead to a misunderstanding of these research findings for clinicians, patients and researchers. Future studies investigating CBT intervention for patients with IBS should involve analysis of adverse outcomes including but not limited to treatment failure, worsening of IBS symptoms, psychological distress, harm to self or suicidal behaviour. Furthermore, the majority of studies in the meta-analysis did not include patients with IBS and concomitant psychological disorders and where psychological outcomes were included, they were a secondary focus [13]. Most of the studies relied on screening instruments for anxiety and depression rather than an individual psychiatric assessment, which is viewed as the gold standard when diagnosing psychological diagnosis [47]. Whilst it is noted that individual psychiatric assessment may be difficult to conduct in large studies due to cost, it is important to recognise the need for more rigorous studies on populations with significant psychological comorbidity rather than low levels of psychological distress. Until this can occur, we may not be certain whether psychological therapies improve the associated psychological distress in IBS patients.

7. Clinical Implications and Future Considerations

The use of psychotherapy to manage IBS is becoming more widely accepted and CBT may be an effective treatment for IBS [13, 30]. Although IBS is the most prevalent gastrointestinal disorder diagnosed in primary practice, there are practical limitations that diminish the clinical utility of CBT, such as long wait-lists, lack of trained therapists, cost and perceived stigma associated with accessing psychological treatment [16]. Furthermore, the likelihood of CBT being successful is largely dependent on the patient's motivation levels and receptiveness to this therapy, which may make it inappropriate for some patients [16]. Several authors have recognised this problem and have endeavoured to address this by reducing the number of CBT visits in a standard program of therapy [48, 49]. One randomised trial showed that IBS patients have immediate improvements in IBS symptoms to CBT in only four sessions [49]. Other studies investigating a brief CBT treatment approach have also demonstrated efficacy in other health conditions, such as asthma [50]. It is increasingly clear that there is a significant unmet need for a modified CBT that is shorter and more cost-effective while retaining the clinical effectiveness of traditional CBT. This has highlighted a need for further studies to compare the efficacy and cost-effectiveness of briefer CBT interventions with standard CBT interventions. Furthermore, in order to work towards CBT being an essential element of routine care, more resources and training should be allocated to aid clinicians in competently delivering CBT for common functional gastroenter-

ology conditions, such as IBS.

More work is required to establish and implement the adoption of evidence-based CBT into existing medical practices and routine care. The provision of CBT in current IBS practice is based on isolated intervention approaches (34). In an ideal world, the delivery of CBT would be integrated as part of a multidisciplinary approach, with the psychologist communicating regularly with the treating specialist. However, this service integration rarely occurs due to barriers including poor knowledge of CBT amongst clinicians, high costs and lack of skilled therapists (51). Treating IBS through this interdisciplinary and collaborative approach is often necessary, especially in the case of patients with a higher disease burden or refractory symptoms (34). The effective integration of psychological care in primary practice has been demonstrated in other physical illnesses, such as chronic tension headache, leading to a reduction in future healthcare costs, improved psychological well-being and improved quality of life (52). However, many authors have commented on the increasing difficulties of delivering CBT in primary care citing the high financial barriers for both the practice and patient, lengthy treatment regimens and session duration [53, 54]. Most courses of CBT treatment require patients attend a minimum of 10 sessions, which is costly and time-consuming for the patient [38]. Some researchers have recommended the use of alternative delivery methods, such as telehealth, as an approach to increase adherence for young adults with IBS, in order to improve access to care and reduce costs [13, 16]. A systematic review demonstrated that some patients experienced benefits from the delivery of CBT via a range of platforms including telephone, internet and group or self-administered therapy compared to participants in the control group [55]. However, the review was informed by a small number of trials, all of which were subject to methodological weaknesses highlighting the need for further research to evaluate the efficacy of CBT delivered through different modalities. Recently, there has been a greater emphasis on using the internet as a platform to reach a large numbers of patients than has been possible through conventional methods [56]. Some studies have shown that internet-based CBT was more effective at reducing symptom severity than placebo for other chronic illnesses, such as anxiety disorder and panic disorder [57, 58]. Particularly in the next generation of technology-based interventions, more research will be important to understand how to most effectively design and implement practical alternative modalities for CBT. This could be particularly beneficial in patients with IBS and provide both clinicians and patients with greater accessibility compared with conventional psychological treatments.

Advancements are also needed to better customise CBT modalities in patients with IBS to improve cost-effectiveness and overall outcomes. Currently, there is little understanding for which specific components of CBT are most effective at improving IBS symptoms [39]. As detailed in this review, there are several effective ways of improving the symptoms of patients with IBS using CBT, includ-

ing a combination of psychological techniques based on the patient's needs [38]. Given the complex nature of IBS and the influence of psychosocial factors on IBS symptoms, it makes sense that the psychological requirements from the CBT framework may vary between patients with IBS [20]. The customisation of CBT to patients' needs and preferences, such as based on IBS phenotype (constipation-predominant or diarrhoea-predominant), may lead to increased efficiency in CBT interventions (e.g. a shorter course of treatment), improved treatment adherence, fewer adverse effects and improved IBS outcomes [13, 31]. Furthermore, a small randomised controlled trial identified gut-directed hypnotherapy as an effective psychotherapy approach for IBS with very good efficacy; however, it is unknown whether this may lead to better outcomes if used in conjunction with CBT [13]. Further research should focus on assessing which components and/or combination of components commonly used in CBT are effective treatments for IBS.

Finally, although the clinical benefits of CBT for IBS patients are well documented, the findings from the current body of evidence are hampered by methodological limitations, such as small sample sizes, inadequate control conditions and lack of long-term follow-up [13, 30, 44-46]. To strengthen recommendations for future research directions, there is a compelling need for more robust and rigorous randomised controlled trials to improve on the methodological shortcomings of previous studies assessing psychotherapy in IBS. Furthermore, researchers need to select optimal control conditions. This is critical as psychotherapy trials have methodological shortcomings due to their inability to blind patients and the trouble in constructing a placebo that is plausible without being efficacious [59]. These findings have implications for researchers, clinicians and patients, but are not yet clearly represented in current international IBS guidelines [17]. There is also a need for research to assess the impact of starting CBT earlier in the IBS disease process. This is required to better understand whether CBT (which improves psychological wellbeing) may be sufficient to lead to benefits across the spectrum of the disease course. The earlier adoption of psychological therapy programs as an adjunct to the usual standard care for IBS may reduce the economic burden of IBS through indirect future cost savings (e.g. reduced absenteeism from work) and positive downstream effects (e.g. reduced morbidity) [39].

8. Conclusion

It has recently become evident that psychological processes and the dysregulation of the gut-brain axis are key mechanisms underlying the onset and maintenance of IBS [20]. The available evidence supports the use of psychotherapy, particularly CBT, in patients with IBS. Not only can these therapies improve quality of life and associated psychological comorbidity, but they also directly target the brain-gut axis, which may also explain the gastrointestinal effects of common psychological stressors, such as stress and anxiety [39]. However, caution is needed in interpreting these findings, due to the methodological weaknesses in the current research base. There re-

mains a clear need for rigorous data and higher-quality trials that focus on improving accessibility and integration into primary health care to inform the use of CBT before adoption into current clinical IBS practice. Future efforts should also focus on increasing training for clinicians administering behavioural interventions, better multi-disciplinary integration into primary care and research into alternative delivery models.

References

1. Lacy BE, Mearin F, Chang L, Chey WD, Lembo AJ, Simren M, et al. Bowel Disorders. *Gastroenterology*. 2016; 150: 1393-407.
2. Canavan C, West J, Card T. The epidemiology of irritable bowel syndrome. *Clin Epidemiol*. 2014; 6: 71-80.
3. Saha L. Irritable bowel syndrome: pathogenesis, diagnosis, treatment, and evidence-based medicine. *World J Gastroenterol*. 2014; 20: 6759-73.
4. Lee C, Doo E, Choi JM, Jang SH, Ryu HS, Lee JY, et al. The Increased Level of Depression and Anxiety in Irritable Bowel Syndrome Patients Compared with Healthy Controls: Systematic Review and Meta-analysis. *J Neurogastroenterol Motil*. 2017; 23: 349-62.
5. Maxion-Bergemann S, Thielecke F, Abel F, Bergemann R. Costs of irritable bowel syndrome in the UK and US. *Pharmacoeconomics*. 2006; 24: 21-37.
6. Monnikes H. Quality of life in patients with irritable bowel syndrome. *J Clin Gastroenterol*. 2011; 45: 98-101.
7. Lacy BE, Weiser K, De Lee R. The treatment of irritable bowel syndrome. *Therap Adv Gastroenterol*. 2009; 2: 221-38.
8. Khan S, Chang L. Diagnosis and management of IBS. *Nature Reviews Gastroenterology & Hepatology*. 2010; 7: 565-81.
9. Ronnevig M, Vandvik PO, Bergbom I. Patients' experiences of living with irritable bowel syndrome. *J Adv Nurs*. 2009; 65: 1676-85.
10. Lazaraki G, Chatzimavroudis G, Katsinelos P. Recent advances in pharmacological treatment of irritable bowel syndrome. *World J Gastroenterol*. 2014; 20: 8867-85.
11. Linde K, Sigterman K, Kriston L, Rucker G, Jamil S, Meissner K, et al. Effectiveness of psychological treatments for depressive disorders in primary care: systematic review and meta-analysis. *Ann Fam Med*. 2015; 13: 56-68.
12. Malhi GS, Bell E, Bassett D, Boyce P, Bryant R, Hazell P, et al. The 2020 Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for mood disorders. *Aust N Z J Psychiatry*. 2021; 55: 7-117.
13. Black CJ, Thakur ER, Houghton LA, Quigley EMM, Moayyedi P, Ford AC, et al. Efficacy of psychological therapies for irritable bowel syndrome: systematic review and network meta-analysis. *Gut*. 2020; 69: 1441-51.
14. Rawla P, Sunkara T, Raj JP. Updated review of current pharmacological and non-pharmacological management of irritable bowel syndrome. *Life Sci*. 2018; 212: 176-81.
15. Moser G, Fournier C, Peter J. Intestinal microbiome-gut-brain axis and

- irritable bowel syndrome. *Wien Med Wochenschr.* 2018; 168: 62-6.
16. Everitt HA, Landau S, O'Reilly G, Sibelli A, Hughes S, Windgassen S, et al. Cognitive behavioural therapy for irritable bowel syndrome: 24-month follow-up of participants in the ACTIB randomised trial. *Lancet Gastroenterol Hepatol.* 2019; 4: 863-72.
 17. Drossman DA, Camilleri M, Mayer EA, Whitehead WE. AGA technical review on irritable bowel syndrome. *Gastroenterology.* 2002; 123: 2108-31.
 18. Tanaka Y, Kanazawa M, Fukudo S, Drossman DA. Biopsychosocial model of irritable bowel syndrome. *J Neurogastroenterol Motil.* 2011; 17: 131-9.
 19. Levy RL, Olden KW, Naliboff BD, Bradley LA, Francisconi C, Drossman DA, et al. Psychosocial aspects of the functional gastrointestinal disorders. *Gastroenterology.* 2006; 130: 1447-58.
 20. Kennedy PJ, Cryan JF, Dinan TG, Clarke G. Irritable bowel syndrome: a microbiome-gut-brain axis disorder? *World J Gastroenterol.* 2014; 20: 14105-25.
 21. Mudyanadzo TA, Hauzaree C, Yerokhina O, Architha NN, Ashqar HM. Irritable Bowel Syndrome and Depression: A Shared Pathogenesis. *Cureus.* 2018; 10: 3178.
 22. Sugaya N, Izawa S, Saito K, Shiotsuki K, Nomura S, Shimada H, et al. Effect of prolonged stress on the adrenal hormones of individuals with irritable bowel syndrome. *Biopsychosoc Med.* 2015; 9: 4.
 23. Van Oudenhove L, Crowell MD, Drossman DA, Halpert AD, Keefer L, Lackner JM, et al. Biopsychosocial Aspects of Functional Gastrointestinal Disorders. *Gastroenterology.* 2016.
 24. Whitehead WE, Palsson O, Jones KR. Systematic review of the comorbidity of irritable bowel syndrome with other disorders: what are the causes and implications? *Gastroenterology.* 2002; 122: 1140-56.
 25. Chang L. The role of stress on physiologic responses and clinical symptoms in irritable bowel syndrome. *Gastroenterology.* 2011; 140: 761-5.
 26. Qin HY, Cheng CW, Tang XD, Bian ZX. Impact of psychological stress on irritable bowel syndrome. *World J Gastroenterol.* 2014; 20: 14126-31.
 27. Surdea-Bлага T, Baban A, Nedelcu L, Dumitrascu DL. Psychological Interventions for Irritable Bowel Syndrome. *J Gastrointestin Liver Dis.* 2016; 25: 359-66.
 28. Gracie DJ, Irvine AJ, Sood R, Mikocka-Walus A, Hamlin PJ, Ford AC, et al. Effect of psychological therapy on disease activity, psychological comorbidity, and quality of life in inflammatory bowel disease: a systematic review and meta-analysis. *Lancet Gastroenterol Hepatol.* 2017; 2: 189-99.
 29. Yorke J, Fleming SL, Shuldham C. Psychological interventions for adults with asthma: a systematic review. *Respir Med.* 2007; 101: 1-14.
 30. Ford AC, Quigley EM, Lacy BE, Lembo AJ, Saito YA, Schiller LR, et al. Effect of antidepressants and psychological therapies, including hypnotherapy, in irritable bowel syndrome: systematic review and meta-analysis. *Am J Gastroenterol.* 2014; 109: 1350-65.
 31. Palsson OS, Whitehead WE. Psychological treatments in functional gastrointestinal disorders: a primer for the gastroenterologist. *Clin Gastroenterol Hepatol.* 2013; 11: 208-16.
 32. Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS. Comparative efficacy of psychological therapies for improving mental health and daily functioning in irritable bowel syndrome: A systematic review and meta-analysis. *Clin Psychol Rev.* 2017; 51: 142-52.
 33. Davies-Smith L. An introduction to providing cognitive behavioural therapy. *Nurs Times.* 2006; 102: 28-30.
 34. Nelkowska DD. Treating irritable bowel syndrome through an interdisciplinary approach. *Ann Gastroenterol.* 2020; 33: 1-8.
 35. Midenfjord I, Borg A, Tornblom H, Simren M. Cumulative Effect of Psychological Alterations on Gastrointestinal Symptom Severity in Irritable Bowel Syndrome. *Am J Gastroenterol.* 2021; 116: 769-79.
 36. Hauser G, Pletikosic S, Tkalcic M. Cognitive behavioral approach to understanding irritable bowel syndrome. *World J Gastroenterol.* 2014; 20: 6744-58.
 37. Gaudiano BA. Cognitive-behavioural therapies: achievements and challenges. *Evid Based Ment Health.* 2008; 11: 5-7.
 38. David D, Cristea I, Hofmann SG. Why Cognitive Behavioral Therapy Is the Current Gold Standard of Psychotherapy. *Front Psychiatry.* 2018; 9: 4.
 39. Kinsinger SW. Cognitive-behavioral therapy for patients with irritable bowel syndrome: current insights. *Psychol Res Behav Manag.* 2017; 10: 231-7.
 40. Drossman DA, Toner BB, Whitehead WE, Diamant NE, Dalton CB, Duncan S, et al. Cognitive-behavioral therapy versus education and desipramine versus placebo for moderate to severe functional bowel disorders. *Gastroenterology.* 2003; 125: 19-31.
 41. Kennedy T, Jones R, Darnley S, Seed P, Wessely S, Chalder T, et al. Cognitive behaviour therapy in addition to antispasmodic treatment for irritable bowel syndrome in primary care: randomised controlled trial. *Bmj.* 2005; 331: 435.
 42. Heymann-Mönnikes I, Arnold R, Florin I, Herda C, Melfsen S, Mönnikes H, et al. The combination of medical treatment plus multicomponent behavioral therapy is superior to medical treatment alone in the therapy of irritable bowel syndrome. *Am J Gastroenterol.* 2000; 95: 981-94.
 43. Mahvi-Shirazi M, Fathi-Ashtiani A, Rasoolzade-Tabatabaei SK, Amini M. Irritable bowel syndrome treatment: cognitive behavioral therapy versus medical treatment. *Arch Med Sci.* 2012; 8: 123-9.
 44. Li L, Xiong L, Zhang S, Yu Q, Chen M. Cognitive-behavioral therapy for irritable bowel syndrome: a meta-analysis. *J Psychosom Res.* 2014; 77: 1-12.
 45. Ford AC, Talley NJ, Schoenfeld PS, Quigley EM, Moayyedi P. Efficacy of antidepressants and psychological therapies in irritable bowel syndrome: systematic review and meta-analysis. *Gut.* 2009; 58: 367-78.
 46. Zijdenbos IL, de Wit NJ, van der Heijden GJ, Rubin G, Quartero AO. Psychological treatments for the management of irritable bowel syn-

- drome. *Cochrane Database Syst Rev.* 2009; 006442.
47. Meyer GJ, Finn SE, Eyde LD, Kay GG, Moreland KL, Dies RR, et al. Psychological testing and psychological assessment. A review of evidence and issues. *Am Psychol.* 2001; 56: 128-65.
 48. Lackner JM, Jaccard J, Krasner SS, Katz LA, Gudleski GD, Holroyd K, et al. Self-administered cognitive behavior therapy for moderate to severe irritable bowel syndrome: clinical efficacy, tolerability, feasibility. *Clin Gastroenterol Hepatol.* 2008; 6: 899-906.
 49. Lackner JM, Gudleski GD, Keefer L, Krasner SS, Powell C, Katz LA, et al. Rapid response to cognitive behavior therapy predicts treatment outcome in patients with irritable bowel syndrome. *Clin Gastroenterol Hepatol.* 2010; 8: 426-32.
 50. Kew KM, Nashed M, Dulay V, Yorke J. Cognitive behavioural therapy (CBT) for adults and adolescents with asthma. *Cochrane Database Syst Rev.* 2016; 9: 011818.
 51. Mol M, Dozeman E, van Schaik DJ, Vis CP, Riper H, Smit JH, et al. The therapist's role in the implementation of internet-based cognitive behavioural therapy for patients with depression: study protocol. *BMC Psychiatry.* 2016; 16: 338.
 52. Perlini C, Donisi V, Del Piccolo L. From research to clinical practice: a systematic review of the implementation of psychological interventions for chronic headache in adults. *BMC Health Serv Res.* 2020; 20: 459.
 53. Mignogna J, Hundt NE, Kauth MR, Kunik ME, Sorocco KH, Naik AD, et al. Implementing brief cognitive behavioral therapy in primary care: A pilot study. *Transl Behav Med.* 2014; 4: 175-83.
 54. Weisberg RB, Magidson JF. Integrating cognitive behavioral therapy into primary care settings. *Cogn Behav Pract.* 2014; 21: 247-51.
 55. Altayar O, Sharma V, Prokop LJ, Sood A, Murad MH. Psychological therapies in patients with irritable bowel syndrome: a systematic review and meta-analysis of randomized controlled trials. *Gastroenterol Res Pract.* 2015; 2015: 549308.
 56. Webb CA, Rosso IM, Rauch SL. Internet-Based Cognitive-Behavioral Therapy for Depression: Current Progress and Future Directions. *Harv Rev Psychiatry.* 2017; 25: 114-22.
 57. Stech EP, Lim J, Upton EL, Newby JM. Internet-delivered cognitive behavioral therapy for panic disorder with or without agoraphobia: a systematic review and meta-analysis. *Cogn Behav Ther.* 2020; 49: 270-93.
 58. Kumar V, Sattar Y, Bseiso A, Khan S, Rutkofsky IH. The Effectiveness of Internet-Based Cognitive Behavioral Therapy in Treatment of Psychiatric Disorders. *Cureus.* 2017; 9: 1626.
 59. Mohr DC, Ho J, Hart TL, Baron KG, Berendsen M, Beckner V, et al. Control condition design and implementation features in controlled trials: a meta-analysis of trials evaluating psychotherapy for depression. *Transl Behav Med.* 2014; 4: 407-23.