



Effect of Surya Namaskar and Pragma Yoga on Anxiety, Stress and Depression in Female College Students: A Three-Arm Randomized Controlled Trial

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ABSTRACT

Anxiety, stress and depression are common among college students and are often managed with medication or counselling, which are not always accessible. Yoga has drawn attention as a safe and low-cost complementary practice for mental well-being. To examine and compare the effect of six weeks of Surya Namaskar and Pragma Yoga on anxiety, stress and depression among female college students at Lakshmibai National Institute of Physical Education (LNIFE), Gwalior. Thirty-five female students aged 18 to 28 years were assessed for eligibility, and 30 were randomly assigned to three equal groups: Surya Namaskar, Pragma Yoga and control. The experimental groups practised five days a week for six weeks against a control group. Anxiety, stress and depression were measured before and after using the Anxiety Depression Stress Scale (ADSS), and analysed with one-way ANCOVA using the pre-test score as covariate. No significant difference was found between the three groups for anxiety ($F = 0.997$, $p = .383$), stress ($F = 0.710$, $p = .501$) or depression ($F = 1.104$, $p = .347$). The small differences in adjusted means did not favour either yoga intervention over the control condition. Six weeks of Surya Namaskar or Pragma Yoga did not significantly reduce anxiety, stress or depression relative to the control condition.

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Larger samples, longer interventions and participants with elevated symptoms are recommended for future work.

INTRODUCTION

Anxiety, stress and depression are among the most common mental health problems of the present time, and their burden falls heavily on young people. Depression alone is estimated to affect around 280 million people across the world and is a leading contributor to disability (World Health Organization, 2023). College students form a particularly vulnerable group, since they face academic pressure, examinations, financial worries, competition and uncertainty about their future. These pressures can lower mood, disturb sleep and concentration, and in the long run affect academic performance and quality of life (Falsafi, 2016). Finding safe and affordable ways to protect the mental health of students has therefore become an important concern for educators and health professionals alike.

Medication and psychotherapy remain the mainstay of treatment for these conditions, yet they are not always within reach, may carry side effects, and are sometimes viewed with hesitation. For this reason there is growing interest in complementary practices that are simple, inexpensive and free of harmful effects. Yoga is one such practice. As a mind and body discipline rooted in the Indian tradition, it brings together postures, breathing, relaxation and meditation, and is thought to act on the nervous and hormonal systems by calming the sympathetic response, supporting the hypothalamic-pituitary-adrenal axis, and influencing gamma-aminobutyric acid activity and cortisol levels (Streeter et al., 2012; Woodyard, 2011). Reviews of controlled trials have reported that yoga can improve mood and lower physiological markers of stress, though the strength of the evidence varies with the length and intensity of practice (Pascoe & Bauer, 2015).

A number of studies point to yoga as a useful support for depression and anxiety. Meta-analyses have concluded that yoga can reduce depressive symptoms and may serve as an additional treatment option (Cramer et al., 2013; Wu et al., 2023), and a randomized trial found that an eight-week practice significantly lessened the severity of mild to moderate depression (Prathikanti et al., 2017). Among the many yogic methods, Surya Namaskar, or the sun salutation, is a flowing sequence of twelve postures performed with coordinated breathing that develops flexibility, strength and concentration while encouraging calm. Pragyā Yoga, developed within the tradition of Pandit Shriram Sharma Acharya, combines selected postures, breathing, meditation and positive thought, and is increasingly practised for health, although scientific evidence on its effect on mood is still limited.



Evidence also extends to anxiety and stress, the other two states examined here. Controlled work suggests that regular yoga can ease anxiety and lower perceived stress, partly through its effect on breathing, muscular relaxation and focused attention (Cramer et al., 2018; Kirkwood et al., 2005; Pascoe & Bauer, 2015; Woodyard, 2011). Within India, Surya Namaskar and allied practices have long formed part of school and college physical education, and Indian studies have reported that even brief yoga programmes can reduce self-rated fear, anxiety and distress (Telles et al., 2007). Pragma Yoga has likewise spread through community and educational settings, yet a formal comparison of the two under controlled conditions remains uncommon. Because the methods differ in emphasis, with Surya Namaskar being more dynamic and physically demanding while Pragma Yoga places greater weight on breathing, meditation and positive thought, a direct comparison is useful for judging which practice, if either, is better suited to supporting mental well-being in students.

Despite this interest, few studies have compared Surya Namaskar and Pragma Yoga directly, and fewer still have examined their effect on anxiety, stress and depression together in Indian female students. Given the rising prevalence of these conditions in young adults and the need for accessible interventions, the present study was undertaken to characterise the level of anxiety, stress and depression among the three groups, and to compare their adjusted mean scores after six weeks of practice, taking the pre-intervention scores as covariates. It was hypothesised that there would be no significant difference between the groups on any of the three variables.

MATERIALS AND METHODS

Research Design

A three-group, pre-test and post-test randomized comparative design was used. Participants were assessed on all three psychological variables before the programme and again after six weeks. Two groups received the yoga interventions and a third served as a control, which allowed the effect of the two practices to be compared against ordinary routine.

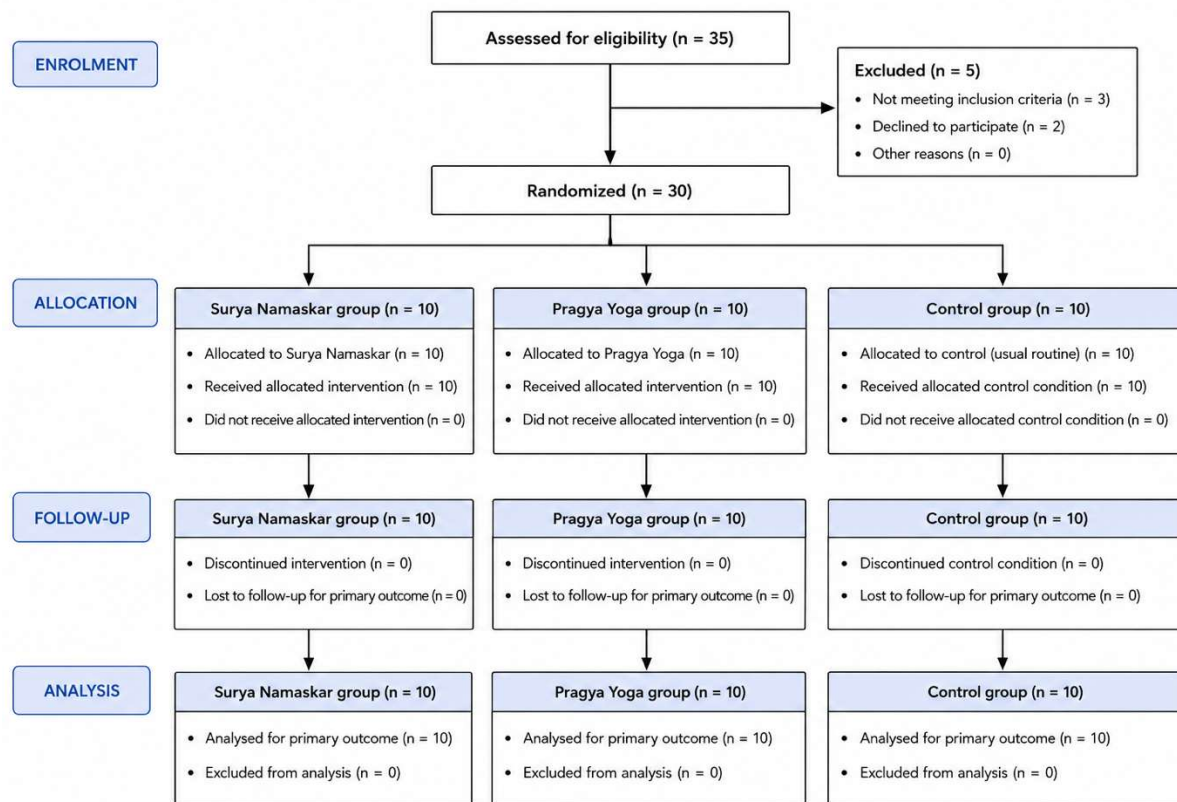


Figure 1. CONSORT 2025 flow diagram showing the flow of participants through the three-arm randomized controlled trial.

Participants

Thirty-five female students of Lakshmibai National Institute of Physical Education, Gwalior, aged between 18 and 28 years, were assessed for eligibility. Of these, three participants did not meet the inclusion criteria and two declined to participate. The remaining 30 eligible participants were randomly allocated into three groups of ten each, namely a Surya Namaskar group, a Pragya Yoga group and a control group. The random allocation sequence was generated using a computer-generated random number sequence, and the group assignments were concealed in sequentially numbered, opaque, sealed envelopes that were opened only after a participant had been enrolled. All participants were informed about the nature of the study, and written informed consent was obtained before participation. The two experimental groups practised their respective schedules alongside regular college activities, while the control group continued its usual routine without any structured intervention.

Criterion Measure

Anxiety, stress and depression were assessed with the Anxiety Depression Stress Scale (ADSS) developed by Pallavi Bhatnagar. The scale provides separate scores for each of the three states and was administered to every participant before and after the intervention period under uniform conditions.

Intervention

The training ran for six weeks, on five days of each week, with two days kept for rest. Each session opened with a short prayer and a common warm-up of Pavanmuktasana series one, after which the two experimental groups practised their assigned method, that is Surya Namaskar for the first group and Pragya Yoga for the second. A period of relaxation and a closing prayer completed the session. The duration of the main practice was increased gradually across the weeks so that the total session time rose from about twenty-five minutes at the start to thirty-three minutes by the sixth week, as set out in Table 1. The control group did not take part in any of these activities.

S. No.	Practice	Wk 1	Wk 2	Wk 3-4	Wk 5-6
1	Opening prayer	2 min	2 min	2 min	2 min
2	Pavanmuktasana series 1	6 min	6 min	6 min	6 min
3	Surya Namaskar / Pragya Yoga	10 min	13 min	15 min	18 min
4	Relaxation	5 min	5 min	5 min	5 min
5	Closing prayer	2 min	2 min	2 min	2 min
	Total time	25 min	28 min	30 min	33 min

Table 1. Progressive schedule of the six-week yoga programme for the two experimental groups.

Statistical Analysis

Descriptive statistics, namely the mean and standard deviation, were computed for the pre-test and post-test scores of each group. To test the difference between the groups on each variable, a one-way analysis of covariance was applied, with the pre-test score of that variable entered as the covariate so that the groups could be compared after adjusting for their starting levels. The level of significance was set at .05.

Results

The descriptive statistics for the three groups, together with the adjusted means, are presented in Table 2. All three groups showed only small changes from pre-test to post-test, and the direction of change was not uniform across the groups.

Variable	Group	Pre-test (M $\pm$ SD)	Post-test (M $\pm$ SD)	Adjusted M
Anxiety	Surya Namaskar	4.10 $\pm$ 3.63	4.40 $\pm$ 4.32	4.42
	Pragya Yoga	2.30 $\pm$ 1.33	5.20 $\pm$ 2.61	5.16
	Control	4.00 $\pm$ 2.21	2.90 $\pm$ 3.21	2.92
Stress	Surya Namaskar	5.50 $\pm$ 3.83	5.10 $\pm$ 3.44	5.10
	Pragya Yoga	5.20 $\pm$ 2.85	4.00 $\pm$ 3.52	4.04
	Control	5.80 $\pm$ 2.69	3.40 $\pm$ 2.75	3.35
Depression	Surya Namaskar	3.00 $\pm$ 2.63	3.70 $\pm$ 3.26	3.68
	Pragya Yoga	1.60 $\pm$ 1.26	3.50 $\pm$ 3.34	3.54
	Control	1.70 $\pm$ 2.00	1.90 $\pm$ 1.91	1.87

Table 2. Descriptive statistics and adjusted means for anxiety, stress and depression by group.

The results of the analysis of covariance are summarised in Table 3. For anxiety, the adjusted F value was 0.997 with a probability of .383, which is not significant. For stress, the adjusted F value was 0.710 with a probability of .501, and for depression it was 1.104 with a probability of .347. In each case the value fell short of the level required for significance, so the null hypothesis was retained for all three variables. In other words, the Surya Namaskar, Pragya Yoga and control groups did not differ significantly in anxiety, stress or depression once their pre-intervention scores had been taken into account.

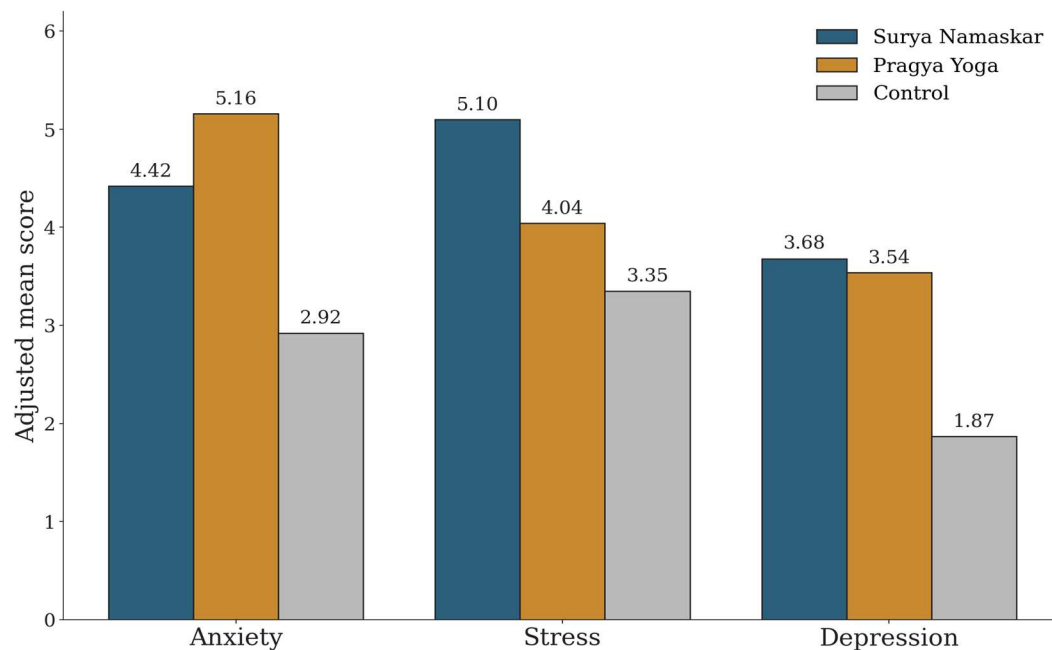
A closer look at the raw scores helps to explain this outcome. In the control group the post-test means for stress and depression fell, whereas in the two yoga groups the post-test means for anxiety and depression did not fall and in some cases rose slightly. Because the analysis of covariance adjusts for the differing starting points of the groups, these mixed movements largely offset one another, and no clear advantage emerged for either yoga practice.

Variable	Source	df	SS	MS	F	p
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Variable	Source	df	SS	MS	F	p
Anxiety	Treatment	2	24.73	12.369	0.997	.383
	Error	26	322.69	12.411		
Stress	Treatment	2	15.39	7.690	0.710	.501
	Error	26	281.90	10.842		
Depression	Treatment	2	19.47	9.735	1.104	.347
	Error	26	229.31	8.820		

Table 3. Summary of one-way ANCOVA for anxiety, stress and depression, with pre-test scores as covariates.

The adjusted means for the three variables are shown together in Figure 2. Although none of the differences reached significance, the small differences that appeared did not favour either yoga group, and the control group in fact returned the lowest adjusted mean on all three measures, which is consistent with the absence of any reliable effect.



Note. Lower scores indicate fewer symptoms. All between-group differences were non-significant ($p > .05$).

Figure 2. Adjusted mean scores for anxiety, stress and depression by group. Lower scores indicate fewer symptoms; all between-group differences were non-significant.



DISCUSSION

The present study set out to compare the effect of six weeks of Surya Namaskar and Pragma Yoga on anxiety, stress and depression in female college students. The analysis showed no significant difference between the three groups on any of the variables, and so the null hypotheses were retained. Small changes in the mean scores did occur, but they were not large or consistent enough to be treated as real effects of the practice.

Several factors may account for the absence of a significant result. The intervention lasted only six weeks, which may be too short a period for measurable psychological change to appear, especially as some benefits of yoga are known to build up gradually. The participants were physically active students rather than people diagnosed with a mental health condition, so their baseline levels of anxiety, stress and depression were already fairly low, leaving little room for improvement to be detected. The number of participants in each group was also small, at ten, which reduces the power of the analysis to reveal differences that might exist. In addition, the starting scores varied noticeably between the groups, which places a heavy demand on the covariance adjustment.

The pattern of change deserves a careful word. In the two yoga groups several post-test scores did not decrease, and a few rose, whereas the control group tended to move downward. This should not be read as evidence that yoga worsened mood, since the groups began at different levels, each contained only ten participants, and single self-report scores are sensitive to passing circumstances such as the timing of the post-test in relation to examinations or college events. Fluctuation of this kind is common when numbers are small, and it underlines why firm conclusions cannot be drawn from a study of this size.

These findings differ from some earlier reports. Prathikanti et al. (2017) found that an eight-week yoga programme significantly reduced the severity of depression, and Falsafi (2016) reported significant improvements in depression, anxiety and stress after an eight-week practice among college students. The difference is likely to reflect the longer duration of those programmes and, importantly, the inclusion of participants who already had raised symptom levels. The broader literature is consistent with this reading, since meta-analyses that support yoga for depression draw largely on trials with clinical or sub-clinical samples (Cramer et al., 2013; Wu et al., 2023), and reviews of stress outcomes note that the size of the effect depends on the dose and regularity of practice (Pascoe & Bauer, 2015; Pascoe et al., 2017). Viewed in this light, the present null result is not surprising for a brief programme delivered to a healthy student group.

At the same time, the adjusted means did not favour either yoga practice over the control condition, and the small numerical differences that appeared are best regarded as noise in a study of this size rather than as a meaningful trend. The main limitations, then, are the short duration, the small and non-clinical sample, and the reliance on a self-report scale. Future studies would do well to recruit larger groups, extend the programme well beyond six weeks, include students with elevated symptoms, and add objective or physiological measures so that any genuine effect has a fair chance of being detected.

CONCLUSION

Six weeks of Surya Namaskar or Pragy Yoga did not bring about a statistically significant reduction in anxiety, stress or depression among female college students when compared with a control group, and the three null hypotheses were retained. The experimental groups showed only minor changes in their mean scores, and the adjusted values did not favour either yoga practice over the control condition. The results should be read with caution, given the short intervention, the small sample and the generally low baseline symptoms of the participants, and they cannot be extended to clinical groups. Even so, the study adds to the developing literature on yoga for mental health and indicates that longer programmes with larger and more symptomatic samples are needed to judge the value of these practices fairly.

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