

Effect of Pranayama on Depression Score and Physical Fitness Index In Pre & Post Menstrual Phases In Young Females

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Abstract:

• **INTRODUCTION-** Premenstrual syndrome(PMS) also called Premenstrual tension(PMT) refers to cyclic recurrence of a combination of distressing physical, psychological or behavioral changes during the luteal phase of menstrual cycle. PMS is most common in women between age group of 18-25yrs. **MATERIALS&METHODS-** Study tools – PMS questionnaire, Zung scale, Harvard step test, Physical Fitness Index ,Study design – Prospective study Study Population –180 divided into 2 groups .**RESULTS-** Baseline mean depression score before PMS is 31.11. After 24 weeks of Pranayama intervention the value decreased to 28.93. This difference was found to be statistically significant ($p=0.001$) using Paired T-Test. Physical Fitness Index calculated during Premenstrual phase is 37.73. After 24 weeks of Pranayama intervention the value increased to 40.30. The difference was found to be statistically significant ($p=0.000$) using Paired T-Test. **CONCLUSION-** • A significant decrease in the depression scores was found indicating a positive impact due to regular practice of pranayama and improving the quality of life in physical, mental and emotional aspects and increase in the overall efficiency of student population.

Key Words- Premenstrual syndrome, Pranayama, Harvard step Test, Depression score, Physical Fitness Index

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I. Introduction

PRE MENSTRUAL SYNDROME : Premenstrual syndrome(PMS) also called Premenstrual tension(PMT) refers to cyclic recurrence of a combination of distressing physical, psychological or behavioral changes during the luteal phase of menstrual cycle. PMS is most common in women between age group of 18-25yrs, having a history of depression and positive family history of PMS. It is estimated that 80% of women experience some type of premenstrual changes during their reproductive period.

Premenstrual syndrome(PMS) can impact an individual's interpersonal relationships, social interactions, productivity, lifestyle, school performance and emotional well-being^{1,2}

Women with PMS are characterized to have prominent mood symptom and 4 other somatic symptoms for 2 consecutive cycles which include mild psychological symptoms, bloating, weight gain, breast tenderness, swelling, aches & pains, poor concentration, sleep disturbance and appetite change.

All included studies reported some changes in their outcome measures, suggesting reduced symptoms of menstrual distress following a yoga intervention.

Premenstrual dysphoric disorder(PMDD)^{3,4} is a more severe subtype of PMS that involves more types of emotional symptoms(such as sadness, anxiety, mood swings, irritability, loss of interest in things). A growing body of evidence supports the belief that Pranayama benefits physical and mental health via down-regulation of hypothalamic-pituitary-adrenal axis and the sympathetic nervous system.^{5,6}

DEPRESSION : Depression is a symptom that many women experience during their menstruating years. The key element that sets apart PMS related depression from other forms of depression is the 'timing of symptoms'. They occur during the 2 weeks prior to the onset of menstruation. Women suffering from PMS-related depression and PMDD report dramatic relief from their symptoms once their menstrual flow is underway.

PHYSICAL FITNESS : Regular aerobic exercise helps relieve cramps, bloating, mood swings as well as other symptoms associated with menstruation and PMS⁷. Physical activity also speeds up blood circulation, which may relieve headaches associated with menstruation⁸.

Also lets loose feel-good hormones, which combats bad moods⁹.

Pranayama focuses on breathing & relaxation techniques that can alleviate stress and tension, increases the blood flow and oxygen around the body and settles down the nervous system.¹⁰

OBJECTIVES:

- To evaluate depression scores during PMS before and after performing PRANAYAMA for 24 weeks.
- To assess the physical fitness index & exercise recovery time of healthy young females before and after performing 24 weeks of Pranayama during PMS.

II. Methodology :

Study tools – PMS questionnaire, Zung scale, Harvard step test, Physical Fitness Index .Study design – Prospective study .Study Population –180 divided into 2 groups

Study Setting – The study was conducted in the Department of Physiology at ACSR Government Medical College, Nellore.

The study was conducted on the basis of a premenstrual distress questionnaire, physical fitness index calculation on 90 females suffering from PMS and 90 healthy controls, between the age group of 18-25 yrs , having regular menstrual cycles from 28-34 days. Premenstrual phase was taken as 1-7 days prior to onset of next menstruation and 5th – 10th day postmenopausal period was take

INCLUSION CRITERIA – Healthy females aged 18-25 yrs having regular menstrual cycles from 28-34 days.

EXCLUSION CRITERIA – The subjects with any physical(musculoskeletal problem), psychiatric illness or on any medication, hypothyroidism, PCOD, irregular cycles, reproductive tract infections were excluded from the study

PROCEDURE: Height,Weight, Body Mass Index,Pulse rate, Respiratory rate,Systolic Blood Pressure and Diastolic Blood Pressure were recorded Before the starting of pranayama and also after 24 weeks of pranayama.

PMS QUESTIONNAIRE :

The subject is asked to complete the given PMS questionnaire(Dr. Ricki Pollycoves'). The questionnaire has questions regarding physical, emotional & behavioural changes during PMS. The participants are asked to choose the appropriate score and the results are evaluated.

DEPRESSION SCALE :

Zung depression questionnaire is given and the participants are asked to fill it. The results are evaluated and average of all the readings is considered.

PHYSICAL FITNESS INDEX :

Harvard Step Test - The **Harvard step test** is a type of cardiac stress test for detecting and diagnosing cardiovascular disease. It also is a good measurement of fitness and a person's ability to recover after a strenuous exercise. The more quickly the heart rate returns to resting, the better shape the person is in.

It is a kind of cardiovascular endurance test. The test computes the capability to exercise continuously for extended intervals of time without tiring.

The subject is asked to perform the Harvard Step Test and the physical fitness index is calculated by using the formula –

Physical Fitness Index = $\text{Duration of exercise in sec} \times 100 / 2(\text{pulse 1} + \text{pulse 2} + \text{pulse 3})$ Pulse 1 - After 1 min of exercise

Pulse 2 – After 3 min of exercise

Pulse 3 – After 5 min of exercise

PROCEDURE FOR PRANAYAMA (24 Weeks) :

To do Pranayama sit facing east or north in a comfortable cross legend position on a yoga mat. Make sure your head, neck and chest are in a straight line and keep your spine stretched. It has to be performed on empty stomach with light clothing.

Round one :

It has to be begin by focusing our attention on our breathing for a minute. The flow of breath in both nostrils has to be observed. Right nostril is closed with the right hand thumb and inhale deeply through the left nostril. After inhaling, close the left nostril with ring and pinky finger and exhale through the right nostril. After exhaling through the right nostril inhale through the same right nostril. Close the right nostril after inhaling and exhale through the left.

Round two :

Repeat the process beginning with right nostril inhalation.

Breathing exercise (Pranayama)- Alternate Nostril (Anuloma Viloma)-

Subjects performed alternate nostril breathing for 20 min on empty stomach under the guidance of a certified yoga trainer. In this breathing technique, the subjects inhale through one nostril, retain the breath and exhale through the other nostril in a ratio 2:8:4.

Exercise protocol:

Precautions - Participants were instructed to avoid heavy meal,caffeine,or nicotine for 4 hours prior to testing and to refrain from strenuous physical activity or exercising for 24 hours prior testing.

Each study session was conducted at approximately the same time of day for each subject and was separated by atleast 48 hours. It was ensured that the subject properly understood the instructions and followed them each time that they were tested. After 30 minutes of rest, radial pulse was counted for full 1 minute, followed by blood pressure measurement with the help of mercury sphygmomanometer.

The participants performed moderate isotonic exercise by modified Harvard step test suitable for Indian students by climbing and descending two steps at a rate of twenty times in a minute for two minutes using metronome, height of each step being. If the participant requested to stop or he had any of the following during exercise, the procedure was stopped and the participant was excluded from the study - nausea and/or dizziness(head ache),heart problems(angina like symptoms),irregular heart beat, physical or verbal manifestations of severe fatigue, breathlessness or a feeling of lack of air, fainting, leg cramps or claudication.

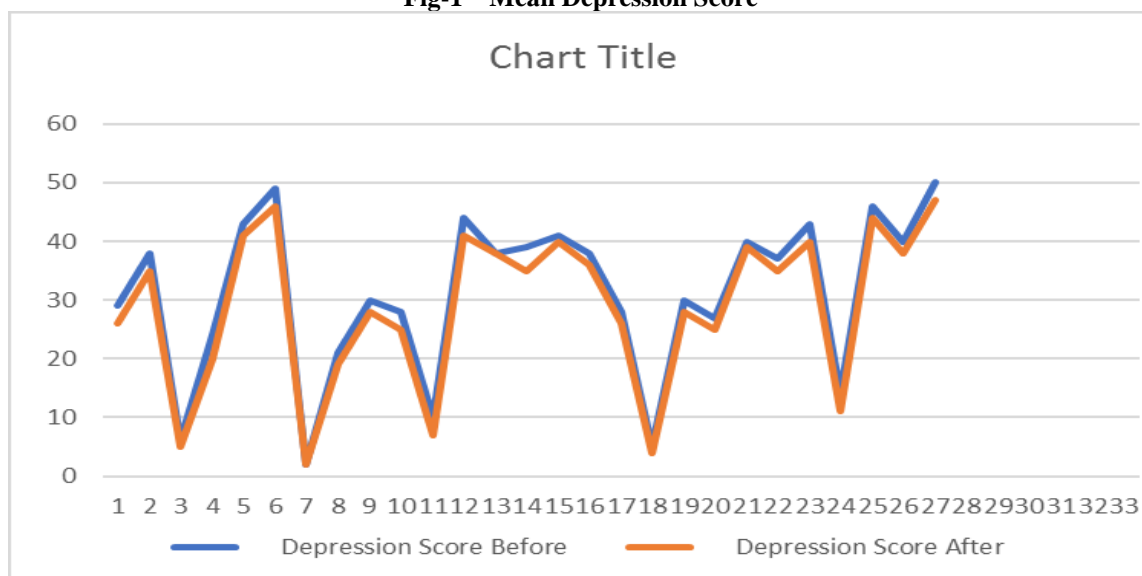
Pre-exercise and post-exercise values of the parameters in premenstrual and postmenstrual phases before and after intervention of pranayama was collected and Statistical analysis was done using SPSS package. Difference between means of the two groups of values(pre-exercise and post-exercise data) was analyzed for significance.

Procedure :

The person who is taking the test steps up and down on a platform in a cycle of one step per two seconds. The platform is at a height of about 50 cm or 20 inches. The rate of 30 steps per minute must be held up for five minutes or until exhaustion. To ensure the right speed, a metronome is used. Exhaustion is the point at which the subject cannot maintain the stepping rate for 15 seconds. The subject immediately sits down on completion of the test, and the heartbeats are counted for 1 to 1.5, 2 to 2.5, and 3 to 3.5 minutes.results were recorded and statistically analyzed.

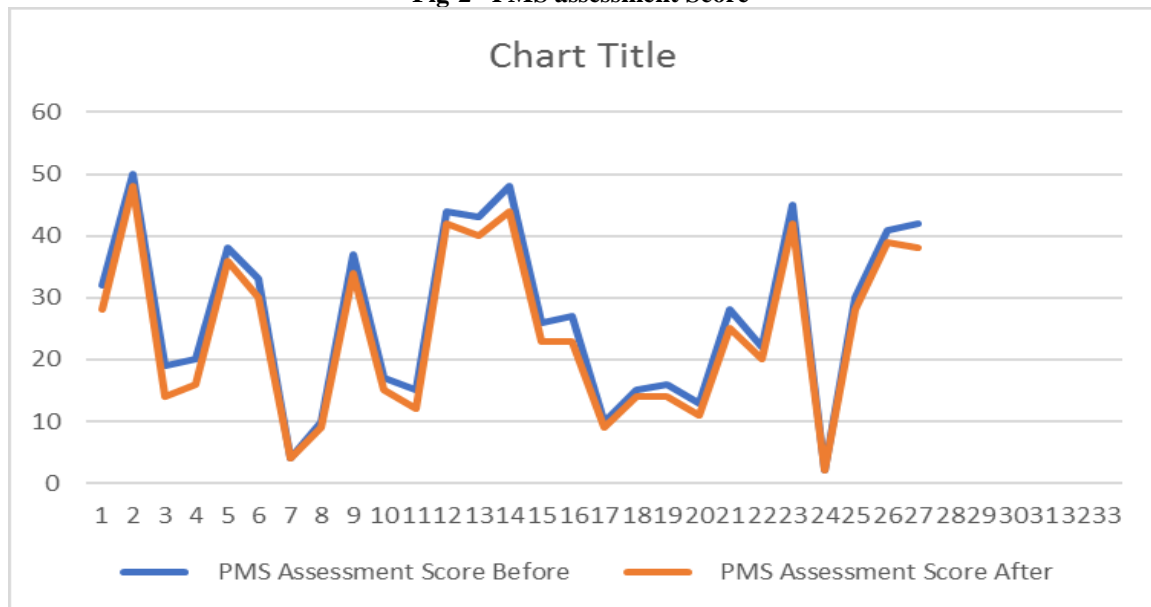
III. Results :

Fig-1 Mean Depression Score



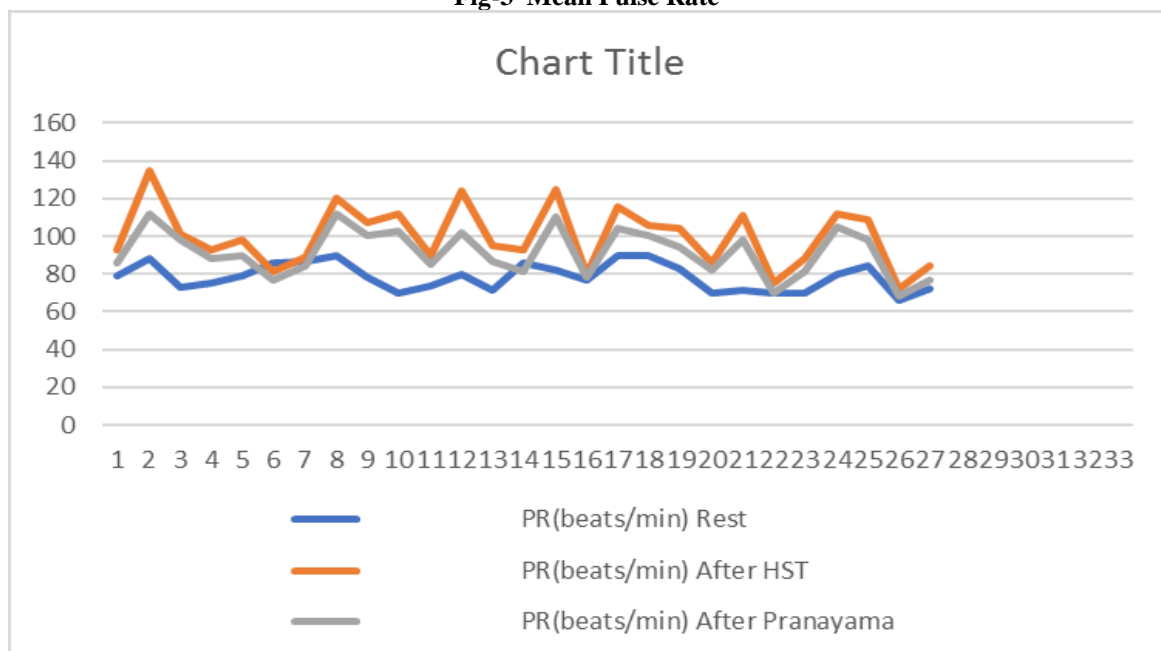
• Baseline mean depression score before PMS is 31.11. After 24 weeks of Pranayama intervention the value decreased to 28.93. This difference was found to be statistically significant (p=0.001) using Paired T-Test.

Fig-2 PMS assessment Score



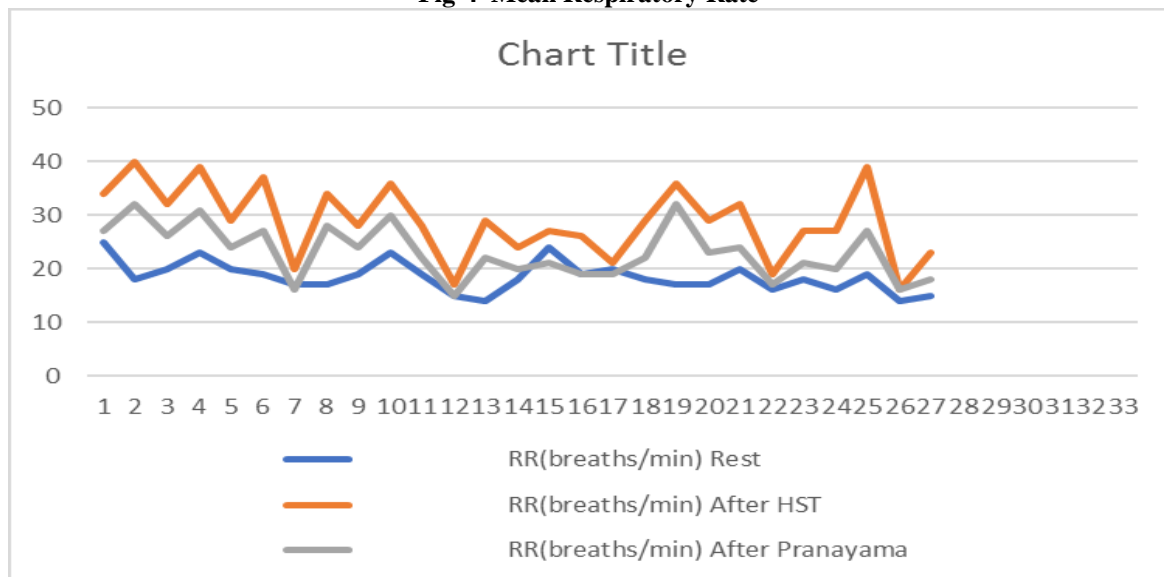
• Baseline mean PMS Assessment Score before PMS is 26.93. After 24 weeks of Pranayama intervention the value decreased to 24.44. The difference was found to be statistically significant ($p=0.000$) using Paired T-Test.

Fig-3 Mean Pulse Rate



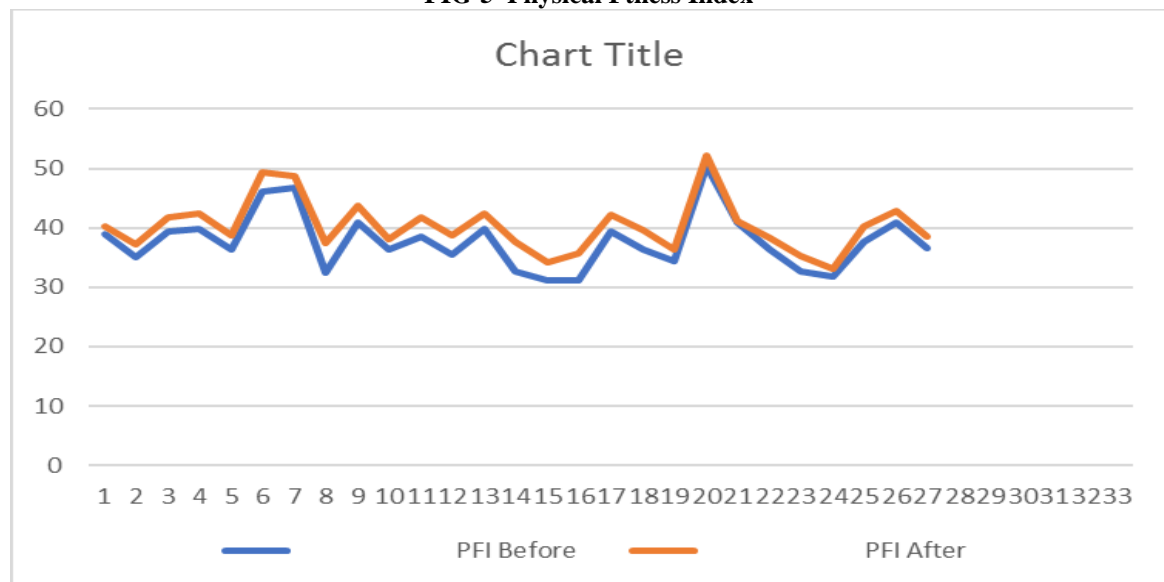
• Mean PR recorded after Harvard step test during Premenstrual phase is 99.96/min. After 24 weeks of Pranayama intervention the value decreased to 91.48/min. This was also found to be statistically significant ($p=0.000$) using Paired T-Test.

Fig-4 Mean Respiratory Rate



- Mean RR recorded after Harvard step test during Premenstrual phase is 28.81/min. After 24 weeks of Pranayama intervention the value decreased to 23.07/min. The difference was found to be statistically significant (p=0.000) using Paired T-Test.

FIG-5 Physical Fitness Index



- Physical Fitness Index calculated during Premenstrual phase is 37.73. After 24 weeks of Pranayama intervention the value increased to 40.30. The difference was found to be statistically significant (p=0.000) using Paired T-Test.

IV. Discussion:

Painful menstrual periods and PMS are the most common gynecologic problems and are the most common reasons for increased absenteeism and more work base with 50% or less of typical productivity per month in females^{11 12. 13 14}Recent studies reported an association between exercise and PMS, and indicated that a regular exercise habit might decrease some physical and psychologic premenstrual symptoms. Pain, a common symptom of PMS, is a complex experience that affects mood and behaviour, and can modify thought patterns leading to activation of different brain regions during cognitive tasks. Another study demonstrated that the mean scores of PMS and symptoms declined after 24 weeks of pranayama effectively reduces the symptoms of PMS and can be used as a treatment. An increase in alpha wave production induced by pranayama is closely

associated with slower abdominal breathing¹⁵. The holistic science of yoga which includes 3 components Adana(yogic postures), pranayama (breath control) and meditation is one of the adjunct methods in management of stress (like PMS). It is also possible that yoga and pranayama improves self efficacy for pain control¹⁶. One report exploring the effects of yoga on persistent pain indicating that yoga could produce psychologic changes, such as increased awareness of mental and physical states, which may help patients to understand their pain.

Numerous studies have shown yoga and pranayama have immediate down regulating effect on both the HPA axis responses to stress by normalizing the autonomic nervous system¹⁷ It is shown that it causes a shift towards the parasympathetic nervous dominance possibly via direct vagal stimulation however the precise mechanism of action has not been determined. A randomized control trial in India demonstrated Yoga Nidra and Pranayama practice is helpful in patients with hormone imbalances, such as dysmenorrhea, oligomenorrhea, menorrhagia, metrorrhagia, and hypomenorrhea. A yoga intervention reduces the severity of dysmenorrhea and may be effective for lowering serum homocysteine levels after an intervention period of 8 weeks.

In my study the systolic and diastolic blood pressures in the subjects after intervention are found to be reduced and it was statistically significant (p=0.000). This is similar to the results published by An and et al in J Indian Med Assoc.1999;97:220-5. In the present study 96.4% participants had regular menstrual cycles. Moderate and heavy menstrual flow was reported by 90.6% of the participants. The majority of the subjects,53.1% reported moderate or severe effects of menstrual pain on work,35.9% subjects required analgesics every month during menstruation to relieve menstrual pain.

None of the participants had any gynecologic disease known to induce menstrual pain, but all reported that PMS affected their wellbeing and quality of life. After the intervention of 6 weeks of pranayama the subjects reported decreased use of analgesics and decreased moderate or severe effects of menstrual pain. The pranayama intervention associated with the improvement in the physical fitness. The finding in my study is reported to be similar to the results as described in an article published in Sleep Sci. 2017 Apr-Jun;10(2):68-72doi:

The research on effect of pranayama on menstrual cycle to relieve stress and enhance quality of life. Hence the purpose of the study is to offer understanding of effect of pranayama on various parameters

Conclusion:

The conclusion of my study is as follows:

Female students after participating reported fewer physical premenstrual symptoms.

- In the present study it was found that there was a statistically significant improvement in all the physiological parameters like PR, RR, SBP, DBP .after intervention of 24 weeks of pranayama
- A significant decrease in the depression scores was found indicating a positive impact due to regular practice of pranayama and improving the quality of life in physical, mental and emotional aspects and increase in the overall efficiency of student population.

Physical Fitness Index calculated during Premenstrual phase is 37.73. After 24 weeks of Pranayama intervention the value increased to 40.30. The difference was found to be statistically significant (p=0.000) using Paired T-Test.

- Hence it is evident from the present study that regular practice of pranayama improves the cardiovascular autonomic functions with parasympathetic predominance.

V. Summary:

Regular practice of pranayama triggers Neuro hormonal Mechanisms that bring about health benefits by suppression of sympathetic activity as evidenced by several studies. Thus it reduces stress and anxiety, improves autonomic and higher neural centre functioning leading to positive impact on overall health quality. So yoga and pranayama can be used as adjunct therapy to improve the health quality and physical fitness when incorporated as a part of lifestyle.

VI. Limitations:

The additional studies should be performed with control groups or a random allocation design to implement and adapt standard instruments to ensure high validity and reliability. Further more potentially confounding factors such as prior yoga exercise at home during the study period.

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