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ORIGINAL RESEARCH

The effect of yoga intervention on depression and anxiety in inflammatory bowel disease patients: A randomized controlled interventional study

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ABSTRACT

Background: Inflammatory Bowel Disease (IBD) is a chronic disease occurs by an incorporation of multiple factors. IBD isconsist of intestinal disorders and extra-intestinal manifestations of illnessthat leads long time inflammation of the digestive tract and is usually associated with anxiety and depression. **Aims and Objectives**: Comparative study to check the effect of yoga interventions on depression & anxiety in inflammatory bowel disease patients. **Materials and Methods**: Data for the present study were collected from inflammatory bowel disease patients in the age range of 20-40 years of both genders those attendingOPD of Gastroenterology department of S.M.S. Medical College and Hospital; Jaipur. An equal number of IBD patients from OPD of the Gastroenterology Department had considered as the control they did not undergone any yoga interventions. **Results:** There found significantly decrease in depression score after 6weeks and 12 weeks of yoga. No significant change found in anxiety score**. Conclusion**: The values of changes in depression show highly significant effect of yoga on quality of health and depression score of IBD patients.

Key words: IBD, BDI, BAI,QOL,MBI

INTRODUCTION

Inflammatory Bowel Disease (IBD) is a chronicintestinal disorder. Pathophysiology is combination of multiple factors which includes environmental as well microbial and immune factors that leads prolong inflammation of the gastrointestinal tract and is usually associated with extra-intestinal manifestations of illness also includes skin, liver disorders and anemia etc.[1]

Clinical symptoms of IBD mainly includes diarrhea, fever, fatigue, pain in the abdomen, reduced appetite, loss of weight, and blood in stools. The majority of IBD patients have the physical symptoms along with psychological symptoms as well.

Altered regulation of immune-mediated inflammatory mechanism to environmental factors play an important role in development of IBD. [2] Stress is a reaction to a stressor or stress is a type of threat to homeostasis. Stressd body releases two hormones adrenaline and cortisol. The autonomic nervous system and the hypothalamic pituitary adrenal axis (HPA) are major retaliation to stress in the human body.

Some studies reported that 75% of IBD patients believe that stress is a major benefactor to the development of IBD and up to 90% of patients believe that stress activates flares of IBD. [3]

When our body undergoes stress attack body handles to “fight or flight” mode to release a complex mix of hormones and chemicals such as Adrenaline, Cortisol, and norepinephrine to prepare the body for physical action. Which diverted the blood to muscles to stop nonessential functions of body such as digestion. Mind-body practices decreases symptoms of stress and anxiety, especially when they are associated with harmful physical experiences. [4] When Internal and external pressures surplus in the individual’s resources to cope with their situation it will lead stress. Stress load to brain activates multiple pathways containing autonomic nervous system and hypothalamic-pituitary-adrenal axis.

The European Crohn’s Colitis Organization (ECCO) recommends cognitive behavioral therapy, meditation,

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relaxation, and yoga in adults with IBD to improve their quality of life (QoL). However, the ECCO acknowledges the lack of evidence of mind–body intervention (MBI) to improve IBD care

According to the National Institutes of Health's National Center for Complementary and Integrative Health, Mind body intervention (MBI) is the most liked complementary health technique in yoga used by the general population worldwide.

MATERIALS & METHODS

Aim of study was to check the effect of yoga interventions on anxiety and depression in inflammatory bowel disease patients.Data for the present study were collected from inflammatory bowel disease patients in the age range of 20-40 years of both genders attending OPD of Gastroenterology Department SMS Hospital; Jaipur with a diagnosis of IBD selected. An equal number of IBD patients from OPD of the Gastroenterology Department were considered controls who did not undergo any yoga intervention. The sample size was calculated as 31 subjects for each of the two groups at an alpha error of 0.05 and power of 80%, assuming a difference of means to be detected in perceived stress score in subjects and controls as 5± 7 (as per seed article). Hence for the study purpose, 40 subjects taken for the study group and 40 subjects for the control group with attrition of 10%. Sample size is sufficient to cover all other study variables.

The criteria for inclusion and exclusion of participants were as follows:

Inclusion criteria for IBD (case and control) Group:

(1) Follow-up IBD patients from OPD (Both UC and Crohn's disease)
(2) Aged 20- 40 years
(3) Subjects giving informed written consent.

Exclusion criteria for both Groups:

(1) Any acute illness affecting ANS functions
(2) Hypertension, Cardiac, Diabetics, Renal, Liver & other chronic diseases
(3) Subjects on medications known to affect autonomic functions.
(4) Subjects who are not cooperative.

Randomization: After taken informed consent from subjects, they were randomized into two groups by an alternate allocation method, assigned a number to each subject as they arrived at the first session (baseline visit). Each subject was designated a number (1, 2, 3, etc.) in the order of his or her arrival. Those subjects with odd numbers were enrolled to the study group; those with even numbers were enrolled to the control group. Patricia L et al 2015.

In our study first patient allocated by chit box method. Odd numbers allocated to yoga group and even numbers as non-yoga control group.

Procedure

The subjects so selected satisfied the above-mentioned inclusion and exclusion criteria. All Subjects were tested under similar laboratory conditions and allowed to acclimatize themselves to experimental and environmental conditions for one hour so that they would be relaxed and rested because anxiety and stress can affect autonomic functions. Informed written consent was obtained and the procedure of every test was explained to the Cases and Controls before conducting the tests.

IBD cases randomized into two groups by alternate allocation methods.

- The study protocol was explained in detail in the subject's understandable language and written consent (Hindi and English) received from each participant before the commencement of any procedure.
- Personal (past and present) history taken and a thorough general physical examination performed to screen out any disorder.
- Anthropometric parameters like height (meter) and weight (Kg) were recorded using standard methods.
- Body mass index (BMI) calculated by dividing weight (kilograms) by the square of his/her height (meters) (QUETELET'S INDEX).
- The study group undergone a 12 weeks yoga intervention (physical postures, pranayama, and meditation) for 50 min/day in addition to standard medical therapy and the control group did not underwent any intervention with standard medical therapy alone. IBD case group trained for yoga exercises at yoga OPD of S.M.S Medical College and Hospital, Jaipur by yoga expert for 3 days than follow monitoring of subjects through social media. Yoga performed under 3 activities
- Asana
- Pranayama
- Meditation

Anxiety and depression in IBD patients assessed by Becks Depression Inventory (BDI) and Becks Anxiety Inventory (BAI) questionnaires. [5]

In BAI, each item scored on a 4-point scale. Scores range from 0 to 63. Anxiety scores correspond to the following severity levels: 0 to 9 minimal, 10 to 16 mild, 17 to 29 moderate, and 30 to 63 severe.[5.

In BDI each items scored on a 4-point scale from 0 to 3. Total scores range from 0 to 63 with higher scores suggesting a more depressed mood. Classes of depression severity based on score are as0 to 13 minimal, 14 to 19 mild, 20 to 28 moderate, and 29 to 63 severe. A score more than 11 is suggestive of clinical depression in the normal persons. [5].

YOGA PERFORMA

Trained case group for 3 days in the yoga OPD of S.M.S medical college and hospital by the yoga expert after that patients performed yoga at home, then continuous monitoredthrough social media**.**

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Total duration: 50 Minutes

1.Warming up exercise for physiological compliance: 2 minutes

2. Sukshmavayama (loosening exercise that release muscular tension): work up the proprioceptive impulse to entrain sensory and attentional mechanisms from varied peripheral sensory pathway (12 minutes)

(a) Neck flexion/Extension, Rotation
(b) Fingers, wrist, elbows, shoulder rotation
(c) Waist movement:
(d) Knee joint exercise: chair pose
e) Ankle rotation and up, down, movements
(f) Tadasana
(i) Forward bending (padahostasana)
(ii) Backward bending (Ardhchakrasana)
(iii) Lateral Bending (Ardh-Katichakrasana)
(iv) Trikonasana

ASANAS: 16 min

A. Sitting Position

i) Vajrasana
(ii) Mondukasna
(iii) Shashankasna
(iv) Vakrasna

B. Prone Position

(1) Bhujangasna
(ii) Shalbhasana
(iii) Naukasna
(iv) Shavasna

C. Supine Position

(i) Pawanmuktasana
(ii) Uttanpadasana

PRANAYAMA: 10 minutes

1. Anulom-Vilom pranayama (alternate nostril breathing)
2. Dheerag-Swas-Pranayama: Deep inspiration followed by slow expiration
3. Chandrabhedi pranayama (left nostril breathing)
4. Bhramari pranayama: after deep inspiration sound of the syllable 'M' with no movement of lips and tongue is produced during prolonged and slow expiration
5. OM kar chanting: to be do 3 times that includes the chanting of the syllable 'AUM' during expiration after deep and long inspiration.

Meditation: 10 minutes

Deep relaxation by autosuggestion technique with full awareness and heightened sensorium meant to entrain the neocortical neural rhythm.

Statistical Analysis

The information entered into Microsoft Excel. The data expressed asproportion of percentage. Fisher Exact test & chi square test applied to calculate the level of significance. The level of significance assigned at $P < 0.05$.

RESULTS

The findings of the present study are depict in Table

Table-1: Age wise distribution of study subjects

Age Group (In Years)	Control Group n (%)	Yoga Group n (%)	Total n (%)	P-value*
20-30	19 (23.75)	21 (26.25)	40 (50.00)	0.823
31-40	21 (26.25)	19 (23.75)	40 (50.00)	
Total	**40 (50.00)**	**40 (50.00)**	**80 (100.00)**	

*Fisher Exact test

Table-2: Gender wise distribution of study subjects

Gender	Control Group n (%)	Yoga Group n (%)	Total n (%)	P-value*
Male	23 (28.75)	20 (25.00)	43 (53.75)	0.654
Female	17 (21.25)	20 (25.00)	37 (46.25)	
Total	**40 (50.00)**	**40 (50.00)**	**80 (100.00)**	

*Fisher Exact test

Table-3: Distribution of severity of Anxiety between control group and yoga intervention group at baseline, after 6week &12 week

Study Timeline	BAI Score	Control Group n (%)	Yoga Group n (%)	P-value*
Baseline	Low Anxiety	37 (46.25)	38 (47.50)	1.000
	Moderate Anxiety	3 (3.75)	2 (2.50)	
At 6th Week	Low Anxiety	37 (46.25)	40 (50.00)	0.241
	Moderate Anxiety	3 (3.75)	0 (0.00)	
At 12th Week	Low Anxiety	37 (46.25)	40 (50.00)	0.241
	Moderate Anxiety	3 (3.75)	0 (0.00)	

*Fisher Exact test

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Table 4: Distribution of severity of Depression between control group & yoga group at baseline & after 6weeks& 12 weeks

Study Timeline	BDI Score	Control Group n (%)	Yoga Group n (%)	P-value*
Baseline	Normal	2 (2.50)	5 (6.25)	0.459
	Mild Depression	18 (22.50)	15 (18.75)	
	Moderate Depression	20 (25.00)	20 (25.00)	
At 6th Week	Normal	2 (2.50)	5 (6.25)	0.003
	Mild Depression	18 (22.50)	29 (36.25)	
	Moderate Depression	20 (25.00)	6 (7.50)	
At 12th Week	Normal	2 (2.50)	10 (12.50)	< 0.001
	Mild Depression	18 (22.50)	28 (35.00)	
	Moderate Depression	20 (25.00)	2 (2.50)	

*Chi square test

DISCUSSION

IBD complications are usually consist of intestinal obstruction (edema vs. fibrosis), toxic mega colon or perforation and intestinal fistulas of bowel, bladder, vagina, skin, soft tissue, often associated with abscess formation, bile salt malabsorption leading to cholesterol gallstones and/or oxalate kidney stones, intestinal malignancy, amyloidosis.[11]

Within the extent and duration of disease, it leads toxic mega colon and colonic perforation.Cancer risk alsoassociated with extent and duration of colitis, which usually preceded with dysplasia. It will bediagnose by surveillance colonoscopy biopsies. IBD is an autoimmune disorder in which the gastrointestinal system involved mainly further other organ systems of our body also. In IBD patients, more chances of occurrence of colorectal cancer. Reported the risk of colorectal cancer to be as high as 18% at age of 30 years in IBD patients.

The central mechanisms of action for the therapeutic effects of yoga involve changes in grey matter morphology, enhanced cerebral blood flow, and cerebral activity, due to this neurotransmitter (GABA, BDNF) expression altered. Mechanism increases grey matter density in yoga practitioners with its effects on the volume of hippocampus and amygdala. The effects on the hippocampus related to increased Brain-derived neurotrophic factor (BDNF) levels, which is a marker for neuroplasticity, whereas a decline in amygdala volume is associated with decreased perceived stress among yoga practitioners. According many studies yoga activates neuron in the pre-frontal cortex. Yogaincreases GABA levels, which associated with decreased stress and may be a consequence of pre-frontal cortex activation.

In the present study,population comprised of 80 inflammatory bowel disease patients, out of these 40 patients as a control group which not undergone any intervention and 40 patients assigned as a yoga group those underwent to 12 week yoga intervention.80 patients randomized by alternate allocation method into study group & control group.

There found no differences in mean of age, sex and body mass index in inflammatory bowel disease patients at baseline. According to becks anxiety inventory (BAI) score patients divided into normal, mild & moderate. In presentstudy 37 patients have mild anxiety in control group and 3 patients have moderate anxiety and in study group 38 patients have mild and 3 patients have moderate anxiety .when these study group patients undergone yoga intervention there was decrease the number of moderate anxiety patients but not significantly. The number of moderate anxiety patients after 6 & 12 weeks of yoga intervention become zero There found decrease in anxiety but not significantly. Table no 3

Study conducted by Subhadra Evans et al (2014)[6] shows the significant improvement in anxiety after yoga. Study do not agree with the findings of the present study.

Study conducted by Ganguli SC et al (2007)[7] found ulcerative colitis patients have severe trait anxiety but no state anxiety, the Crohn's disease patients have no relation with psychological measures but according our study all inflammatory bowel disease patients have mild to moderate anxiety and depression.

Table no 4 show highly significant improvement in depression after 6& 12 weeks of yoga compare to control group. After 12 week of yoga, number of patients with moderate depression is less than the control group. Showed significant effect of yoga on depression after 6 weeks (<0.05) and highly significant after12 weeks of yoga intervention (<0.001).

Study conducted by Ann Ming Yeh et al (2017)[8]found that psychotherapy, mind body practices are helpful to improve depression & quality of life in individuals with inflammatory bowel disease.The study are in agreement with present study results.

H Cramer et al (2017) [9]also found the effect of yoga on depression, stress & quality of life in Ibd patientsAnna K Koch et al (2019) [10]) are in agreement with our study as yoga is a strong adjunct therapy to highly stressed ulcerative colitis patients.

Study conducted by D Silva et al 2023 found no significant improvement in anxiety and depression score when compared within intervention and non - intervention group. Not in agreement with present study results.

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CONCLUSION

Regular practice of yoga asana, pranayama and meditation for 50 minutes daily has shown improvement in number of anxiety and depression scores in IBD subjects. According present study yoga may be helpful in improving the overall quality of health and depression, anxietylevel of IBD individuals.

LIMITATIONS

Small sample size and less number of CD patients than ulcerative colitis patients.

Conflict of interest: NO

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