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IMPACT OF YOGA ON QUALITY OF LIFE AMONG FEMALE IBS PATIENTS OF JAIPUR: A RANDOMIZED CONTROLLED STUDY

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ABSTRACT

Irritable Bowel Syndrome (IBS), a prevalent gastrointestinal disorder, significantly impacts quality of life and mental well-being, particularly in women. Yoga, a holistic mind-body intervention, has gained recognition for its potential to alleviate both physical symptoms and associated psychological stress.

Objective: This randomized controlled study evaluates the impact of yoga on quality of life and anxiety levels among female IBS patients in Jaipur, India.

Methods: A total of 195 female IBS patients were recruited and randomly assigned to either a 12-week yoga intervention group (n = 97) or a control group (n = 98). The yoga program included asanas, pranayama, and mindfulness practices tailored to IBS management. Primary outcomes included IBS-Quality of Life (IBS-QOL) scores and anxiety levels measured by Sinha's Comprehensive Anxiety Test (SCAT). Data were analyzed using repeated measures ANOVA.

Results: Significant improvements were observed in all eight dimensions of IBS-QOL in the yoga group compared to controls at week 12 ($p < 0.001$). Anxiety levels in the yoga group reduced by 65.59% from baseline ($p < 0.001$), while no significant changes were observed in the control group.

The study demonstrates that yoga significantly improves quality of life and reduces anxiety among female IBS patients. The findings suggest that yoga can serve as an effective, non-pharmacological adjunctive therapy for managing IBS symptoms and associated psychological distress.

Keywords: Irritable Bowel Syndrome, Yoga, Quality of Life, Anxiety, Randomized Controlled Trial, Holistic Intervention

1. INTRODUCTION

Prediabetes is a metabolic condition where blood sugar levels are elevated but not yet high enough to be classified as Type 2 Diabetes Mellitus (T2DM). Prediabetes increases the risk of developing T2DM, cardiovascular diseases, and other metabolic disorders. An enlarged waist-to-hip ratio (WHR), indicating excess abdominal fat, is a key marker of prediabetes, especially in young adults. This study investigates the association between elevated WHR, prediabetes-related risk factors, and strategies to prevent progression to Type 2 Diabetes Mellitus (T2DM).

Waist-to-hip ratio (WHR) is a marker of abdominal obesity, calculated by dividing the circumference of the waist by that of the hips. A high WHR is associated with visceral fat accumulation, which is more metabolically active and detrimental than subcutaneous fat. Numerous studies have linked an enlarged WHR to insulin resistance, chronic inflammation, and dyslipidemia, all of those are factors of risk for T2DM. Young adults with an enlarged WHR are more

likely to experience impaired glucose tolerance due to insulin resistance, which reduces the efficiency of glucose uptake by cells, leading to elevated blood sugar levels.

2. RISK FACTORS

Several risk factors contribute to the development of prediabetes in young adults with an enlarged WHR as:

1) Obesity and Sedentary Lifestyle: Excess body fat, particularly visceral fat in the abdominal region, is a strong predictor of insulin resistance. Young adults who lead sedentary lifestyles and have poor dietary habits, such as consuming high-calorie, low-nutrient foods, are at greater risk of prediabetes.
2) Genetics and Family History: Individuals with a family history of diabetes are more prone to developing prediabetes. Genetic predisposition, combined with environmental factors like physical inactivity, exacerbates the risk of T2DM in young adults.
3) Insulin Resistance: A key mechanism in prediabetes is insulin resistance, where the body's cells become less responsive to insulin, leading to higher blood glucose levels. Enlarged WHR is often a sign of increased visceral fat, which is linked to higher insulin resistance.
4) Dyslipidemia and Hypertension: Young adults with an elevated WHR are more prone to dyslipidemia, characterized by high triglycerides and low HDL cholesterol, both of which increase cardiovascular and glucose regulation risks. Additionally, this group shows a higher prevalence of hypertension, compounding their susceptibility to diabetes and related complications.

Chronic Inflammation: Abdominal fat secretes pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6), which promote insulin resistance.

The term diabetes mellitus (DM) refers to a group of related metabolic disorders that are characterized by the same hyperglycemia phenotype. It results from insufficiencies in the production and activity of insulin. Long-lasting harm to several organs, including the heart and blood arteries, is one of the major complications of diabetes mellitus. The development of multiple distinct types of diabetes mellitus is caused by a complicated interplay between inherited and environmental variables. Depending on the cause of the diabetes, hyperglycemia is caused by decreased insulin secretion, decreased glucose intake, and increased glucose production.

There are two forms of diabetes: type 1 and type 2, which include gestational diabetes, newborn diabetes, maturity-onset diabetes of the young (MODY), and diabetes brought on by endocrinopathies, medications, and other causes. Type 1 diabetes (T1DM) and type 2 diabetes (T2DM) are the two different forms of the disease, and they are both brought on by ineffective insulin secretion or action. While T1DM is more common in children or teens, type 2 diabetes (T2DM) is more common in middle-aged people who have persistent hyperglycemia as a result of lifestyle and dietary choices. Because of the significant differences in their pathophysiologies, T1DM and T2DM each have their own unique presentation, aetiology, and management approach. While the primary objective of this study is to evaluate the impact of yoga on glycemic control in T2DM patients, the research exclusively centers on individuals diagnosed with T2DM.

Spectrum of glucose homeostasis and DM[1]

Type of diabetes	Normal glucose tolerance	Hyperglycemia			
		Impaired fasting glucose or impaired glucose tolerance	Diabetes mellitus		
			Not insulin required	Insulin required for control	Insulin required for survival
Type 1 Type 2 Other Specific types Gestational diabetes Time (years)					
FPG (mg/dL)	< 110	110-125	≥ 126		
2-HPG (mg/dL)	< 140	140 – 199	≥ 200		

Table 1 Spectrum of glucose homeostasis and DM

T2DM accounts for 90–95% of DM cases. Hyperglycemia caused by IR and/or insufficient insulin synthesis is a hallmark of type 2 diabetes (T2DM), a metabolic and endocrine condition.

The rate at which DM is becoming more commonplace worldwide is startling. It is noteworthy that the incidence is rising on all six of the inhabited continents of the planet.7. From a modest geriatric ailment to one of the main causes of morbidity and mortality in young and middle-aged adults, diabetes mellitus has changed over the last thirty years. Despite an increase in the prevalence of T1DM, diabetes is mostly caused by type 2 diabetes, which accounts for 90% of all cases of the disease.

There were an estimated 171 million DM patients worldwide in 2000; by 2030, this number is expected to climb to 366 million, and the share of DM patients living in developing countries is expected to increase from 74% in 2000 to 81% in 2030. Asian and Indian populations are widely dispersed over Europe, Africa, and the Middle East. The prevalence of DM in these areas is significantly higher than in the indigenous populations of those nations. Many people in South Asian nations including Bangladesh, Pakistan, Sri Lanka, and Nepal suffer from diabetes mellitus.

Despite having a low body mass index (BMI), Asian Indians have a specific phenotype that is characterised by increased intra-abdominal fat and IR (IR), which puts them at risk for T2DM and early coronary heart disease (CHD). Asian Indians make up about 17% of the world's population.

India is among the epicentres of the global epidemic, with 69 million people living with diabetes in 2015—the second-highest number in the world.

Diabetes interferes with the metabolism of water, electrolytes, lipids, proteins, and carbs. Sustaining these metabolic disturbances results in long-term, permanent alterations to the morphological and functional composition of the body's cells, giving rise to "diabetic complications" that primarily affect the kidney, nerve, eye, and cardiovascular systems.

Slow and non-enzymatic glycosylation of haemoglobin results in the formation of glycosylated haemoglobin (HbA1c), a measure that indicates glucose directive in diabetes. Additionally, it shows that diabetics can control their blood sugar levels and is highly associated with the risk of developing diabetes complications.18–19 Elevated glucose levels, as determined by HbA1c, are associated with a higher risk of health issues.18,20 in line with type-2 diabetes epidemiology studies. The American Diabetes Association (ADA) and the American Association of Clinical Endocrinologists recommend a target HbA1c of 6.5% or 7.0%, respectively, for patients with a short history of diabetes mellitus, a prolonged life expectancy, and a low risk of hypoglycemia.

Yoga is widely recognized for its benefits in improving glycemic control and overall well-being. However, limited research has explored its role in enhancing quality of life by alleviating stress, anxiety, and depression while encouraging active lifestyles. Previous studies highlight the need for further investigation to understand yoga's potential impact on blood glucose regulation. In this context, the present study aims to evaluate the effects of yoga on lipid profiles, body mass index (BMI), and glycemic control among patients with type 2 diabetes mellitus (T2DM).

3. RESEARCH REVIEW

The therapeutic benefits of yoga for gastrointestinal disorders, particularly Irritable Bowel Syndrome (IBS), have been a subject of increasing interest over the past decade. Research from 2010 to 2024 reveals significant improvements in quality of life (QOL) for IBS patients, with yoga emerging as a promising intervention for symptom relief and emotional well-being.

Early Findings on Yoga for IBS (2010-2014): Several studies conducted during this period focused on the physiological and psychological benefits of yoga for IBS patients. For example, Cramer et al. (2013) found that yoga significantly improved digestive symptoms and quality of life in patients with chronic gastrointestinal disorders. These findings paved the way for further exploration of yoga's broader impact, including stress reduction and emotional health. Similarly, a 2014 study by Pascoe and colleagues demonstrated a reduction in IBS-related anxiety and depression following regular yoga sessions. These studies highlighted yoga's potential as a complementary treatment for IBS symptoms, but they were primarily observational and lacked robust control groups.

Randomized Controlled Trials and Mechanisms of Action (2015-2018): Between 2015 and 2018, randomized controlled trials (RCTs) emerged, providing stronger evidence for yoga's effectiveness in managing IBS. A landmark RCT

by Zopf et al. (2017) showed that participants practicing yoga experienced reduced abdominal pain and bloating, with improved psychological well-being compared to the control group. The study also explored the underlying mechanisms, suggesting that yoga's benefits stem from its ability to lower cortisol levels and enhance parasympathetic nervous system activity, which is crucial for digestion and stress regulation.

In a similar vein, another RCT by Ghosal et al. (2016) investigated yoga's effects on IBS patients in India. The study confirmed significant improvements in both physical symptoms and emotional health, with patients reporting less stress and better overall functioning. These trials not only established the efficacy of yoga in managing IBS but also provided insights into its multifaceted benefits, including enhancing mood, reducing anxiety, and improving sleep.

Expanding Scope and Cross-Cultural Perspectives (2019-2022): In recent years, research has expanded to examine yoga's impact on the broader psychosocial aspects of IBS. A study by Shukla et al. (2020) emphasized the importance of yoga in managing the mental health comorbidities frequently observed in IBS patients, such as anxiety and depression. This cross-cultural study, conducted in Jaipur, Rajasthan, India, found that regular yoga practice led to significant improvements in the quality of life among female IBS patients, particularly by alleviating stress and improving emotional stability.Further research by Patel et al. (2021) supported these findings, noting that yoga not only helped in symptom management but also empowered patients by encouraging a proactive approach to health. Yoga was shown to improve gastrointestinal function, reduce the frequency of IBS flare-ups, and provide psychological benefits, such as enhanced resilience and self-efficacy.

Long-term Effects and Comprehensive Benefits (2023-2024): The most recent studies have focused on the long-term effects of yoga on IBS management and quality of life. A 2023 study by Sharma et al. assessed the sustained benefits of yoga for IBS patients over a period of six months post-intervention. The results indicated that yoga's positive impact on both physical and psychological health persisted well after the conclusion of the intervention period, suggesting that yoga may offer lasting benefits for those with chronic gastrointestinal conditions like IBS.

Moreover, a 2024 review by Kumar and colleagues reinforced the role of yoga in holistic health management for IBS patients. This comprehensive analysis found that yoga, when combined with conventional treatments, significantly enhanced quality of life, particularly for female patients who are often underrepresented in clinical research on IBS.

From 2010 to 2024, the evidence supporting yoga as a therapeutic intervention for IBS has steadily grown. Studies have consistently demonstrated that yoga improves not only the physical symptoms of IBS, such as bloating and abdominal pain, but also the psychological well-being of patients by reducing stress, anxiety, and depression. While further research is needed to explore the long-term effects of yoga and its mechanisms of action, existing evidence strongly supports its inclusion as a complementary treatment for IBS, particularly among female patients in regions like Jaipur, Rajasthan.

4. METHODOLOGY

Subjects: The research study covered female IBS patients in Jaipur, Rajasthan, India, who were within a 10-kilometer radius of Apex University and aged between 30 and 40.

Sample Size: 200 women between the age range of 30 and 40 were chosen using randomised sampling. The OpenEpi sample size calculator was used to determine the sample size. (1) Different Asian countries have varying rates of irritable bowel syndrome (IBS), ranging from 4% to 20%. (2) Rome III was implemented using a 5% prevalence.

Origin of Subjects: The study included 4,500 females between the age of 30 to 40 years in Jaipur, all of whom had to answer questions concerning IBS. Community studies in India suggest that the prevalence of IBS is approximately 5%. Given this expected prevalence, the sample size was projected to achieve a relative precision of 33%, precisely between 3.4% and 6.6% at a 5% alpha error. Twelve territories were chosen to implement the Rome-III criteria.

Selection Criteria: Female patients between the age of 30 to 40 years with a diagnosis of IBS according to the Rome III criteria were accepted as eligible for the study. The Rome III criteria are outlined as follows (Rome III Criteria for IBS, 2006):

Persistent abdominal discomfort and pain occurring at least three days per month in the past three months, accompanied by two or more of the following:

- Improvement in diarrhea.
- Onset linked with a difference in stool frequency.

- Onset linked with a difference in stool appearance.

Diagnostic criteria met for the past three months, with symptom onset occurring at least six months before diagnosis. In pathophysiology research and clinical trials, it is advised that subjects exhibit pain or discomfort at least twice weekly during the screening evaluation to qualify for inclusion (Spiller et al., 2007).

4.5. ELIGIBILITY CRITERIA

1) Patients who have not engaged in Yoga in the past six months.
2) Patients not participating in any other alternative medicine programs.
3) Patients engaged in a three-month Yoga program, five times per week.

4.6. CRITERIA FOR EXCLUSION

1) Patients who are pregnant.
2) Patients with mental or physical illnesses to practice Yoga.
3) Patients with a history of substance abuse, including drugs, alcohol, or chemicals, within the six months preceding screening.
4) Individuals with any organic gastrointestinal disorder.
5) Patients unable to adhere to trial and follow-up protocols

Design of the Study: This was a randomized, experimental - controlled trial in which 200 patients were randomized into two study groups: Yoga module group practiced 50 minutes yoga session five days a week for 12 weeks (limited medicine/supplement use to three days a week); the Wait-list Control group maintained their life style for 12 weeks. Both the groups were assessed two times; Week 0 (baseline), and Week 12 (post-intervention).

Randomization: 200 IBS patients were randomized (parallel) into two groups - 100 in Yoga and 100 in Control groups. In order to ensure allocation of an equal number of patients to both the groups, randomization was carried out in blocks of six patients, and the patients were asked to pull out numbers from an envelope. The random numbers were generated using online software ("Randomization," 2012). The randomization process was handled by research team members not involved in data collection and was concealed from the research team that was involved in the data collection process.

Spectrum of glucose homeostasis and DM[1]

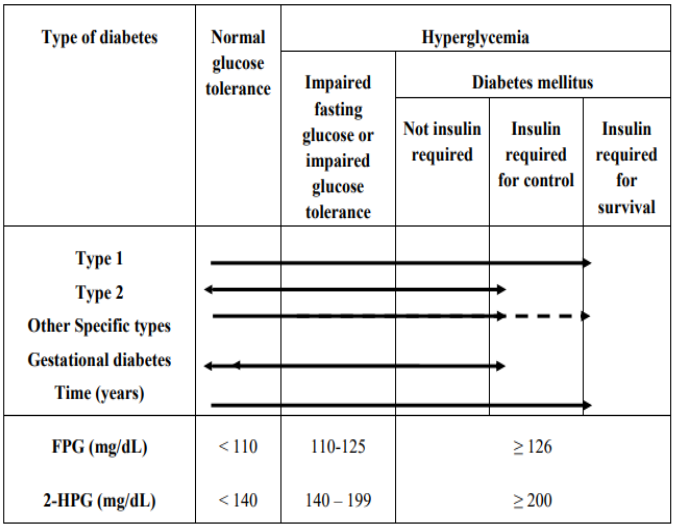

Figure 1 Flow chart for subjects assignment for the study

5. ASSESSMENTS

The study employed a comprehensive selection of measures to ensure an accurate representation of the symptoms experienced by IBS patients. The yoga intervention module induces changes at multiple levels, necessitating the selection of specific evaluations to detect these nuanced alterations. All these characteristics would yield insights into the intervention and facilitate the identification of differences between intervention groups and control groups.

Demographic and Health Checklist: This was developed specifically for the study to gather demographic data, including personal and family background, as well as clinical information (Table 2).

Patient Number:	Date:
PERSONAL INFORMATION	
Date of Birth	
Age	
Sex	M F
Education	High school and below College and beyond
Economic Status	Yearly income 1. < 30 k 2. 30-60k 3. 60-100k 4. >100k
Family Status	1. Single 2. Married 3. Divorced 4. Living together
Children	1. One 2. Two 3. Three or more
Stress Factors	1. Family 2. Job related 3. Other factors
ANTHROPOMETRIC MEASURES	(Taken before after the study)
Height (inches)	
Weight (pounds / lbs)	
CLINICAL SYMPTOMS	
Number of years suffering from IBS	
During the last 6 weeks:	
Medications used for IBS symptoms	
Number of times health services used (doctor/hospital)	
Days lost from work due to complications from IBS	
IBS symptoms of the patients now:	1. Terrible; 2. Worse; 3. Slightly worse; 4. No change; 5. Slightly better; 6. Better; 7. Excellent.

Table 2 Patient's Demographic and Health Checklist

5.2. ASSESSMENTS TOOL

Irritable Bowel Syndrome Quality of Life (IBS-QOL): IBS-QOL is a self-reported tool designed to assess various aspects of quality of life in IBS patients. The questionnaire consisted of a 5 point rating of 34 items inquiring into the emotional well-being and interference with activity, body image, health worry, food avoidance, social reaction, sex, and relationships. The scores (reverse scoring) were transformed to 0 to 100 range, higher score indicating better quality of life. An increment of 14 points was considered to be clinically significant improvement (Patrick, Drossman, Frederick, DiCesare, & Puder, 1998).

Intervention: A group of experts, including a gastroenterologist, yoga therapists, and yoga experts, worked together to make the Yoga Intervention Module for IBS. There were checks to make sure that all of the yoga teachers who helped with the intervention followed the same variation of the yogasana during the practice sessions.

Yoga Intervention Module:

The ideas behind this Intervention Yoga Module came from traditional yoga texts like the Upanishada, Patanjali Yoga Süträs, and Yoga Väsistha. These texts explained the importance of managing health in a comprehensive way, not just at the physical body level but also at the mental, social, and intellectual levels, seeing each person as a mind-body complex.

While keeping the general benefits in mind, a module just for IBS was made (Table3, mentions the benefits of the yoga therapy) A special 50 minutes Yoga module was made that anyone could follow, even if they had never done yoga before. This module was tried on a small group of patients to see if it would work, and everyone agreed that it would

work. Based on the results of this study, this program can be used as an effective way to help people with IBS. (Table 3, details of the yoga intervention module).

S. No.	Name of yoga practice D	Duration (minutes)
Start with prayer		
	Sithilikarana Vyayama/loosening exercises	5 min
1	Forward and backward bending	1 min
2	Side bending	1 min
3	Twisting	1 min
4	Pavanamuktasana//wind relieving pose	2 min
	Asanas/postures-standing, sitting,prone, supine	23 min
1	Ardhakati chakrasana/half-waist wheel pose	1 min
2	Ardha chakrasana/Half wheel pose	1 min
3	Padahastasana/hands to feet pose	1 min
4	Trikonasana/triangle pose	2 min
5	Parivritta trikonasana/revolved riangle pose	2 min
6	tadasana	1 min
7	Vakrasana/half spinal twist	1 min
8	Savaasana/quick relaxation	2 min
9	Pascimottanasana/seated fwd bend pose	1 min
10	Bhujangasana/cobra pose	1 min
11	Shalabhasana/locust pose	1 min
12	Viparitakarani with wall support	1 min
13	Matsyasana/fish pose	1 min
14	4 Vyaghrasana/tiger pose breathing	1 min
15	Shashankasana/moon pose breathing	1 min
16	Padottanasana/straight leg raise breathing (supine position, both legs)	1 min
17	Savaasana/deep relaxation	4 min
	Kriyas/cleansing and Pranayama/regulated breathing	13 min
1	Uddiyana Bandha and Agnisara/abdominal lock and rigorous movement of abdomen	2 min
2	Kapalabhati/forceful exhalation	2 min
3	Vibhagiya Svasana/sectional breathing	2 min
4	NadiShuddhi pranayama/alternate nostril breathing	3 min
5	Sitali/cooling pranayama	1 min
6	Sitkari/cooling pranayama	1 min
7	Bhramari/M-chanting	2 min
	Dhyana/meditation	9 min
1	Chakra meditation	8 min
2	OM Chant with visualization (OM)	1 min
	Total time	50 Minutes

Table 3 Yoga Intervention Module

All the yoga sessions took place online from the participants' homes. Before starting the intervention, all participants gathered at the Institute to practice yoga in eight different groups. During this time, they learned the yoga techniques and had their questions answered, which helped them prepare for the online sessions.

6. STATISTICAL ANALYSIS

An ANOVA was conducted for each assessment, which consisted of two factors: time points (week 0 and week 12) and groups (Control and Experimental). The interaction between time points, groups, and assessments, as well as the significant main effects of time points and assessments.

Assessments Outcome IBS-QOL: Post hoc analysis with Bonferroni correction of IBS-QOL showed a significant improvement in the Yoga group when compared to the control group. Figure1☹IBS-QOL) illustrates the changes between groups and time points. There was a significant difference between Yoga and Control groups at week 6 ($p<0.001$),, the mean difference was 226.31 ± 16.8, ($p<0.001$).. Table ….. shows between group differences and within group changes of the primary outcomes.

Assessment → Week ↓	Week 0	Week 12	95% CI
IBS-QOL Scores			
Yoga (n = 25)	92.00 ± 21.17	148.05 ± 11.62 *** §§§ (56.62%)	143.90, 157.28
Control (n = 98)	92.86 ± 19.05	91.52 ± 18.14	90.68, 103.44

Table 4 Analysis of between group differences and within group changes of primary outcomes in IBS patients

Data were analyzed using repeated measures of ANOVA followed by Post hoc analysis with Bonferroni adjustment. Values are group mean ± S.D.; (%): Percent change when compared to week 0; *: Represents mean change within groups when compared to week 0; *** p < 0.001; §: Represents between group differences when compared to Control group; §§§ p < 0.001.

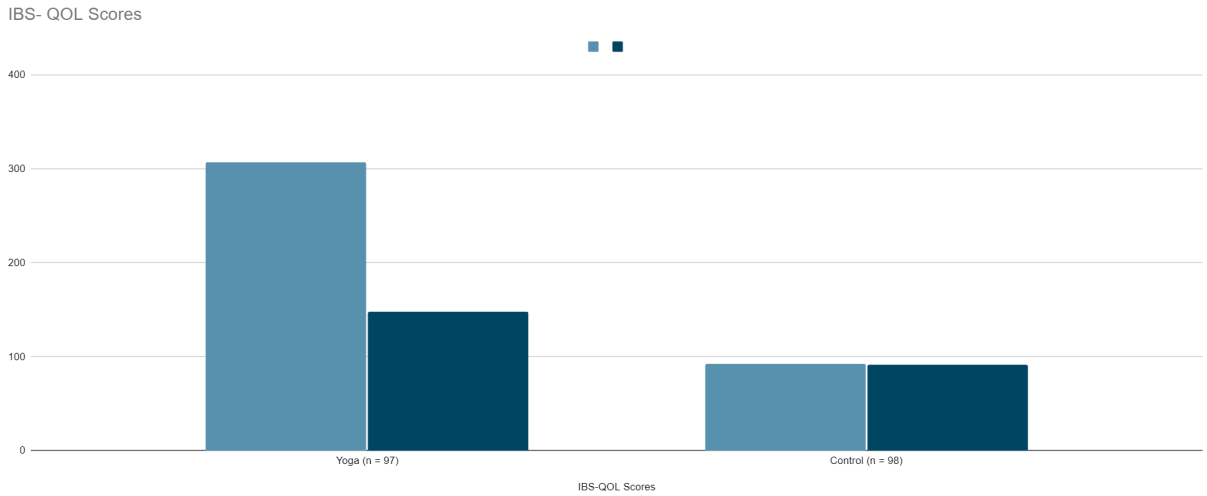

Chart 2 Analysis of between group differences and within group changes of primary outcomes in IBS (QOL) patients.

There was a significant difference between Yoga and Control group at week 12, the mean difference was 56.53 ± 5.71 [42.56, 70.5]; (p<0.001). Similarly, the mean difference of 47.95 ± 5.65 [34.12, 61.77]; (p<0.001), was observed (Table 3).

Eight Dimensions of IBS-QOL: A similar detailed analysis of eight dimensions of IBS-–Quality of Life assessments was carried out. As shown in Table 6, there was a significant difference between Yoga and the Control group (p<0.001) in all eight dimensions. Within group changes were observed in dimensions of one to six and eight in Yoga and control groups at week 12 (p<0.001) when compared to week 0 . There were no changes observed in the Control group.

Assessment Week	Week 0	Week 12	95% CI
Dysphoria			
Yoga (n = 97)	21.65 ± 7.52	34.6 ± 2.88 *** §§§ (51.56%)	33.79, 38.01
Control (n = 98)	21.56 ± 7.38	20.69 ± 6.73	19.7, 23.93
Interference			
Yoga (n = 97)	16.65 ± 7.15	29.09 ± 2.73 *** §§§ (60.19%)	28.24, 31.96
Control (n = 98)	18.01 ± 6.11	18.41 ± 5.5	17.64, 21.21
Body Image			
Yoga (n = 97)	07.09 ± 2.92	14.49 ± 2.46 *** §§§ (70.09%)	14.32, 16.5
Control (n = 98)	07.30 ± 3.49	07.60 ± 3.36	7.47, 09.75
Health worry			
Yoga (n = 97)	5.01 ± 2.22	10.41 ± 1.39 *** §§§ (64.13%)	10.55, 12.30
Control (n = 98)	4.83 ± 2.38	4.45 ± 1.43	4.66, 6.33
Food avoidance			

Yoga (n = 97)	5.29 ± 1.56	09.41 ± 1.51 ***	7.02, 10.81
Control (n = 98)	5.16 ± 1.36	3.41 ± 1.79	3.52, 5.33
Social reaction			
Yoga (n = 97)	13.53 ± 3.69	19.08 ± 1.63*** §§§ (40.71%)	17.87, 20.29
Control (n = 98)	10.12 ± 3.14	09.49 ± 2.2	09.32, 11.67
Sexual			
Yoga (n = 97)	5.61 ± 3.25	9.48 ± 1.16 *** §§§ (42.77%)	8.83, 10.13
Control (n = 98)	6.01 ± 1.21	6.01 ± 1.21	6.38, 7.63
Relationships			
Yoga (n = 97)	6.93 ± 1.09	11.09 ± 1.01 *** §§§ (37.71%)	11.24, 12.96
Control (n = 98)	6.69 ± 1.29	6.04 ± 1.88	6.22, 7.89

Table 5 Analysis of between group differences and within the group changes of the IBS patients in eight dimensions of IBS-QOL.

Data were analyzed with repeated measures ANOVA, followed by post hoc analysis with Bonferroni adjustment. Values are expressed as group mean ± standard deviation; (%): Percentage change relative to Week 0; Indicates intra-group changes compared to Week 0; $p < 0.01$; $p < 0.001$; §: Indicates inter-group differences relative to the Control group; § $p < 0.05$; §§ $p < 0.01$; §§§ $p < 0.001$.

7. CONCLUSION

Yoga has a substantial correlation with IBS level, suggesting that it may help with IBS and related anxiety management. The need for a treatment strategy for IBS that is both effective and cost-efficient. The future implications of yoga therapy in IBS control and anxiety prevention are quite promising.

Research supports yoga's role in effectively managing Irritable Bowel Syndrome (IBS) symptoms and the related anxiety that often accompanies it. For instance, a study by Kuttner et al. (2018) demonstrated that yoga practices, especially those focusing on mindfulness and deep breathing, significantly reduced both the physical and psychological symptoms of IBS, suggesting that yoga can improve both gut health and mental well-being.

Furthermore, Saha et al. (2020) found that yoga therapy improved quality of life and reduced anxiety in IBS patients, as participants showed reduced abdominal discomfort and a better ability to manage stress. This correlation aligns with findings by Evans et al. (2019), which showed that practices focusing on the mind-body connection, such as yoga, could influence gut-brain axis function, potentially reducing both the frequency and severity of IBS symptoms.

Given the substantial evidence, the potential for integrating yoga into mainstream IBS treatment strategies is promising. Yoga provides a cost-effective, non-pharmacological option for managing both the gastrointestinal and psychological dimensions of IBS, offering a sustainable path to relief and improved quality of life (Chaudhary & Sehgal, 2021).

CONFLICT OF INTERESTS

None.

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None.

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