

# Nurse-led self-management support to improve symptom management and self-reported outcomes in people with irritable bowel syndrome

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## Abstract

**Objectives:** Irritable bowel syndrome (IBS) is a disorder of gut-brain interaction with an unknown precise etiology. Intricate mechanisms underlying the disruption of bidirectional communication between the brain and the gut may influence the severity of symptoms as well as the response to self-management interventions. Management of IBS can be particularly challenging due to recurrent and resistant symptoms to therapeutic approaches. The present study aimed to evaluate the role of nurse-led self-management support on symptom management and self-reported outcomes in people with IBS.

**Methods:** In the current study, which was part of a parent randomized controlled trial, participants with IBS received one-on-one self-management intervention either by phone or in-person by Registered Nurses (RNs) in 3 sessions over 12 weeks. Each intervention was between 15 and 30 minutes. During the first intervention, the RN asked open-ended questions on symptom episodes, stress, physical activity, Quality of Life (QOL), and diet to provide recommendations for improved self-management. At the second and the third nurse-led self-management sessions, the RN helped in problem-identification and solving throughout the intervention. Quantitative content analysis was performed using the coding system developed by 2 authors for analyzing the participants' responses.

**Results:** In total, 24 participants with IBS completed the 3 nurse-led self-management sessions. Participants' mean age was 21.37 ( $\pm$  2.55) years old, and 83.33% were female. At the first nurse-led self-management session, 79% of participants reported pain, 62.5% reported bloating, 50% reported diarrhea, 37.5% reported constipation, 100% reported stress, and 95.6% had physical activity as part of their routines, while only 33.3% of the participants reported having a "high" QOL. After 3 nurse-led self-management sessions, participants reported improved IBS symptoms in pain 73%, bloating 73.7%, diarrhea 76.8%, constipation 50%, stress 42.1%, and physical activity 45%, as well as 66.7% of the participants experienced a "high" QOL. Dairy, fast/processed foods, and high-fat foods were the most frequent triggers of the symptoms, with a frequency of 40%, 24.5%, and 12%, respectively. After receiving nurse-led support, 69.20% of the participants reported improved dietary habits.

**Conclusions:** Nurse-led self-management can support participants to manage various IBS symptoms and improve their QOL. The unique strength of this study was evaluating participant needs and offering individualized solutions. A further study utilizing novel nurse-led self-management approaches may provide a valuable platform for empowering IBS patients' self-management.

**Keywords:** Irritable bowel syndrome, Nurse-led support, Quality of life, Self-management, Symptoms

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## Introduction

Irritable bowel syndrome (IBS) is a widespread disorder of gut-brain interaction affecting 10%–15% of North Americans<sup>1–4</sup>. IBS patients suffer from a range of different symptoms that are characterized by chronic or recurrent abdominal pain and altered bowel habits without apparent structural abnormalities<sup>5–8</sup>. IBS symptoms significantly impair patients' health-related quality of life (QOL) and increase disability, which includes decreased work productivity, more missed workdays, and increased mood disorders<sup>1,9</sup>. Management of IBS symptoms remains challenging, and IBS patients often endure a long and frustrating course of learning how to manage their symptoms on their own accord, which highlights the importance of empowering IBS patients with self-management skills<sup>7,10</sup>.

Self-management is a process of empowering a person by improving knowledge and skills to optimize well-being and QOL<sup>11-13</sup>. In this process, the patient, as the central decision-maker, plays a key role in improving health outcomes using self-regulation knowledge and skills<sup>14</sup>. Over the recent years, various self-management studies using social, behavioral, and cognitive theories have been conducted to help IBS patients manage their symptoms and improve QOL<sup>10,15</sup>. Some of these interventions included education and reassurance, supportive psychotherapy, assertiveness training, relaxation training, cognitive behavior therapy, hypnotherapy, and dietary restrictions<sup>16,17</sup>. While these studies showed promising effects of self-management in IBS patients, interventions that targeted mechanisms of IBS symptoms and were personalized using the support of health care providers had more success<sup>10,13,15,18-21</sup>. This highlights the importance of receiving support from health care providers who have insight into the mechanism of IBS during the process of self-management<sup>15,22</sup>.

Nurses, as health care providers who spend the most time with patients, can provide self-management support to IBS patients to reduce symptom burden and improve their QOL<sup>14</sup>. Nurse-led self-management support may emphasize improving knowledge and skills on cognitive behavioral strategies, dietary modifications, and individualized lifestyle changes to lead to coping, self-efficacy, and behavioral change<sup>22,23</sup>. According to a review study, nurse-led self-management support that focused on patients' self-efficacy rather than just improving knowledge has led to more behavioral change and better improvement in health outcomes<sup>22</sup>. Thus, it is crucial that nurses provide individualized information based on patients' intrinsic processes, which can improve self-efficacy and coping skills and finally lead to behavioral changes<sup>22,24</sup>. To the best of our knowledge, no study has evaluated the impact of nurse-led self-management support focusing on empowering patients' self-efficacy and coping strategies to reduce symptom burden and improve QOL in the IBS population. Concerning the role of nurses in guiding patients to have better self-management, we aimed to identify the content of nurse consultation that facilitated IBS self-management.

## Methods

### Study design

The current study was part of a parent randomized controlled longitudinal trial entitled "Precision pain self-management in young adults with irritable bowel syndrome" (NCT03332537)<sup>25</sup>. The parent study assessed whether a nurse-led self-management intervention could enhance pain and symptom management and improve the quality of life for individuals with IBS compared with offering only online self-management education and learning modules. This study was guided by the Individual and Family Self-Management Theory<sup>26</sup>, in which self-management was conducted within the context of individual, family, physical, and social environments<sup>14</sup>. Participants with IBS were randomized into experimental and control groups. Both the experimental and control groups received 10 video modules on improving self-management skills. The experimental group also received one-on-one intervention with a registered nurse (RN) for personalized self-management of IBS. The participants were followed for 12 weeks after enrollment. The first nurse-led self-management intervention took place 2 weeks after the start of enrollment, and

the second and third interventions were at 6 and 12 weeks, respectively. The detailed explanation of the intervention along with the accompanying CONSORT flow diagram can be found in this paper<sup>14</sup>.

### Study population

Participants with IBS were recruited for the study based on Rome IV criteria. Inclusion criteria were (1) adults who were aged 18 to 29 years and (2) with a diagnosis of IBS by a health care provider. Exclusion criteria were (1) other chronic painful conditions, including but not limited to fibromyalgia, chronic pelvic pain, or chronic interstitial cystitis; (2) infectious diseases (hepatitis, HIV, MRSA); (3) celiac disease or inflammatory bowel disease; (4) diabetes mellitus; (5) serious mental health conditions (eg, bipolar disorder, schizophrenia, and mania); (6) women who are pregnant or within 3 months postpartum; and (7) regular users of opioids, iron supplements, and prebiotics/probiotics or antibiotics, or those with substance abuse problems.

### Nurse-led self-management intervention

The trained registered nurses provided one-on-one self-management support either by phone or in person with the participants with IBS. The first intervention was scheduled 2 weeks after the start of the participant's enrollment in week 2. The RN asked open-ended questions about the participants' experiences with symptom episodes (pain, bloating, diarrhea, and constipation), diet, stress, activity/exercise, and QOL within the last 2 weeks (see the sample questions in the data analysis section) following our consultation script. During the first intervention session, in addition to asking questions about participants' symptoms, the RN provided recommendations and strategies such as improving physical activity, avoiding triggering foods (eg, dairy and fast foods), and managing stress to improve self-management knowledge and skills. In the second and third follow-up sessions (6 and 12 wk), the RN followed the participant by integrating the information from the last session through a phone call. The participants were given further recommendations based on problem identification and problem-solving throughout the nurse-led self-management support intervention. Each intervention session took between 15 and 30 minutes. All of the sessions were recorded for further transcript and analysis.

### Data analysis

A quantitative content analysis was performed to analyze answers to the structured questions. In this method, the intervention and responses were coded. The codes were developed based on the aim of each question, such as the presence, severity, and triggers of symptoms. A review of the resulting data revealed the gaps that need improvements<sup>27</sup>. The following questions guided the coding process: (1) Could you please tell me about any symptoms that you have experienced during the last 2 weeks? (2) Could you please tell me whether there were any recent changes or stressors in your life during the last 2 weeks? (3) Could you please tell me about your physical activity? (4) Could you please tell me how much you would say your symptoms are affecting your QOL? (5) Could you please tell me what your typical daily diet is?

The responses were coded, and the codes were categorized based on the sessions. The codes for the first nurse-led self-

**Table 1**  
**Demographic characteristics of the participants.**

	Mean (SD)
Age (y)	21.37 (2.55)
	N (%)
Gender	
Female	20 (83.33)
Male	4 (16.66)
Ethnicity	
Hispanic	2 (8.33)
Non-Hispanic	22 (91.66)
Race	
White	20 (83.33)
African American	3 (12.50)
Asian	1 (4.16)

management support intervention for symptom episodes, stress, and activity/exercise were “presence” and “lack of presence,” and the codes for QOL were “low,” “satisfactory,” and “high.” The codes for the second and third intervention sessions for symptom episodes, stress, and activity/exercise were “no change,” “improved,” and “worsened,” and the codes for QOL were “low,” “satisfactory,” and “high.” In all 3 sessions, the participants were asked an open-ended question about their diet type. Two authors independently reviewed and coded each of the responses from the 24 participants. Then, the codes were compared; in the case of discrepancy, the authors asked a third person to code the data to achieve agreement.

**Results**

**Demographic data**

Twenty-four participants were consulted over 12 weeks. Participants were predominantly White (83.3%), non-Hispanic (91.7%), and female (83.3%) with a mean age of 21.4 (±2.6) years. Most of the participants (83.3%) did not take probiotics to manage IBS. Participant demographic characteristics are summarized in Table 1.

**Quantitative content analysis of responses to the questions**

**Symptom episodes**

Question one was asked to determine the presence of IBS symptoms and their fluctuation over time. Participants with IBS reported any changes in their symptoms in 4 categories, including pain, bloating, diarrhea, and constipation.

**Pain.** Most of the participants (79%) reported pain at the first session of nurse-led self-management support intervention. Notably, in the second and third session, 25.9% and 73.7% of the participants reported improvements in their pain, 39.3% and 21% reported worse pain, and 34.7% and 5.3% reported no change in pain level, respectively (Table 2).

**Bloating** In the first session, 62.5% of the participants reported bloating. Among the participants who reported bloating, 35.5% reported improvement in their condition, 29% reported a worse condition, and 35.5% reported no change in the second session. In the third session, 73.7% reported improvement, 21% reported worse bloating, and 5.3% reported no change in their symptom (Table 2, Fig. 2).

**Diarrhea.** In the first session, 50% of the participants suffered from diarrhea. During the second session, 40.4% of the participants felt improvement, while 26.3% reported worse diarrhea. Also, 33.3% of the participants reported no change in this symptom. At the third session, 76.8% of the participants reported improvement, 15.5% reported worse diarrhea, and 7.7% reported no change in their diarrhea (Table 2).

**Constipation.** In the first session, only 37.5% of the participants suffered from constipation. At the second session, 33.3% of the participants reported improvement, 42.5% reported no change in constipation, and 24.2% reported worse constipation. At the last session, 50% of the participants felt improvement, 37.5% reported no change, and 12.5% reported worse constipation (Table 2).

**Stress level**

Question 2 was asked to determine the level of stress in the participants’ life and its change over 12 weeks. Participants with IBS reported changes in their stress levels at each nurse-led self-management session. In the first session, all of the participants reported stress as part of their daily lives. At the second session, 33.3% reported improvement in their stress level, 37.5% felt no change, and 29.2% reported more stress. At the final session, 42.1% of the participants reported less stress, 42.1% stated no change, and 15.8% reported more stress compared with the previous session (Table 2).

**Exercise/physical activity**

Question 3 was asked to determine the participants’ engagement in physical activity within the last 2 weeks. Most participants (95.6%) engaged in exercise/physical activity during the first nurse-led self-management session. At the second session, 56.5% of the participants reported no change in their physical activity, 21.7% reported an increase, and 21.7% reported a decrease in their exercise. In the third session, 45% of the participants

**Table 2**  
**Change in symptoms and stress over time.**

	First session		Second session			Third session		
	Presence N (%)	Lack of presence N (%)	No change N (%)	Improved N (%)	Worsened N (%)	No change N (%)	Improved N (%)	Worsened N (%)
Pain	15 (79)	4 (21)	8 (34.7)	6 (25.9)	10 (39.3)	1 (5.3)	16 (73.7)	4 (21)
Bloating	15 (62.5)	9 (37.5)	8 (35.5)	8 (35.5)	7 (29.0)	1 (5.3)	15 (73.7)	5 (21)
Diarrhea	12 (50)	12 (50)	8 (33.3)	10 (40.4)	6 (26.3)	2 (7.7)	16 (76.8)	3 (15.5)
Constipation	9 (37.5)	15 (62.5)	10 (42.5)	8 (33.3)	6 (24.2)	7 (37.5)	10 (50)	3 (12.5)
Stress	24 (100)	0	9 (37.5)	8 (33.3)	7 (29.2)	8 (42.1)	8 (42.1)	3 (15.8)

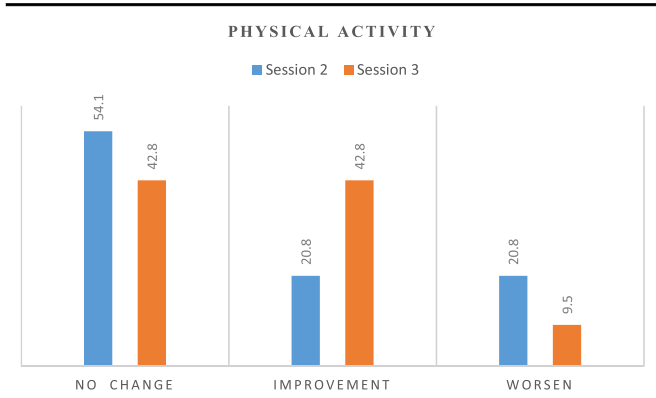


Figure 1. Change in physical activity over time.

reported no change, 45% improved their activity, and 10% of the participants reported a decrease in their physical activity (Fig. 1).

### Quality of life

Question 4 was asked to determine the feeling of participants' satisfaction with the QOL over time. In the first session, 66.7% of the participants reported a satisfactory QOL and 33.3% reported a high QOL. In the second session, 50% of the participants reported a high QOL, 36.6% reported a satisfactory QOL, and 13.6% reported a low QOL. At the final session, 66.7% of the participants reported a high QOL, 23.8% reported a satisfactory QOL, and 9.5% reported a low QOL (Fig. 2).

### Diet

Question 5 was asked to determine any triggers of food and changes in the participants' diets over 12 weeks. Among different foods, dairy, processed foods, and food containing wheat were the most frequent triggers of IBS symptoms, with a frequency of 40%, 24.5%, and 12%, respectively. After receiving nurse-led support, at the second session, 66.6% of the participants reported improvement in their dietary habits by decreasing using triggered food, 27.7% reported no change, and 5.55% reported using foods that trigger symptoms. In the third session, 69.20% of the participants reported improvement in their dietary habits, 23% reported continued using triggered food, and 7.70% reported no change in their dietary habits (Figs. 3, 4).

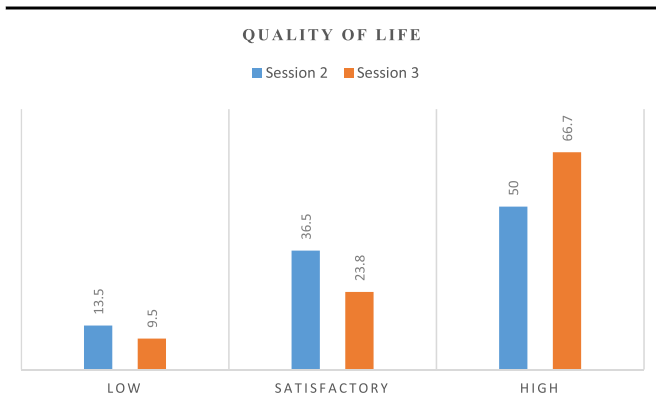


Figure 2. Change in quality of life over time.

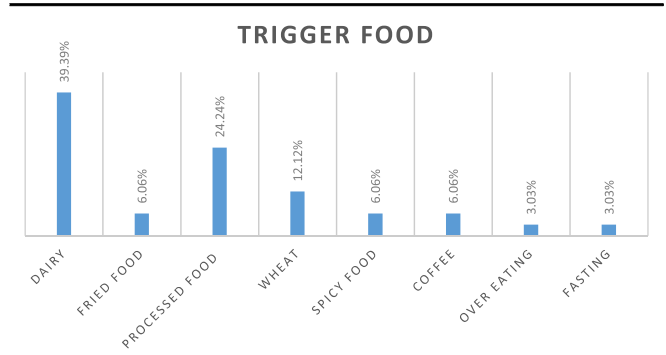


Figure 3. Frequency of trigger food.

### Discussion

The current study was conducted to evaluate the advantages of nurse-led self-management support in improving symptoms and QOL in patients with IBS. Although several self-management methods for IBS patients have been developed, interventions using structured, open-ended questions that give flexibility to patients to talk about their conditions are limited. Also, the unique strength of this study was using nurse-led support to empower patients' self-efficacy and coping strategies to achieve better health outcomes. Our nurse-led self-management support over 12 weeks resulted in decreasing reported symptoms episodes and improved the ability of participants with IBS to deal with their challenges using healthier dietary habits, as well as enhanced physical activity, which consequently led to better QOL.

Consistent with our findings, previously published studies showed the effectiveness of self-management and nurse-led support, including diet modifications, lifestyle behaviors, cognitive behavioral therapy, and relaxation techniques, in decreasing GI symptoms and increasing QOL<sup>13,21,28-30</sup>. Kamp et al<sup>13</sup> found that 8 individual sessions with a nurse containing education, dietary counseling, relaxation training, and cognitive behavioral strategies reduced symptoms in patients with IBS. In a study, Jarrett et al<sup>28</sup> showed that individualized self-management sessions, including themes of education, cognitive behavioral therapy (CBT), relaxation strategies, and diet, might decrease the severity of IBS symptoms as well as improve QOL. Another study by Zia and colleagues found that self-management strategies over the span of a year may empower IBS patients' adherence to a

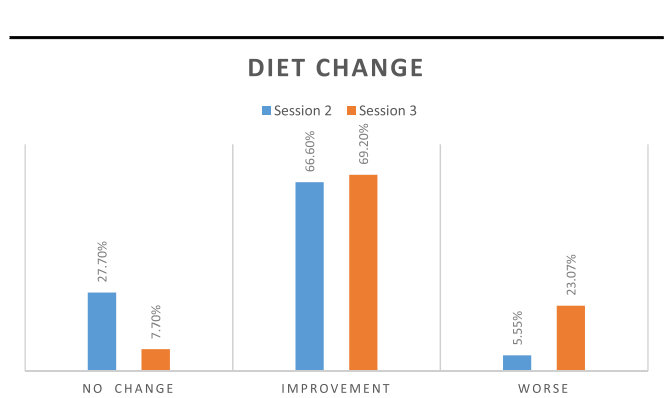


Figure 4. Diet change over time.

healthy diet and lifestyle behaviors. Labus et al<sup>31</sup> also found that the biopsychosocial model of IBS and cognitive behavioral exercises reduced patients' symptom severity, catastrophizing, depression, and increased their QOL.

The findings of the current study showed improvements in symptoms. Although there was no cause-and-effect assessment in the present study, changes in symptoms may be explained by the gradual improvement in behavior achieved via stress management, diet modification, and physical activity. Nurse-led self-management support helped IBS patients select better strategies, such as meditation, relaxation, breathing, or even physical activity, to cope with their stress. Moreover, nurses helped participants modify their diets by identifying triggers and exclusion of such foods. This indicates the role of nurses to specifically address patients' needs and guide them to select better behavioral approaches to deal with various situations.

The discussion with a nurse on IBS challenges helped patients create awareness of their condition and the progress they made during the intervention. After 12 weeks, the participants felt more competent to face IBS symptoms, which need to be confirmed by more extensive use of self-management behaviors. The persistence of new behaviors relies upon IBS patients' receipt of nurse feedback, which enables patients to manage various situations.

An essential component of this study was customizing self-management support to IBS patients' needs, attitudes, and preferences. Nurses were able to assess IBS patients' challenges individually and discuss solutions that helped relieve the patients' symptoms. The findings of a narrative review also highlighted the crucial role of nurses in guiding and monitoring IBS patients over time<sup>32</sup>. The open-ended questions enabled IBS patients to share their needs with nurses. This open platform and individualized method can give patients and nurses the flexibility to choose the best solution-based approaches for the patients' needs and preferences.

The present study advocated patient-centered care with individualized support by emphasizing the importance of assessment and addressing specific unmet needs. More research is needed to evaluate the effectiveness of nurse-led interventions by focusing on the specific needs of each IBS individual for symptom management improvement and patient-reported outcomes for people with IBS. Moreover, nurse-led self-management can implement technology (MHealth or web-based SELF-MANAGEMENT)<sup>33,34</sup>. Kamp et al<sup>13</sup> which can help personalize lifestyle recommendations. They can also provide data-driven insights to help nurses tailor treatment plans more effectively based on each patient's specific symptom patterns and triggers, thus leading to more precise, individualized care.

### Limitations

There are some limitations to the current study that need to be considered while interpreting the results. The small sample size is inherent to the pilot study, which makes it difficult to generalize the results to all IBS patients. In addition, our open-ended questions were limited to 5 categories. Further investigations might expand the inquiries to cover more aspects of IBS patients' daily challenges and to empower trustful relationships between nurses and patients.

### Conclusions

Nurse-led self-management support can help to improve IBS patients' primary symptoms. Throughout the intervention, the essential elements were assessing the patients' needs and offering individualized solutions. In addition, using open-ended questions might build trustful relationships, allowing patients to talk about their situations easily and openly. Future larger studies are needed to investigate the potential effects of nurse-led self-management support for improving IBS patients' QOL.

### Ethical approval

The parent trial has been approved by the University of Connecticut Institutional Review Board (IRB# H16-152), and written informed consent was obtained from all participants.

### Author contribution

Z.A.B.: analyzed and interpreted the data and wrote the manuscript. J.C.: contributed to data collection and manuscript revision. W.H., A.S., and X.C.: supervised the study and contributed to manuscript revision.

### Conflicts of interest statement

The authors declare that they have no conflicts of interest concerning the content of this study.

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### Data availability statement

The data sets used and/or analyzed in the present study can be obtained from the corresponding author upon reasonable request.

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