

# “EFFECT OF YOGASANAS ON GASTRIC MOTILITY OF CONSTIPATED INDIVIDUALS”

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**ABSTRACT:** *Functional or Primary constipation is an on-going symptom for more than six months which is not due to any medication side effects or any medical condition. Even though there are various treatments available for the management of constipation, there have not been scientific evidences for their efficacy and safety published. This study aims to evaluate the effect of yogasanas on gastric motility of individuals suffering from constipation using: Constipation assessment scale (CAS), Constipation scoring scale (CSS), Patient assessment of Constipation-Quality of life (PAC-QOL) and Gastric motility by using EGG. 72 subjects were recruited for the study, 12 subjects dropped out. Study was conducted on 60 subjects among which 37 male subjects and 23 female subjects. Experimental group consisted of 30 subjects who were made to practice yogasanas daily twice for 20 minutes for 15 days with diet modification and wait list control group subjects consisted of 30 subjects who were instructed to follow the normal routine. Data Analysis was done using Statistical Analysis Software [statistical package for social sciences (SPSS) for Windows 20.0]. The results showed, significant decrease in CAS ( $p<0.001$ ), CSS ( $p<0.001$ ), PACQOL ( $p<0.001$ ), QOL Satisfaction ( $p<0.001$ ) scorings in experimental group and also showed significant changes in fasting EGG ( $p=0.01$ ) significant increase in the post prandial EGG ( $p<0.001$ ) in experimental group when compared to wait list control group. Hence practice of yogasana is effective in reducing severity of constipation and improving the gastric motility.*

**Index Terms:** *Yogasana, Constipation, Electrogastrogram.*

## INTRODUCTION

Constipation is one of the most common gastroenterology problem which is defined as unsatisfactory defecation which is characterized by the presence of infrequent stool passage with difficulty in passing stools or both. [1] Chronic constipation (CC) is the most important components of clinical gastroenterology practice. [2] Functional or Primary constipation is an on-going symptom persisting for more than six months which is not due to any medication side effects or any medical condition. [3] Worldwide 2% to 27% of the population are affected by chronic constipation. [2] The common most gastrointestinal complaint is seen evidently in healthy population as well as in patients having various predisposing disorders with 12% to 19% approximately of global prevalence. [4]

Though it is properly diagnosed in more than 95% of the cases, the disease is controlled only in less than 50% of the population. When constipation is not controlled, it is the most significant risk factor which leads to faecal impaction that is found in almost 50% of the population. [5] Constipation is a major public health issue with high prevalence rate, economic burden and adverse implications on daily standards of living and quality of life is interfered significantly and also affects them physically and mentally which becomes troublesome for many individuals. Based on clinical definition, either self-reported or with Rome III Criteria individual suffering from functional constipation is identified. [3, 6, 7]

Chronic Idiopathic Constipation (CIC) also known as Functional Constipation (FC) is the one which may have issues like neurological, psychological or psychosomatic. A healthy person may also have functional constipation, yet will have the difficulty in defecation. [8] Constipation is a condition of the digestive system where a person experiences having a bowel movement fewer than three times per week, with constipated stools usually hard, dry, small in size and difficult to eliminate faeces which is extremely painful and in severe cases faecal impaction leads to symptoms of bowel obstruction. [9, 10, 11, 12]

Studies have also shown that individuals with constipation will have poor abdominal tone and sluggish colonic movements with a chronic problem ending up with the complication of haemorrhoids and rectal prolapse, [13] and in later stages leads to antral hypo-motility causing gastric stasis. [14] Some people also have a bowel movement and often experience straining, bloating and the sensation of a full bowel. [12] Constipation occurs when the colon absorbs too much water or if the colon's muscle contractions are slow or sluggish, causing the stool to move through the colon very slowly. As a result, stools can become hard and dry. [15, 16] As the person ages, the bowel movements generally decreases. 95% of adults have bowel movements between 3 to 21 times per week and this would be considered normal.

The most common pattern is one bowel movement a day, but this pattern is seen in less than 50% of people. However most people have altered bowel movements such as irregular, no bowel movements or the same number of bowel movements every day. [15]

Constipation can be treated with irrespective of the cause which is initiated from life style modification, [17] and the most empirical, simple and helpful measure which includes educating the patients, adequate fluid intake, dietary fibre supplements and regular physical activity. Pelvic floor retraining may be helpful in the management of patients with outlet delay. Selective patients with the intractable constipation may be benefited from surgery. [18] But surgery may have serious complications and hence it is least advised. [19] Some non-pharmacological treatments like enema, colon irrigation relieves constipation symptoms, but they may reduce the intestinal tone when used for a longer duration. [20]

The origin of yoga dates back around 4000 – 8000 years during indus valley civilization in north-western part of India. Yoga means “unity or oneness”, which has been derived from Sanskrit word *yuj* means “to join”. [21] Yoga includes ancient practises like postures, breathing techniques and meditation which is gaining a lot of attention from healthcare professionals. [22] It also offers several practices that help to restrain from fluctuation in the consciousness (*chitta-vritti-nirodha*) [23] by which mind becomes cultured and mature through the process of calmness of mind (*manah prashamana upaya*) [24] to reach a state of balanced functioning of the mind body complex (*samatvam yoga uchyate*). [25] Yoga text clearly mentions that the aim of any yoga practice that helps in physical, mental or emotional is to reach a state of control (*chitta-vritt-iniroda*) [23] over the responses to situation by the process of slowing or silencing the mind. [24] Internal awareness of the changes in the mind helps in conscious slowing down and thus offers physiological rest.

Practice of yogasanas offers deep stimulation by activating the basic autonomic reflexes by acting on the enteric division of autonomic nervous system by increasing the intra-abdominal pressure, by enhancing a mechanical laxative effect.

According to the Indian system of health, the *apana vata* in the gastrointestinal tract influences other *vatas* in the body leading to various digestive disorders. [26] Practice of yogasanas is believed to shorten the transit time through the gastrointestinal tract and thus enhances evacuation of stool, but in other way lack of muscle tone as a result of inactivity decreases the facilitative function of the abdominal and pelvic floor musculature in evacuating the stool. [27] Though there are various treatment options available for the management of constipation, evidence for their efficacy and safety are limited, [28] and also there are no scientific evidences published on the practice of specific yogasanas on increasing the gastric motility for constipated individuals.

Hence, this study is designed to evaluate the effect of specific yogasanas practice to reduce constipation in related with symptoms, increase in gastric motility and improving the lifestyle of a constipated individuals.

## METHODOLOGY

**Participants:** The study population was selected from Out-Patient Department of Sri Dharmasthala Manjunatheswara Yoga and Naturopathy Hospital, Ujire. After the initial screening, among 150 populations, 72 subjects were selected based on their detailed case history. All the 72 subjects were given detailed information regarding the study and were asked to go through the consent form. Out of which 12 subjects dropped out, among which 4 participants changed their residency, 6 subjects were not willing to continue the study and 2 subjects had viral fever. Later 60 subjects were eventually recruited, among which 37 male subjects and 23 female subjects based on the selection criteria and who gave signed informed consent in Kannada/English language to participate in the study. The selected subjects were randomly allocated into two groups using computer generated randomizer. The study was given institutional ethical committee approval.

**Inclusion Criteria:** Age: 18 to 35 years, Gender: male & female, suffering from functional constipation as per diagnostic criteria, willing to give consent for participation in the study.

**Exclusion Criteria:** Patients with fissures and fistula, haemorrhoids, hernia, Patients suffering with Ischemic Heart Disease (IHD), liver and lung diseases, neurological disorders like Parkinsonism, Cancer, Diabetes Mellitus (DM), hypothyroidism, abdominal surgeries, familial intestinal polypoid syndrome, IBD and psychiatric disorders. No history of lactose intolerance, colorectal cancer, recent cerebrovascular accident/ stroke, spinal cord injury and disc herniation causing bowel symptoms. Analgesics, opioid use in last week. Women during Menstruation.

### Study Design:

The recruited subjects who fulfilled the inclusion criteria were divided equally into two groups. Subject design is a randomized controlled trail.

Group A (n= 30) Experimental Group (Yogasana Practice twice daily for 20 minutes for 15 days with Diet modifications)

Group B (n= 30) Wait List Control Group (No modification in diet or physical activity for 15 days)

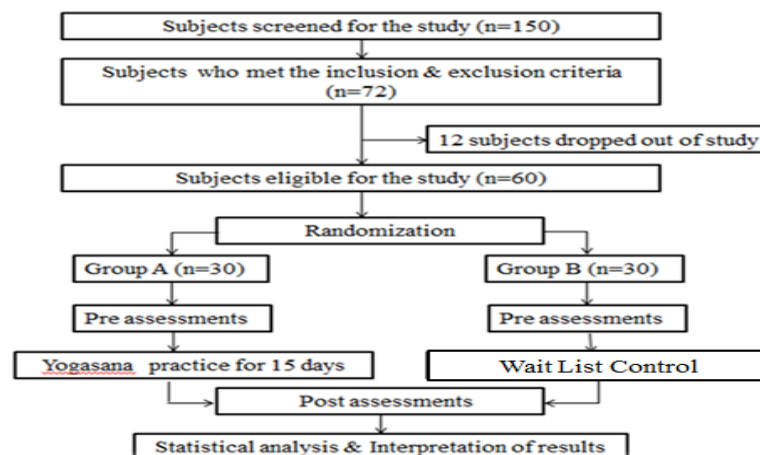


Figure 1: Illustration of the study plan

**INTERVENTION:**

**Experimental group:** The subjects were given a set of yogasanas Trikonasana, Padahasthasana, Bhujangasana, Ushtrasana, Paschimotanasana for all 30 subjects was given daily twice. [29] Along with yogasanas practice, all subjects were advised to follow normal diet at home with slight modifications like increased intake of high fibre diet and intake of enough of water and none of the subjects were under any laxatives drugs during this period of 15 days.

**Wait List Control group:** The subjects were not given intervention but only advised to follow normal daily routine.

**OUTCOME MEASURES****PRIMARY OUTCOME:**

Is to assess symptoms of constipation by Constipation Assessment Scale (CAS) [30]

- 1) To see the improvement in frequency of stools.
- 2) To see the improvement in hard stools and see the changes in consistency of stools.
- 3) To see the reduction in straining while defecation.
- 4) To see the improvement in the incomplete evacuation.

**SECONDARY OUTCOME:**

To assess Constipation Questionnaire April 2012, which consists of Bristol Stool Chart and which will assess the severity of constipation in the last 3 months. [31] This constipation questionnaire consists of set of 14 questions to assess the severity of constipation in the last 3 months.

Patient Assessment of Constipation Quality of Life (PAC-QOL) was done only at day 15 of intervention and wait list control group both to assess the general quality of life in patients with Functional Constipation. [32] The validated PAC-QOL is composed of 28 items grouped into four subscales: physical discomfort, psychological discomfort, worries and concerns, and satisfaction. The first 3 subscales are used for the assessing the patient dissatisfaction index, with an overall score ranging from 0 to 96 (where lower scores correspond to better quality of life) and the satisfaction subscale which includes 4 items with a global score ranging from 0-16, so that each patient's self-reported definitive outcome is defined as either poor (0-4), fairly good (5-8), good (9-12), or excellent (13-16).[32]

Surface EGG (Electrogastrogram) to study gastric myoelectric activity after a test meal. This was done at baseline and after 15 days of intervention or control period using test meal protocol. [33]

In evaluation of the EGG recordings, the following parameters were considered:

- The dominant frequency- this reflects the frequency of the gastric slow waves; normal range is  $2\pm 4$  cpm.
- The dominant power- the amplitude and the regularity of the EGG (contractile activity is associated with its relative changes). Only relative changes of the dominant power were used since its absolute value is associated with many factors that could not be controlled, such as thickness of abdominal wall, accurate location of the stomach, etc.
- Percentage of  $2\pm 4$  cpm waves- this represents the percentage of time occupied by the regular  $2\pm 4$  cpm gastric slow waves (normogastria)
- Percentage of dysrhythmias- this specifies the percentage of time associated with irregular gastric slow wave activity. Sub classification includes bradygastria (dominant peak in the 0.5 to 2.0cpm range) and tachygastria (dominant peak in the 4.0 to 9.0 cpm range). [34]

**DATA EXTRACTION**

The data was collected using one primary outcome and three secondary outcome variables. The assessments were collected on the first day (baseline) and the end of 15<sup>th</sup> day (post data). The data was organised in Microsoft Excel sheets (version 2010).

**DATA ANALYSIS**

Appropriate statistical tests were done to assess mean difference across the baseline (pre) and endpoint (post) based on the quality of data normality and distribution). These tests were done using Statistical Analysis Software- Statistical Package for Social Sciences (SPSS for Windows version 20.0). Significance was determined.

Normality test was done by Kolmogorov Smirnov test method. The data analysis for comparing both the groups was done by Independent t test. Pre and post comparison was done by using paired t test. Categorical variables were analysed using fishers exact test. P value  $<0.05$  was not considered as significant.

## RESULT

The data were analysed for normality distribution by Kolmogorov Smirnov test. The experimental and wait list control group are comparable with age and gender. When both the groups were compared, there was significant changes in the Experimental group fasting EGG, post prandial EGG, Quality of life satisfaction, Constipation Scoring Scale and Constipation assessment scores. In Experimental group there were significant improvement with p value <0.001. In Wait list control group there was slight significant change in the Post prandial EGG with p value 0.16.

Table 1:- Comparison of pre and post data in Experimental group and wait list control group with respect to CAS, CSS, PAC-QOL, QOL-SATISFACTION, FASTING EGG, POST PRANDIAL EGG with Independent t test

PARAMETERS	WAIT LIST CONTROL (n=30)	EXPERIMENTAL (n=30)	P- VALUES
MALE/FEMAL RATIO	11:19	12:18	1.00#
AGE	23±3	22±3	0.41
PRE CAS	12.5±1.7	12±1.4	0.27
POST CAS	11.9±1.6	1.7±1.3	<0.001*
PRECSS	14.2±3	14±2.2	0.77
POST CSS	13±2.8	3.4±1.5	<0.001*
PRE QOL	36.9±7.4	36.5±7.8	0.81
POST QOL	36.8±7.3	18.3±8.7	<0.001*
PRE SAT	7.1±2.5	6.9±2.2	0.74
POST SAT	7.2±2.5	13.6±1.6	<0.001*
PRE FASTING EGG	1.9±0.6	1.8±0.4	0.48
POST FASTING EGG	1.9±0.5	2.2±0.4	0.01*
PRE POSTPRANDIAL EGG	2±0.5	2.1±0.3	0.52
POST POSTPRANDIAL EGG	2±0.6	2.3±0.3	<0.01*

\* Implicates P<0.05, # Implicates Fishers Exact Test and Results are expressed in Mean±SD

Table 2:- Pre Post Comparison of Wait list control and Experimental Groups with respect to Fasting EGG and Post Prandial EGG with Paired t test

PARAMETERS	PRE	POST	P VALUE
WAIT LIST CONTROL GROUP			
FASTING EGG	2±0.61	1.93±0.59	0.50
POST PRANDIAL EGG	2.08±0.56	2.01±0.62	0.16
EXPERIMENTAL GROUP			
FASTING EGG	1.85±0.48	2.06±0.43	<0.001*
POST PRANDIAL EGG	2.16±0.39	2.39±0.34	<0.001*

\* Implicates P<0.05

## DISCUSSION

This study mainly aims to evaluate the effect of set of yogasanas practice on constipation related symptoms and change in gastric motility in subjects with functional constipation, by using CAS, CSS, PACQOL and EGG.

The number of subjects in total was 60. 30 subjects in case group and 30 subjects in wait list control group. Subjects in experimental group were made to practice set of yogasanas for 20 minutes twice daily for duration of 15 days. They were also advised to consume high fibre diet during the intervention period. Subjects in the wait list control group were only advised to follow normal daily routine for 15 days of intervention period and there were no adverse effects reported during or after the intervention period.

The present study examined the effect of set of yogasana with high fibre diet on constipation. Subjects in the experimental group showed decrease in CAS, CSS, PACQOL scorings and increase in postprandial EGG after the practice of yogasanas than compared to the fasting EGG. Subjects who practiced yogasanas along with high fibre diet showed more satisfaction after the intervention. Whereas, results of the subjects who were in wait list control group were advised to follow normal daily routine no significant decrease in CAS, CSS, PACQOL scorings but Fasting EGG remained unchanged but they showed little significant change in Post Prandial EGG intervention period.

Gastrointestinal disorders are most prevalent in the society. Major causes for constipation is due to tremendous change in lifestyle, diet and dietary habits, psychological stress.

Yoga places a major in managing constipation in two ways

- Managing stress
- Improves the digestion

#### MANAGING STRESS

Yoga like asana pranayama and meditation by the practice of this reduces the cortisol level and reduces stress in the individual. [35]

#### IMPROVES DIGESTION POWER

By practicing of yogasanas enhances the intraabdominal pressure and strengthens the abdominal muscles. This relieves gastric pressure and automatically enhances the gastric motility. This increase in gastric motility reduces the symptom of constipation. Symptoms like abdominal pain, discomfort, flatulence will be reduced after practicing yoga. In this aspect yoga is effective in maintaining constipation and its related symptoms. [36]

Yogic diet like satwik diet which is rich in fibre freshly prepared relieves constipation and its symptoms.

In the present study to measure the quality of life in constipation patients PAC-QOL was used which showed a significant improvement in the intervention group ( $p < 0.001$ ) and the improvement in total quality of life scores was also seen in the wait list control group ( $p = 0.731$ ) but not as significant as compared to the intervention group because the subjects in the wait list control group continued to do their physical activity which might have resulted in improvement in their quality of life. A similar study done on Iyengar yoga and IBS showed improvement in health related quality of life in IBS patients ( $p = 0.03$ ) [37]

A pilot study done on yoga treatment in children with functional abdominal pain and IBS showed reduction in the pain frequency with ( $p = 0.031$ ). In this study CSS scores showed significant decrease in the abdominal pain with ( $p < 0.001$ ). [38]

In the current study the rectal symptoms including burning during and after bowel movement, showed a significant reduction in post values compared to the pre values within the intervention group ( $p < 0.001$ )

#### LIMITATION OF THE STUDY

There was lack of control over the intake of high fibre diet.

#### DIRECTIONS FOR THE FUTURE STUDY

- Intervention period can be increased.
- Study can be conducted with a large sample size.

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