

A case report on the impact of a digital health intervention in the integrated care management for IBS in India

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ABSTRACT

Irritable bowel syndrome (IBS) is a chronic functional gastrointestinal disorder characterized by abdominal discomfort and altered bowel habits. Despite its prevalence, IBS remains challenging due to its multifactorial pathophysiology. Digital health interventions offer novel solutions, integrating dietary, psychological, and wellness interventions. This case report explores the use of the DailyBloom IBS App in managing IBS in a patient with IBS diarrhea-predominant. This patient underwent a structured 14-week program that included a low-FODMAP diet, cognitive behavioral therapy, and physical wellness therapy modules through a smartphone application. The patient noted significant improvement in abdominal pain, bloating, and diarrhea frequency. Improvements were also observed in quality-of-life measures, anxiety, and stress levels, with adherence facilitated by the app's tracking features. The patient's symptoms improved substantially from baseline, reflecting overall symptom relief and lifestyle improvement.

Key words: Digital health intervention, Integrated care, irritable bowel syndrome, Low-FODMAP diet, Physical wellness, Psychological therapy


Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder affecting an estimated 10–15% of the global population [1], whereas, in India, its prevalence ranges from 4.0% to 7.9% [2]. It is defined by recurring symptoms, including abdominal pain, bloating, and altered bowel habits, which vary in severity and form, leading to subtypes such as IBS diarrhea-predominant (IBS-D), IBS-constipation-predominant, and IBS-mixed [3]. The underlying pathophysiology of IBS is complex and not fully understood, though factors such as gut-brain axis dysfunction, stress, diet, and microbial imbalances are known contributors [4]. Conventional treatment approaches often involve pharmacological options for symptom relief; however, growing evidence supports an integrated care approach that combines dietary management, psychological therapy, and physical wellness (PW) techniques, addressing the disorder's multifactorial nature [5].

This case report evaluates the benefit of a digital health interventions (DHI) designed to deliver a 14-week program. This structured intervention leverages non-pharmacological therapies tailored to individual patient needs, focusing on reducing symptom severity and improving quality of life through four key phases.

CASE REPORT

A 36-year-old female homemaker came to the outpatient department with a complaint of persistent diarrhea associated with pain in the abdomen for more than a year, which is insidious in onset and gradually worsening over a 1.5-year duration. She has a body mass index of 28.34 kg/m² and a history of hypertension (on irregular medication), fatty liver, and inactive peptic ulcer presented with symptoms consistent with IBS-D as per the ROME-IV criterion [5] for over 1.5 years. At the time of presentation, all the routine serological investigations were within normal limits, and the abdomen ultrasound and fecal calprotectin test were also normal. The patient visited multiple times for repeated exacerbations of her IBS symptoms and was prescribed medications – mebeverine and chlordiazepoxide with probiotics, which provided relief over the short-term period.

The general appearance of the patient showed that the patient was well-nourished and slightly anxious. The heart sounds were normal, and there were no murmurs heard. The respiratory system showed clear breath sounds bilaterally. The abdomen was soft and non-tender, with no hepatosplenomegaly. On examination, the blood pressure was 140/90 mm Hg, heart rate was 82 beats/min, respiratory rate was 18 breaths/min, and the temperature was 98.6°F.

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The patient was recommended to begin this 14-week DailyBloom IBS program with non-pharmacological interventions in March 2024 comprising of the following phases:

Discovery phase

This phase enables the care team, comprising of a dedicated nutritionist and a psychologist, to get introduced and make the patient fully understand their medical history, orientation in the mobile application – installation and usage, and the extent of personalization required for each intervention over a telephone call. The patient recorded her baseline symptoms of abdominal pain to be about 4 times a week, bloating 3 times a week, and diarrhea 2 times a week. Furthermore, she mentioned that her daily routine was affected significantly. The personalized diet plan for the 1st week of the second phase was curated by the nutritionist, and the patient was initiated on progressive muscle relaxation (PMR) exercise through pre-recorded videos in the app. She was also started on 20 min yoga modules which were specific to her current symptoms and included the sequence – Om chanting, Vyaghrasana breathing, spinal movements, Pawanmuktasana (Wind Release Pose), Padahasthasana, Trikonasana, Alternate Nostril Breathing, Silent Meditation + Om Chanting. The patient was able to track her symptoms, visualize the recommended daily diet plan, maintain a thought diary, and practice meal logging and PW through the pre-recorded videos.

Elimination phase

The second phase, over weeks 2–5 for 4 weeks, consisted of a low-FODMAP diet (LFD) regimen. The diet plan for the subsequent week is prepared through a programmed diet plan algorithm incorporating personalized food recipes under the guidance of a nutritionist aimed to eliminate high FODMAP foods known to exacerbate IBS symptoms.

The LFD diet included millets, sprouted pulses, and vegetables such as cucumber, as per Table 1. This helped the patient plan well in advance to source the recommended ingredients required for the week ahead.

She continued to practice cue-controlled relaxation (CR) and yoga modules as instructed. Her daily water intake increased from 2 to 3 L as per her nutritionist's advice. At the end of this phase, the patient reported abdominal pain 4 times a week, bloating 2 times a week, and diarrhea 3 times a week, and added that her symptoms continue to affect her daily routine, although to a lesser extent than earlier.

Reintroduction phase

The third phase, over weeks 6–11 for 6 weeks, consists of reintroducing high FODMAP foods gradually and sequentially interspersed between LFD diets. This is to assess specific tolerance levels to different food categories. Tamarind and citrus foods were known food triggers for the patient. During this phase, cauliflower and carrots were newly identified food triggers. By

the end of this phase, the list of food items that were found to be safe in portions was: Wheat roti – 50 g, sooji upma – 140 g, apple – 150 g, mango – 150 g, turmeric milk – 250 mL, mint buttermilk – 250 mL, peas parantha – 60 g, cucumber and onion salad – 75 g, garlic bread – 3 g, besan dhokla – 70 g, and toor dal khichdi – 70 g.

She reported to be benefit from PMR sessions and, thus, was encouraged to continue practicing regularly to manage her stress. Another set of yoga modules was introduced to help her manage the bloating and burping reported during this phase. This included a 20-min video comprising OM chanting, Shashankasana breathing, spinal movements, Pawanmuktasana (Wind Release Pose), Ardha Halasana – Beginner Viparitarani, Matsyasana, Kapalabhati Kriya, Silent Meditation + OM Chanting. By the end of this phase, she was found to adhere substantially to her daily meal logging in the app and reported better control over her symptoms, as follows: No episodes of abdominal pain, one episode of bloating per week, three episodes of diarrhea per week, and her daily routine continuing to be affected a little.

Sustenance phase

In the final phase, over weeks 12–14 for 3 weeks, the patient followed the personalized meal plan as identified in the reintroduction phase. She reported further improvements in her IBS symptoms. Diarrhea was reduced to 3 times weekly, and with minimal bloating. She maintained adherence to the thought diary and reported overall satisfaction with her symptoms. She achieved further improvements in her life quality and was able to adapt and maintain a regular diet plan with minimal modifications, keeping her known and newly identified food triggers into consideration. The patient over this 14-week program had completed 10 calls with the nutritionist and four calls with the psychologist, logged 587 meals (out of 7 meal logs/day), and watched videos 63 times over varied time durations. Therefore, the overall adherence to the program was found to be considerably high.

DISCUSSION

This IBS-D case report demonstrated significant symptom relief and quality-of-life improvements over the recommended 14-week DHI program. The phased dietary plan based on good evidence, starting with dietary elimination (LFD) [6,7], progressing through targeted reintroduction of high-FODMAP foods, and concluding with sustainable dietary practices, has helped the patient manage her condition better despite her long medical history. This mirrors findings published already about LFD that have effectively reduced IBS symptoms, particularly bloating and diarrhea [8].

Psychological therapy delivered by psychologists over the telephone, based on gut-directed cognitive behavioral therapy principles and Cue-CR, PMR, mindful meditation-based, and PW-based videos contributed to reducing stress, and improving sleep quality [9]. Regular adherence to phone calls over 14 weeks enabled the patient to manage symptoms on their own.

Table 1: Low FODMAP food recommended during gut cleanse phase

Early morning	Jeera water (1 glass) overnight soaked almonds (6 No) overnight Soaked walnuts (2 No)	Chia seeds water (1 glass) overnight soaked almonds (6 Nos) overnight soaked walnuts (2 No)	Lemon ginger water (1 glass) overnight soaked almonds (06 Nos) overnight soaked walnuts (2 No.s)		
Breakfast	Sabudana Khichdi (1 bowl) Yogurt with Flax seeds (1 bowl)	Palak Methi Paratha (1 Nos) Coriander and Mint Chutney (2 Tsp) Yogurt with Flax seeds (1 bowl)	Jowar Upma (1 bowl) Peanut Chutney (2 Tbsp) Masala Tea (1 cup)	Scrambled eggs (1 bowl) Gluten Free Bread Toast (1 No) Masala Tea (1 cup)	Turmeric Milk (1 glass) Millet Poha (1 bowl)
Midday Snack	Orange (1 No) Sunflower seeds (2 Tsp)	Papaya Smoothie (1 Glass)	Kiwi (1 No) Flax seeds (2Tbsp)		
Lunch	Butter Chicken (1 bowl) Bajra Roti (2 No) Asian Cucumber Salad (1 bowl)	Jeera Rice (1 Bowl) Yogurt with Flax seeds (1 bowl) Green Salad with sprouts (1 Bowl)	Millet Pulav (1 bowl) Yogurt with Flax seeds (1 bowl) Asian cucumber salad (1 bowl)	Mint cucumber raita (1 bowl) Jowar roti (2 Nos) Beans Sabzi (1 bowl)	Palak Dal (1 bowl) Jowar Roti (2 Nos) MiX Veg Sabzi (1 bowl)
Evening Snack	Black Tea (1 cup) Makhana Laddoo (1 No)	Masala Tea (1 cup) Sprout Chat (0.5 bowl)	Ginger Tea (1cup) Bhel Puri (0.5 bowl)		
Dinner	Dal Tadka (1 bowl) Oats Roti (1 No) Pumpkin Sabzi (1 bowl)	Sprouted Moong Dal Roti (2 Nos) Ginger chutney 92 Tbsp) Carrot Coriander Soup (1 bowl)	Dal Tadka (1 bowl) Bajra Roti (1 No) Baigan Bharta (0.5 bowl)	Lauki kofta (1 bowl) Oats roti (1 Nos) Vegetable Raita (1 bowl)	Chicken Pulav (1 bowl) Yogurt with Flax seeds (1 bowl) Asian Cucumber salad (1 bowl)
Bedtime	Turmeric Milk (1 Glass)				

DHIs have shown promise in enhancing patient engagement and promoting long-term behavioral changes in helping them manage chronic conditions, including IBS [10]. Evidence-based DHIs such as the DailyBloom IBS App incorporating all three non-pharmacological interventions simultaneously with personalization features enabled this patient to maintain a high level of adherence observed through phone call connects, meal logging, watching videos, and daily thought tracking, leading to gradually greater improvements in symptoms over 14 weeks, thereby reflecting the potential of such integrated care aligned DHIs necessary in overall IBS management, especially from a patient's perspective of desiring symptom relief and improvement in life quality over and above conventional therapies. In addition, the patient could identify two new dietary triggers in addition to those already known, which helped with overall personalization.

This case report aligns with the current evidence supporting an integrated approach over conventional healthcare delivery, including non-pharmacological approaches for improving overall IBS management. Studies indicate that combining evidence-based dietary modifications, psychological therapy, and PW simultaneously over 3 months yielded better outcomes than any one singular approach [11].

CONCLUSION

This IBS-D case report emphasizes the key role of early diagnosis and the innovative, gastroenterologist-led, integrated, evidence-based DHI approach. Incorporating non-pharmacological options such as specific dietary and lifestyle modifications, psychotherapy, and PW therapies effectively addresses the multifaceted nature of IBS, particularly as a gut-brain axis disorder. An integrated

approach not only significantly improves overall patient outcomes but also highlights the importance of digital delivery for the majority of patients, especially in the Indian context. Further research is needed to evaluate the long-term effectiveness and scalability of DHIs across broader IBS populations. This could pave the way for such personalized and effective DHIs, reflecting the need for consistent patient care to further improve IBS patient outcomes.

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