

ORIGINAL RESEARCH

Standardized Yoga and Meditation Program for Stress Reduction (SYMPro-SR) for Adolescents with Irritable Bowel Syndrome

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ABSTRACT

Background • Irritable bowel syndrome (IBS) results in discomfort in youth. This study proposes that yoga and mindfulness will decrease anxiety and improve the quality of life in IBS youth.

Primary Objective and Intervention • To measure the impact of a virtual 6-week Standardized Yoga and Meditation Program for Stress Reduction (SYMPro-SR) program on anxiety, symptoms, and quality of life.

Methods/Design • Participants completed 3 surveys over the phone before and after the yoga course. A minimum sample size of 45 subjects was calculated to detect a 20% difference in pre and post Screen for Child Anxiety Related Disorders (SCARED) scores, using 80% power, a two-tailed P value of .05, and a standard deviation SCARED total score of 10. Due to COVID-19, the study was converted into a pilot study with a goal of 10 recruited patients. Additional recruitment is ongoing.

Setting • Virtual

Participants • Youth aged 12-21 years with IBS in 2 pediatric gastroenterology offices in New Jersey. 40

subjects were approached, 10 were onboarded, and 8 completed the program. There were 4 female, 4 male, 6 white, 1 Asian, and 1 black participant(s).

Primary Outcome Measures • SCARED, Pediatric Quality of Life Inventory (PedsQL), and Children Somatic Symptoms Inventory (CSSI) pre and post-yoga survey scores.

Results • Post-intervention, PedsQL showed improvement ($P = .01$). The SCARED anxiety subscale scores significantly decreased ($P = .01$). There was a trend for improved outcomes in SCARED panic disorder and separation anxiety subscale scores ($P = .07$ and $.08$, respectively). Four (sore muscles, stomach aches, feeling bloated or gassy, and food making one sick) of the 24 symptoms in the CSSI significantly improved post-intervention.

Conclusion • Teenagers with IBS were able to complete the yoga videos at home, with demonstrated improvement in quality of life, certain aspects of anxiety, and some somatic symptoms. (*Altern Ther Health Med.* 2025;31(1):6-9).

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INTRODUCTION

Irritable Bowel Syndrome (IBS) is a functional gastrointestinal disorder linked to motor and sensory physiology and the central nervous system. It is the most common cause of general recurrent abdominal pain (RAP) in youth. It presents as abdominal pain with abnormal defecation patterns.¹ This discomfort significantly impacts patients' lives, leading to emotional stress, school absenteeism, decreased quality of life because of bathroom patterns, co-morbid anxiety, and depression symptoms. The Rome IV Criteria is used to diagnose patients with IBS subtypes clinically and

includes RAP at least one day per week in the last three months on average, with two or more of the following: related to defecation, change in stool frequency, or change in stool form.² There are four subtypes of IBS: predominant constipation (IBS-C), predominant diarrhea (IBS-D), mixed bowel habits (IBS-M), and unclassified.³ IBS-C is characterized by bloating and infrequent or difficult feces evacuation. IBS-D is characterized by an urgent need to move the bowels, usually with loose and watery stools. IBS-M has an alternation between difficult feces evacuation and frequent, loose bowel movements.⁴ IBS unclassified is associated with hard or loose stools less than 25% of the time.³

IBS is often accompanied by anxiety as well as psychological and quality-of-life issues. Yoga and mindfulness interventions have been shown to decrease anxiety and increase the quality of life in prior studies on depression^{5,6} and post-traumatic stress disorder,^{7,8} which provides rationale for this study in the IBS patients. As proposed originally in ancient India, yoga includes meditation, and mindfulness is one of the two types of meditation (the other being concentration).⁹ Yoga includes postures, exercises, various breathing techniques, relaxation

practices, and meditation to improve a person's mental and physical health.¹⁰ Yoga can be used for strength training and relaxation, which can be incorporated into each class. Meditation is the conscious and purposeful self-regulation of one's attention, bodily sensations, and movements to achieve inner calmness. It induces non-reactivity in one's mind. This way, it becomes possible to observe non-judgmentally the ongoing stream of experiences as they arise during meditation. Mindfulness focuses an individual's entire attention on their surroundings, sensations, and breathing, which allows complete absorption in the present moment.¹¹ Yoga and mindfulness have been used in various settings to manage anxiety and stress and are beginning to be used as a holistic approach in various medical treatment plans.^{5,6} Huguet et al. found that mindfulness-based group therapy significantly lowered levels of anxiety, depression, and aggression in children with ADHD.⁵ Evans et al. found that relative to controls, young adults assigned to yoga as part of their IBS treatment plan reported significantly improved IBS symptoms, global improvement, disability, psychological distress, sleep quality, and fatigue.⁶

Finding ways to improve symptoms of chronic illness in children is pivotal to their quality of life. Devanarayana states that IBS has significant effects on the quality of life of patients, thus it is important to continue efforts in finding ways to improve symptoms.¹² By implementing a mind-body approach to care, patients learn about tools to assist them beyond their pediatric years for long-term symptom control. The objective of this study is to evaluate the impact of a brief, at-home, six-week twice-per-week yoga and mindfulness program, known as Standardized Yoga & Meditation Program for Stress Reduction (SYMPro-SR), on anxiety, IBS symptoms, and quality of life in children ages 12 to 21 who suffer from IBS. Further, it will determine if yoga and mindfulness can be integrated into pediatric care. This study proposes that by making children with IBS more aware of their feelings and correlating that with their IBS symptoms, their symptoms will decrease and become more controllable.

This study was done per the appropriate institutional review body (IRB), approval number 19-126, and ethical standards outlined in the Helsinki Declaration of 1975.

MATERIALS AND METHODS

Study Design

This IRB-approved study that was registered with ClinicalTrials.gov (CTR: NCT05719246) was conducted as a single-armed, interventional cohort study via an at-home, 6-week twice-per-week yoga and mindfulness program, SYMPro-SR. This feasibility study's recruitment began on January 1, 2021, and was completed on August 12, 2021. Patients in two pediatric gastroenterology offices, one in Camden, NJ office, and one in Voorhees, NJ office were screened by reviewing electronic health records (EHR). Qualified patients and parents were contacted via telephone to discuss the study and inquire about their interest in participating. Interested subjects aged 12-17 years had a

consent form sent to their parent's email address, while those aged 18-21 had a consent form sent to their email address. During the primary phone call, a second phone call was scheduled a few days later, to allow time for consent form review. At the second phone call, subjects aged 12-17 verbally agreed to an assent form and their parent or guardian verbally agreed to a consent form. Subjects aged 18-21 verbally agreed to their consent form. Consents were signed, received, and archived. All patients were instructed to continue adhering to their normal daily regimens.

During the second call, subjects were asked to complete the Screen for Child Anxiety Related Disorders (SCARED),¹³ Pediatric Quality of Life Inventory (PedsQL),⁶ and Children Somatic Symptoms Inventory (CSSI) questionnaires as administered by the researchers. A private YouTube link with access to six yoga videos for their six-week course and a calendar to track video completion were emailed. Three weeks after the second phone call, the researchers conducted a third call to assess adherence. The fourth phone call was completed three weeks after the third phone call and six weeks after the second phone call. During this final phone call, subjects reported the number of videos completed over the six weeks and completed the SCARED, PedsQL, and CSSI questionnaires again. Dates for completed calls and the questionnaire responses were input into an Excel spreadsheet for collection.

Inclusion. Patients are between 12-21 years of age, diagnosed with IBS, and have access to the internet.

Exclusion. Patients under 12 years or over 21 years of age, did not visit a provider for symptoms related to IBS, and/or did not have internet access.

Variables

Participants were selected based on the symptomatology of IBS. Most subjects had been diagnosed via the Rome IV criteria and categorized as IBS-D, IBS-C, IBS-M, or unclassified. Criteria include RAP at least one day per week over the past three months on average with association with two or more of the following: related to defecation, change in stool frequency, or change in stool form.² However, some providers refrain from formal input of IBS in pediatric charts and therefore, more extensive chart review was required by researchers to identify symptoms of functional constipation or diarrhea. The primary outcomes of this study were the results from the 41-item SCARED, PedsQL, and CSSI questionnaires before and after the six-week yoga intervention. Secondary outcomes include the factors that may influence the outcomes of these questionnaires, such as the child's age, gender, and social confounders. The scales included statements that required a numerical response by the subject, depending on how often or severely, they experienced the symptom or thought in the statement.

Statements were read to the subjects over the telephone and subjects responded verbally with their answer. If the subject was under 18, one parental figure had to be present during the assessment. Demographic data including gender, race, and zip code was collected. To minimize bias, two

demographically different areas were evaluated, Camden, NJ, and Voorhees, NJ and there were no limitations on gender or race for participation.

Study Size

This was a pilot feasibility study. Hence it was assumed that ten recruited patients would allow the researchers to evaluate the ability to recruit, implement yoga and mindfulness as integrative care, and determine the adherence to the program.

Quantitative Variables & Statistical Methods

Results of the SCARED, CSSI, and PedsQL total scores and sub-scales were analyzed as continuous variables using paired *t*-tests or the Wilcoxon signed rank tests for the pre-post results. SPSS (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp) was used to analyze the data. ANCOVA was used for repeated measures, incorporating age, sex, baseline scores, etc. as covariates. The SCARED questionnaire was subdivided into groups for the presence of an overall anxiety disorder, panic disorder, or significant somatic symptoms, generalized anxiety disorder, separation anxiety disorder, social anxiety disorder, and school avoidance. The CSSI questionnaire evaluated 24 symptoms and was used as a continuous variable. The PedsQL questionnaire was assessed based on each subcategory and as a mean score overall. The mean scores were compared using a paired *t* test. Comparisons within the group were performed using the student's paired *t* tests for the survey data. The difference was considered significant at $P < .05$.

Standardized Yoga & Meditation Program for Stress Reduction (SYMPro-SR)

SYMPro-SR is a wellness program developed by Basant Pradhan, MD. SYMPro-SR has been adapted from the three original traditions of yoga and mindfulness: Buddha's vipassana meditation (satipat-thana), Patanjali's Eight-Limbed Yoga (ashtanga), and the standardized and technique-rich traditions of Tantra. It purports to use yoga in its entirety (all eight limbs including meditation, its 7th limb) and not in a piecemeal fashion. SYMPro-SR uses a neurobiologically informed bottom-up model of meditation, which is an emotion regulation idea that focuses on the body's response to stress and trauma, and is considered compatible with other Western models of therapy including cognitive behavioral therapy (CBT).^{8,9} The study was registered with ClinicalTrials.gov (CTR: NCT05719246)

RESULTS

A total of 1508 patients were screened for potential enrollment eligibility. Among those, 1,468 did not meet eligibility criteria due to age restrictions and/or lack of IBS diagnosis or symptoms. The 40 eligible patients were approached; only 10 decided to enroll and were included in the study. The 30 who did not enroll cited a lack of interest. Among the 10 participants, 8 completed the entire study, including all the videos and questionnaires. The 10 participants were

between 14 to 17 years of age. The remaining two did not complete all the designated videos and were not included in the analysis. Pre and post-test questionnaire results of the eight patients who completed the videos were analyzed.

There was no gender difference among participants, with four female and four male subjects. Six of the subjects were white (80%), one Asian (10%), and one black (10%). The type of IBS was equally split between IBS-C and IBS-mixed, with four subjects in each category. Potential cofounders such as the possibility that some subjects may have previously participated in yoga or had been concurrently doing other types of yoga were not evaluated. Similarly, participants were not instructed to discontinue or restrict any medical treatment or lifestyle activities during the study.

Mean scores of pre and post-test results showed significant improvement in PedQL post-intervention ($P = .01$). The SCARED anxiety subdivision significantly decreased post-intervention ($P = .01$). There was a trend for improved outcomes in SCARED panic disorder and separation anxiety subdivisions post-intervention ($P = .07$ and $.08$, respectively) which did not reach statistical significance. No significant difference between pre and post-intervention was observed for the remaining SCARED subcategories. There was a post-intervention improvement in several variables in the CSSI scale. Four of the 24 symptoms in the CSSI significantly improved post-intervention, namely, sore muscles ($P = .04$), stomach aches ($P = .01$), feeling bloated or gassy ($P = .02$), and food causing feelings of sickness ($P = .03$). The remaining variables did not show any significant difference.

DISCUSSION

This study evaluated the effect of yoga and mindfulness intervention on symptoms associated with quality of life and daily well-being in children with IBS. There was significant improvement in the Pediatric Quality of Life, the Screen for Child Anxiety Related Disorders, and several symptoms on the Children Somatic Symptoms Inventory questionnaires in participants aged 12-21 years who suffered from IBS. Also, there was a trend in improvement in panic disorder and separation anxiety. Similarly, Evans et al. found significant improvement in feelings of anxiety related to gastrointestinal symptoms on the Visceral Sensitivity Scale (VSI). However, Evans' findings differed from ours, in that they found no significant difference in gastrointestinal symptoms in adolescent yoga responders compared to non-responders.⁶ This study shows that its 6-week yoga intervention can be beneficial in reducing both gastrointestinal symptoms themselves, and the associated anxiety.

In this study, participants were instructed to continue adhering to their normal regimen, with just the addition of the brief yoga intervention. If they were using any medications or supplements, these were continued. Therefore, it can be concluded that this yoga intervention may be generalizable, and further consideration should be taken on incorporating yoga and mindfulness with standardized medical interventions. Similarly, Kavuri et al. found that adults who

incorporated yoga experienced an improvement in IBS symptom severity, quality of life, and feelings of anxiety and depression regardless of medication when compared to a control group. Their control group did not incorporate yoga and only maintained their lifestyle and medication use.¹⁴

As a feasibility study, the main objective was to evaluate whether adolescent adherence was possible. Of the 10 patients who enrolled, eight completed the study. Participants who completed the study watched all 12 videos to complete the series. The two participants who did not finish the six-week study completed two weeks' worth of videos. Thus, an overall adherence rate of 80% shows the feasibility of participation. Furthermore, since the study was conducted using a virtual format, it allowed more patients to participate. The total yoga time per week was 30 minutes, allowing flexibility in schedule and ease of integration into participants' lives. These features were likely influential in the high completion rate. The importance of those qualities for adherence is highlighted in a study of adults by Shahabi et al., who found that in a long-term follow-up study, participants adhered to a walking regimen more than their yoga regimen. Participants cited reasons such as difficulty completing a yoga regimen without supervision, and the need for props to complete their yoga regimen.¹⁵ The current study was completely done virtually, with no direct supervision or props needed, which again may have increased adherence and allowed for continued benefit. However, it would be beneficial to explore teaching these participants in person and assessing how the personal connection impacts their symptoms.

This study was very inclusive, with minimal exclusion criteria, and therefore may be generalizable to children with all types of IBS, regardless of gender, race, or access to exercise space. Due to the methodology of this study, most patients who have access to an electronic device with internet access and a small living space can participate in this program. This creates wider inclusivity than programs dependent on in-person visits to a gym or medical facility.

This study achieved patient adherence to a yoga intervention, with positive results based on the small number of participants recruited. The results contribute to the positive literature that a yoga intervention for children who suffer from IBS is feasible and could benefit their symptoms and quality of life.⁶ Study results were consistent with previous research, with even more promising data. In conclusion, adolescents and young adults with IBS were able to complete yoga videos at home, with improvement in quality of life, certain aspects of anxiety, and a few somatic symptoms.

Limitations

As an internet-based protocol, some subjects may have been unable to participate due to lack of internet access, thus introducing selection bias. Additionally, there was some difficulty contacting potential participants due to the virtual format. Further, all adherence was self-reported and therefore has a potential for self-reporting bias. Also, no patients with IBS-D agreed to participate, limiting the interpretation of the effects of SYMPro-SR on the IBS-D subtype.

Potential confounders such as the possibility that some subjects may have previously participated in yoga or had been concurrently doing other types of yoga were not evaluated and may have affected the study findings. Similarly, participants were not instructed to discontinue or restrict any medical treatment or lifestyle routines during the study. Thus, extraneous interventions may have played a role. Lastly, age may be a potential confounder, as older subjects may have been able to control their schedule and have less limited access to the internet.

CONCLUSION

Finding ways to improve symptoms of chronic illness in children is pivotal to their quality of life. IBS significantly affects the quality of life in patients, so it is important to continue research efforts to improve symptoms. IBS management should extend beyond just medical treatment, as evidenced by the significant improvement experienced by the subjects upon completion of the program (SYMPro-SR). By implementing a mind-body approach to care, patients learn about tools to control their symptoms in the long term. This feasibility study was significant as it showed that yoga and mindfulness can be easily integrated into pediatric gastroenterology care and lead to significant symptom improvement.

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AUTHOR DISCLOSURE STATEMENT

The authors declare that they have no competing interests.

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