



Rajyoga meditation and academic stress in secondary school students: A quasi-experimental study

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Abstract

Background: As we know Academic stress is an undoubted risk for adolescents' mental health and it increases in the examination-driven years such as Standards 9 and 10 in India. So Rajyoga meditation which is a silent, thought-based practice can help adolescents to cope stress, this was yet to be studied.

Methods: A quasi-experimental pre test–post test study with non-equivalent groups included 138 students of Standards 9 and 10 in one school in Maharashtra, India (intervention $n = 70$; control $n = 68$). The intervention group attended a 45-minute Rajyoga meditation session daily for 45 consecutive days; the control group followed usual routines. Academic stress was measured with the Educational Stress Scale for Adolescents (ESSA; range 16–80).

Results: Groups did not show different scores before the intervention. However, after the Intervention ESSA scores fell by 17.29 points in the intervention group and 5.72 points in the control group (difference = 11.57, 95% CI [8.66, 14.48], $d = 1.34$, $p < .001$), and all five ESSA dimensions showed high reductions with the intervention. Within the intervention group, the reduction did not differ by gender or standard and was not related to attendance ($r = .10$). However, the advantage over the control group was larger for boys than for girls (group $\times$ gender interaction, $p = .001$), because control-group boys showed almost no change.

Conclusion: A 45-day Rajyoga meditation programme was followed by a much larger reduction in academic stress than usual routines. Because allocation was not random and there was no active control, the size of the effect should be treated cautiously and tested in randomised, active-controlled trials.

Keywords: academic stress, adolescents, Rajyoga meditation, secondary school students, Educational Stress Scale for Adolescents, quasi-experimental study

Introduction

Academic stress is one among the most common psychological pressures on adolescents in secondary schools. A systematic review of studies from several countries found a steady association between high academic pressure and depression, anxiety, and general psychological distress (Steare et al., 2023), and school-related distress tends to increase as high-stakes assessments approach (Jagiello et al., 2024). In India, Standards 9 and 10 combine a heavier syllabus with preparation for the Standard 10 board examinations, so students in this phase need a prevention method from mental agony.

Many people think that Meditation helps in reducing Stress in an cost effective manner. Many studies have reported that students who practise meditation, yoga, or mindfulness show lower stress among (Breedvelt et al., 2019; González-Valero et al., 2019), and mindfulness-based stress reduction practice has produced effects of around $d = 0.40$ – 0.70 in healthy individuals (Sharma & Rush, 2014). The evidence for adolescents of school-aged is less steady. A deep study of stress-management programmes in U.S. high schools found a small effect on stress ($g = -0.36$; Ng et al., 2023), a reanalysis of universal school-based mindfulness study found no significant benefit against combined control groups (Galla et al., 2024), and a randomised study found that there was hardly any effect of an eight-week mindfulness programme on stress in young adolescents (Piguet et al., 2025). Reviews of school-based academic stress programmes also describe weak designs, small samples, and a lack of comparison groups (Jagiello et al., 2024).

Rajyoga meditation, as taught by the Brahma Kumaris Organisation, is a silent, thought-based practice. Rather than focusing on the breath, posture, or mantra or a repeated sound, practitioners consciously replace stress-inducing thoughts with thoughts of peace and self-stability, which resembles change in thought process. The proof for it is weak. A cross-sectional survey of adults in India reported lower stress and less impact of stressful events among Raja Yoga meditators ($n = 802$) than among non-meditators ($n = 357$; Madhu et al., 2022), but that design did not show that meditation caused the difference, and it did not include adolescents. To our knowledge, no peer-reviewed controlled study has tested Rajyoga meditation against academic stress in secondary school students.

This study therefore tested whether a structured 45-day Rajyoga meditation programme reduced academic stress in students of Standards 9 and 10, compared with students who followed their usual routines. It also examined whether the effect differed by gender and standard, and whether attendance was related to the size of the reduction.

Review of Literature

Academic Stress and Its Measurement

Academic stress is generally treated as multidimensional. Sun et al. (2011) developed the Educational Stress Scale for Adolescents (ESSA), whose 16 items cover five dimensions: pressure from study, workload, and worry about grades, self-expectation, and despondency. The scale was developed and validated with Chinese students, so its reliability was to be checked when it is used with Indian adolescents.

Meditation and Yoga in Student Populations

Reviews of student samples generally report benefits, although the quality of the proof varies. Dawson et al. (2020) found that interventions based on mindfulness reduced the distress in university students, but the study were often at high risk of bias. In Indian schools, Kauts and Sharma (2009) reported that students who practised yoga regularly showed lower stress and higher academic performances than the non-practitioners of yoga. Among adolescents, results are more mixed: stress-management programmes showed a small effect (Ng et al., 2023), stress but not depression or anxiety improved in a study of nine school-based trials (Fulambarkar et al., 2023), and gains against active control groups was not large (Galla et al., 2024).

Rajyoga Meditation

Rajyoga meditation has seldom been evaluated in adolescents. Its core technique is consciously converting stressful thoughts with peaceful ones, just like cognitive restructuring, and school programmes based on cognitive-behavioural therapy have the strong evidence for reducing academic stress (Jagiello et al., 2024). This provides a possible, but untested, route by which the therapy could act. The only study of RajYoga meditators we came across was a cross-sectional survey of adults (Madhu et al., 2022).

The Present Study

The study tested one primary hypothesis: students in the Rajyoga meditation group would show a greater reduction in ESSA total score from pre-test to post-test than students in the control group. Five secondary hypotheses predicted the same for each ESSA dimension. Because earlier evidence is limited, whether the effect differed by gender and by standard, and whether attendance had any relation to the size of the reduction, were examined as exploratory questions without guessing its consequences.

Methodology

Research Design

This study was based on a quasi-experimental pre test–post test design with non-equivalent groups. Random assignment of individual students was not doable within intact class divisions, so entire divisions were allocated to the intervention or control condition by lottery (chit method). Academic stress was measured before the programme (pre-test) and after 45 days (post-test).

Participants

Participants were students of Standards 9 and 10, aged approximately 14–17 years, in one Institution in Maharashtra, India. A multi-stage approach was used: a Institution was chosen on the basis of accessibility, permission from administrative department and practicability ; intact class divisions of Standards 9 and 10 were then treated as clusters. There were 2 divisions namely A and B; and divisions were allocated to the two conditions by lottery. The analysed sample comprised 138 students (Table 2).

Students were included if they were enrolled in Standard 9 or 10, gave assent, and had written parental or guardian consent, and if they attended at least 80% of sessions during the intervention. Students were excluded if they had a diagnosed psychiatric disorder or were receiving pharmacological mental-health treatment, had practised meditation before, or missed more than 20% of sessions. All 138 students who were enrolled in the participating divisions, gave assent, and had parental consent were retained in the analysis; none were excluded, as attendance among participants remained above the 80% threshold throughout the programme. Sample size was determined by the number of eligible students in the participating divisions rather than by an advance power calculation. A sensitivity analysis showed that 70 and 68 students per group gave 80% power to detect a between-group difference of $d = 0.49$ (two-tailed $\alpha = .05$).

Table 1

Structure of Each 45-Minute Rajyoga Meditation Session

Session component	Duration	Description
Introduction and settling	5 min	Comfortable sitting posture, brief relaxation, and awareness of breathing and posture
Thought awareness and concentration	10 min	Observing thoughts and focusing on positive self-awareness
Rajyoga meditation practice	20 min	Guided silent meditation using a standard commentary, with the theme of the day
Positive visualisation	5 min	Imagining calm, focused study and confident handling of examinations
Closing and reflection	5 min	Gradual return to normal awareness, brief reflection, and reinforcement of positive thoughts

Note. The same structure was used on each of the 45 days.

Tools and Instruments

Academic stress was measured with the Educational Stress Scale for Adolescents (ESSA; Sun et al., 2011), a 16-item self-report scale with five dimensions: pressure from study (4 items), workload (3 items), worry about grades (3 items), self-expectation (3 items), and despondency (3 items). Items are rated from 1 (strongly disagree) to 5 (strongly agree), so total scores range from 16 to 80, and higher scores indicate greater stress. The scale was administered in English. Internal consistency in the present sample was acceptable for the total score at pre-test ($\alpha = .62$) and good at post-test ($\alpha = .81$), but low for the individual dimensions at pre-test (pressure

from study $\alpha = .44$, workload $\alpha = .53$, worry about grades $\alpha = .16$, self-expectation $\alpha = -.10$, despondency $\alpha = -.20$), improving at post-test (pressure from study $\alpha = .57$, workload $\alpha = .61$, worry about grades $\alpha = .36$, self-expectation $\alpha = .44$, despondency $\alpha = .46$). For descriptive purposes, total scores were grouped into three bands: low (16–37), moderate (38–58), and high (59–80). These bands are the ones used in this study. Attendance was recorded by the facilitator as the number of sessions attended out of 45. Students in the intervention group also completed a five-item feedback form at the end of the programme, which asked for a star rating (1–5), two yes/no questions about calm and concentration, and two open-ended questions.

Procedure

Permission was obtained from the school, and parental consent and student assent were collected before testing. The pre-test was completed in class on 1 May under supervision, with each student identified by a code. The intervention group then attended a 45-minute session daily for 45 consecutive days, led by the researcher (first author), a Brahma Kumaris Rajyoga teacher with 14 years of dedicated teaching experience. Every session followed the structure in Table 1. The programme had three phases: introductory psychoeducation (Sessions 1–5), core practice with progressively longer silent meditation (Sessions 6–30), and consolidation and reflection (Sessions 31–45). Each day had a theme, such as identity as a peaceful self, personal strengths, tolerance, positive thinking, concentration, and overcoming exam-related fear. The guided commentary included the practice of identifying oneself as a peaceful soul and remembering a higher source of peace, in line with Rajyoga as taught by the Brahma Kumaris. The full commentary is available from the author on request. The control group followed its usual academic routine. The post-test was completed under the same conditions as the pre-test, and the programme was offered to the control group after the study.

Statistical Analysis

Data were analysed using IBM SPSS Statistics. Normality was checked with Shapiro–Wilk tests. Pre-to-post change within each group was tested with paired-samples t tests. Groups were compared on pre-test, post-test, and gain scores (pre-test minus post-test, so that positive values mean less stress) with Welch's independent-samples t tests. The five ESSA dimensions were analysed in the same way, with a Bonferroni-adjusted significance level of .01. Effect sizes are Cohen's (1988) d using the pooled standard deviation for between-group comparisons, and dz (mean change divided by the standard deviation of change) for paired comparisons. Within the intervention group, gain was compared between boys and girls and between Standards 9 and 10 with Welch's t tests, and the correlation between attendance and gain was tested with Pearson's r . Because comparing boys and girls within the intervention group alone cannot show whether the intervention effect differed by gender, a group $\times$ gender interaction on gain scores was also tested. This was done with a 2×2 analysis of variance computed from the cell means, standard deviations, and sizes reported in Table 6, and it was added after the main analyses. All tests were two-tailed with $\alpha = .05$ unless stated otherwise.

Ethical Considerations

Approval was obtained before data collection (details are given on the title page). Written informed consent was obtained from parents or guardians, and students gave their own assent. Participation was voluntary, students could withdraw at any time without penalty, and data were anonymised with codes. Students who needed psychological support beyond the scope of the study were referred to the school counselling service.

Results

Sample and Baseline Characteristics

The analysed sample comprised 70 students in the intervention group and 68 in the control group (Table 2). The groups did not differ significantly on baseline ESSA scores, $t(135) = -1.64$, $p = .102$, although the intervention group scored slightly lower ($d = -0.28$; Table 3). Baseline stress was high in both groups, with 64 of 70 intervention students (91.4%) and 61 of 68 control students (89.7%) in the high band (Table 5). Baseline scores were negatively skewed, so pre-test distributions departed from normality (Shapiro–Wilk $p < .001$ in both groups), whereas gain scores were approximately normal (intervention $W = .978$, $p = .249$; control $W = .971$, $p = .108$).

Table 2*Sample Composition by Group, Gender, and Standard*

Group	Boys	Girls	Standard 9	Standard 10	Total
Intervention	32	38	36	34	70
Control	30	38	33	35	68
Total	62	76	69	69	138

Effect of the Programme on Academic Stress

ESSA scores fell significantly in both groups (Table 3). In the intervention group, scores dropped from 65.50 to 48.21, $t(69) = 18.36$, $p < .001$, $dz = 2.19$, and in the control group from 67.12 to 61.40, $t(67) = 5.05$, $p < .001$, $dz = 0.61$. The reduction was much larger in the intervention group: the mean gain was 17.29 points (a 26.4% reduction) compared with 5.72 points (8.5%) in the control group, a difference of 11.57 points, 95% CI [8.66, 14.48], $t(131) = 7.86$, $p < .001$, $d = 1.34$. At post-test, the intervention group scored 13.19 points lower than the control group, $d = -1.78$. The primary hypothesis was supported.

Table 3*ESSA Total Scores in the Intervention and Control Groups*

Outcome	Intervention M (SD)	Control M (SD)	M Difference [95% CI]	t (df)	p	d
Pre-test	65.50 (6.14)	67.12 (5.41)	-1.62 [-3.57, 0.33]	-1.64 (135)	.102	-0.28
Post-test	48.21 (6.98)	61.40 (7.85)	-13.19 [-15.69, -10.69]	-10.42 (133)	< .001	-1.78
Gain (pre – post)	17.29 (7.88)	5.72 (9.33)	11.57 [8.66, 14.48]	7.86 (131)	< .001	1.34

Note. ESSA = Educational Stress Scale for Adolescents (range 16–80; higher scores indicate more stress). Difference = intervention minus control. Gain = pre-test minus post-test, so positive values indicate a reduction in stress. CI = confidence interval. Welch's t tests were used.

The intervention group also showed greater reductions on all five ESSA dimensions (Table 4), and every difference was significant at the adjusted level of .01. The largest effects were for pressure from study ($d = 1.01$) and workload ($d = 0.93$), followed by despondency ($d = 0.86$), worry about grades ($d = 0.68$), and self-expectation ($d = 0.65$).

Table 4*Gain Scores on the Five ESSA Dimensions*

ESSA dimension	Intervention gain M (SD)	Control gain M (SD)	M Difference [95% CI]	t	p	d
Pressure from study	4.56 (3.06)	1.13 (3.68)	3.43 [2.29, 4.57]	5.94	< .001	1.01
Workload	4.03 (3.03)	1.41 (2.59)	2.62 [1.67, 3.57]	5.47	< .001	0.93
Worry about grades	2.59 (2.46)	0.81 (2.76)	1.78 [0.90, 2.66]	3.99	< .001	0.68
Self-expectation	2.94 (2.48)	1.29 (2.61)	1.65 [0.79, 2.51]	3.80	< .001	0.65

ESSA dimension	Intervention gain <i>M</i> (<i>SD</i>)	Control gain <i>M</i> (<i>SD</i>)	Difference [95% CI]	<i>t</i>	<i>p</i>	<i>d</i>
Despondency	3.17 (2.27)	1.07 (2.61)	2.10 [1.28, 5.03 2.92]		< .001	0.86

Note. Gain = pre-test minus post-test. Dimension scores range from 4 to 20 (pressure from study) or 3 to 15 (the other dimensions). Difference = intervention minus control. Welch degrees of freedom ranged from 130 to 135. Stress bands showed the same pattern (Table 5). In the intervention group, the share of students in the high band fell from 91.4% to 7.1%, and 85.7% moved into the moderate band. In the control group, 72.1% were still in the high band at post-test.

Table 5

Students in Each ESSA Stress Band Before and After the Programme

Group and time	<i>n</i>	Low <i>n</i> (%)	Moderate (%)	<i>n</i> High <i>n</i> (%)
Intervention, pre-test	70	0 (0.0)	6 (8.6)	64 (91.4)
Intervention, post-test	70	5 (7.1)	60 (85.7)	5 (7.1)
Control, pre-test	68	1 (1.5)	6 (8.8)	61 (89.7)
Control, post-test	68	3 (4.4)	16 (23.5)	49 (72.1)

Note. Low = 16–37, moderate = 38–58, high = 59–80. Percentages are within each group and time point.

Gender

Within the intervention group, boys' and girls' gains did not differ significantly, $t(50.7) = -0.91$, $p = .365$, mean difference (girls minus boys) = 1.79, 95% CI [-2.15, 5.73], $d = 0.23$. This comparison ignores the control group, however, and so cannot show whether the intervention effect differed by gender. Table 6 shows that the pattern in the control group differed sharply: control-group boys' stress did not change (gain = -0.23), while control-group girls' stress fell by 10.42 points. As a result, the group $\times$ gender interaction on gain scores was significant, $F(1, 134) = 10.98$, $p = .001$, partial $\eta^2 = .08$, interaction estimate = 8.85, 95% CI [3.57, 14.13]. The intervention group had a significantly larger reduction than the control group in both boys (difference = 16.54, 95% CI [12.62, 20.46]) and girls (difference = 7.69, 95% CI [4.15, 11.23]), but the advantage was larger for boys.

Table 6

Gain Scores by Group and Gender

Gender	Intervention <i>n</i>	Intervention gain <i>M</i> (<i>SD</i>)	Control <i>n</i>	Control gain <i>M</i> (<i>SD</i>)	Difference [95% CI]
Boys	32	16.31 (9.59)	30	-0.23 (6.74)	16.54 [12.62, 20.46]
Girls	38	18.11 (6.09)	38	10.42 (8.41)	7.69 [4.15, 11.23]

Note. Gain = pre-test minus post-test. Difference = intervention minus control.

Standard and Attendance

Within the intervention group, gain did not differ significantly between Standard 9 ($M = 17.33$, $SD = 8.31$, $n = 36$) and Standard 10 ($M = 17.24$, $SD = 7.51$, $n = 34$), $t(67.9) = 0.05$, $p = .959$, mean difference = 0.10, 95% CI [-3.68, 3.87]. Students attended an average of 40.5 of the 45 sessions ($SD = 2.2$; range 36–45, or 80%–100%), so attendance was high and restricted by the eligibility criterion. Attendance was not significantly correlated with gain, $r(68) = .10$, 95% CI [-.14, .33], $p = .398$.

Student Feedback

All 70 intervention students completed the feedback form. Responses were short handwritten free text that the researcher coded, so the figures below are approximate. Roughly 85%–90% of students rated the programme 4 or 5 stars out of 5, and none rated it below 3. Nearly all (about 95% or more) reported feeling peace or calm

during practice and said their concentration had improved. The most common open-ended themes were better concentration while studying (about two-thirds of students) and a calmer temperament or less anger (nearly a third).

Discussion

Main Findings

Students who took part in a 45-day Rajyoga meditation programme showed a much larger fall in academic stress than students who followed their usual routines. The difference was about 11.6 points on a 16–80 scale ($d = 1.34$), it appeared on all five dimensions of the ESSA, and it was largest for pressure from study and workload. The proportion of students in the high-stress band fell from more than 90% to 7% in the intervention group. Students' own feedback pointed in the same direction, although it is not independent evidence.

Comparison With Earlier Research

The size of this effect is far larger than most comparable findings. It is well above the $d = 0.40$ – 0.70 reported for mindfulness-based stress reduction (Sharma & Rush, 2014), the pooled $g = -0.36$ for stress-management programmes in U.S. high schools (Ng et al., 2023), and the small gains against active controls reported by Galla et al. (2024). A randomised trial of an eight-week mindfulness programme found no effect on self-reported stress in young adolescents (Piguet et al., 2025). Several explanations are possible. The programme was intensive, with 45 daily sessions amounting to about 34 hours of practice, and its content directly addressed examination stress. But allocation was by division rather than at random, students and facilitators were not blind to condition, and stress was self-reported, so expectancy and demand effects may have contributed. Baseline stress was also very high, which leaves room to fall and may have produced some regression towards the mean. The control group's own fall of 5.7 points shows that time, retesting, or events in the school year changed scores even without an intervention. The observed effect should therefore be read as an upper estimate, and the direction of the result as more secure than its size.

Gender and Standard

Within the intervention group, boys and girls improved by similar amounts, and so did students in Standards 9 and 10. A non-significant difference does not prove that the groups are equal, and the confidence intervals are wide: for standard, the difference could plausibly be anywhere from about 4 points lower to 4 points higher. More importantly, the comparison with the control group showed a gender difference in the intervention effect. The advantage over control was larger for boys (16.5 points) than for girls (7.7 points), but this arose mainly because control-group boys did not change while control-group girls improved by about 10 points. The data cannot explain why, and division-level events, such as the timing of tests, are one possibility. The study therefore cannot conclude that the programme works equally well for boys and girls, only that it was associated with a larger reduction than the control condition in both. Standard was analysed only within the intervention group, so a group $\times$ standard interaction could not be examined.

Attendance

Attendance was not related to the size of the reduction. This should not be taken to mean that a few sessions are enough. Only students who attended at least 80% of sessions were included, so almost everyone attended most sessions, and the study says nothing about students who attended little or not at all.

Possible Mechanisms

Rajyoga meditation may act by replacing stressful thoughts with calmer ones, a process that resembles cognitive restructuring (Jagiello et al., 2024). The study did not measure thought patterns or any other mediating process, and the programme also included relaxation, visualisation, and spiritual content, so it cannot say which components produced the change.

Conclusion and Implications

Implications for Practice

Schools looking for low-cost ways to support students during Standards 9 and 10 may find a structured Rajyoga meditation programme worth piloting, because it was associated with a large fall in academic stress. It is best introduced alongside, and not instead of, counselling and academic support, and with an evaluation that includes a comparison group. Schools should also consider that the practice includes spiritual content and should make sure that families understand this when consent is sought.

Conclusion

In this quasi-experimental study, a 45-day Rajyoga meditation programme was followed by a much larger reduction in academic stress than usual school routines, across all five dimensions of academic stress. Because the design was not randomised, had no active control, and relied on self-report, the size of the effect should be treated cautiously. The findings support testing the programme in randomised, active-controlled trials.

Limitations and Future Directions

Limitations

Several limitations apply. Allocation was quasi-experimental, so pre-existing differences between the groups may remain despite the similar baseline scores. The two conditions were allocated by division and analysed at the student level, which ignores clustering and may make the reported standard errors too small. The study was done in one school. The control group had no active comparison, so the effects of attention and expectancy cannot be separated from those of Rajyoga meditation. Stress was self-reported and not blind. Only students who attended at least 80% of sessions were analysed, which may overstate the effect that would be seen with less committed participation. Outcomes were measured only immediately after the programme. The ESSA was developed with Chinese students, and the stress bands used here are specific to this study. Several secondary analyses were exploratory, and the group $\times$ gender test was added after the main analyses.

Future Directions

Future studies should randomise students or divisions across several schools, use an active control condition such as another relaxation or wellbeing programme, and follow students for at least six months, ideally through the board-examination period. They should analyse clustering explicitly, include students with lower attendance, and test gender and standard as moderators in both arms. Measuring thought patterns and emotion regulation would show whether cognitive restructuring is the active process, and comparing different session lengths would help identify how much practice is needed. The reliability and validity of the ESSA should also be established in the language used with Indian students.

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