



Effectiveness of Pranayama Practice on Concentration Levels of College Students

¹ Dr. Eswara Naik K.G.

¹ Physical Education Director

¹ Government First Grade College, Vijayanagar, Bangalore-560 104. Karnataka, India.

Abstract: The purpose of the study was to examine the effectiveness of pranayama practice on the concentration levels of college students. An experimental research design was adopted for the study. A total of 40 undergraduate students from Government First Grade College, Vijayanagar, Bengaluru, were randomly selected as subjects and divided into two groups, namely an experimental group ($n = 20$) and a control group ($n = 20$). The concentration level of the participants was measured using the Two-Letter Cancellation Test developed by Kumar and Telles (2009). The experimental group underwent a structured pranayama training programme consisting of Nadi Shodhana, Bhramari, Sheetal and Sheetkari pranayama practices for a period of eight weeks, while the control group did not receive any special training. Pre-test and post-test scores were collected and analyzed using paired t-test and independent t-test. The results revealed a significant improvement in the concentration levels of the experimental group, with the mean score increasing from 34.250 to 38.900 ($t = 5.28$, $p < 0.01$). The control group did not show any significant improvement ($t = 0.83$, $p > 0.05$). The findings indicate that regular pranayama practice significantly enhances concentration level among college students. It was concluded that pranayama is an effective and practical yogic intervention for improving concentration and cognitive functioning among undergraduate students.

Index Terms - Effectiveness, Pranayama, Concentration, College students

1. INTRODUCTION

Concentration is one of the most essential cognitive abilities required for academic success, personal development and professional achievement. It refers to the capacity of an individual to direct and sustain attention on a particular task while minimizing distractions from both internal and external sources. In higher education, concentration plays a crucial part in learning, memory retention, problem-solving, decisions making and examination performance. College students are often expected to process large volumes of information, manage multiple academic responsibilities and maintain consistent performance under demanding circumstances. Consequently, the ability to concentrate effectively has become increasingly important in contemporary educational settings.

The transition to college life presents several challenges for young adults. Students frequently meet academic pressure, career-related concerns, financial responsibilities, social adjustments as well as increased competition. In addition, the rapid growth of digital technology has transformed learning environments with daily lifestyles. Although smart phones, social media platforms with digital learning tools offer numerous educational advantages, excessive use of these technologies has been associated

with reduced attention spans, mental fatigue, sleep disturbances and also increased stress levels. Such factors may negatively affect concentration as well as overall academic performance. In India, mental health concerns among college students have become a growing area of concern. Academic stress, uncertainty regarding employment opportunities, peer pressure and family expectations often contribute to anxiety as well as emotional strain. These challenges can impair cognitive functions, including attention, memory as well as concentration. Therefore, there is an increasing need to identify effective, economical and non-pharmacological strategies that can enhance students' cognitive functioning as well as psychological well-being also.

Yoga, one of India's most valuable contributions to global health and also wellness, offers a holistic approach to achieving physical, mental and emotional balance. Originating thousands of years ago, yoga integrates physical postures (asanas), breathing exercises (pranayama), meditation (dhyana) with ethical principles to promote overall well-being. According to Patanjali's Yoga Sutras, yoga is the process of calming the fluctuations of the mind, thereby enabling greater self-awareness as well as mental clarity (Bryant, 2009). Contemporary scientific research has increasingly validated the benefits of yoga for physical health, emotional regulation, stress reduction with cognitive enhancement.

Among the various components of yoga, pranayama occupies a central position. The term 'pranayama' is derived from the Sanskrit words 'prana' (vital life force) with 'ayama' (expansion or regulation). Pranayama involves conscious regulation of breathing through specific techniques designed to control the flow of breath and influence physiological with psychological processes. Traditional yogic literature emphasizes that the regulation of breath leads to the regulation of the mind. Modern scientific investigations support this perspective by demonstrating that controlled breathing practices positively affect the autonomic nervous system, cardiovascular functioning, stress responses along with cognitive performance.

Several pranayama techniques are commonly practiced, including Nadi Shodhana (alternate nostril breathing), Bhramari (humming bee breath), Sheetali (cooling breath) & Sheetkari (hissing breath). These techniques promote relaxation, improve respiratory efficiency, enhance oxygen utilization with facilitate mental calmness. Research suggests that regular pranayama practice reduces sympathetic nervous system activity while enhancing parasympathetic dominance, thereby lowering stress with improving mental focus (Jerath et al., 2015). Furthermore, pranayama has been associated with improved attention, memory, reaction time along with executive functioning.

The relationship of breathing with concentration has attracted considerable scientific interest in recent years. Controlled breathing influences brain activity through neural pathways that regulate attention and also emotional processing. Slow and rhythmic breathing can reduce mental distractions, improve self-regulation and create an optimal state for learning with cognitive performance. Studies have reported that yogic breathing practices improve sustained attention and concentration by increasing cerebral oxygenation as well as reducing psychological stress (Telles et al., 2013). Despite the growing body of evidence supporting the cognitive benefits of yoga with pranayama, relatively few studies have specifically examined the effectiveness of pranayama on concentration among degree college students. Most available research has focused on school children, adolescents, medical students or mixed populations. College students face unique academic as well as psychological challenges that may influence their cognitive functioning differently from other groups. Therefore, investigating the role of pranayama in enhancing concentration among college students is both timely and also relevant.

2. REVIEW OF RELATED LITERATURE

Several researchers have studied the effects of yoga and pranayama on concentration, memory, attention and academic performance. The findings generally indicate that regular yoga and pranayama practice improve cognitive functions and mental well-being.

Telles, Singh and Balkrishna (2013) examined the effects of yogic breathing practices on cognitive performance. Their study found that pranayama improved attention, mental alertness and concentration. The researchers reported that controlled breathing helps calm the mind and improves the ability to focus on tasks and another study by Sharma, Gupta and Bijlani (2013) investigated the effects of fast and slow pranayama practices on healthy individuals. The results showed significant improvements in attention, memory and cognitive functions after regular practice. The study concluded that pranayama helps improve mental efficiency and concentration.

Mishra, Mishra and Kumar (2016) studied the impact of a yoga programme on cognitive functions among students. After participating in yoga sessions, students showed improvement in attention, mental processing speed and visual search ability. The researchers suggested that yoga can be an effective method for improving cognitive performance and another research of Vaksh, Pandey and Kumar (2016) examined the effect of pranayama on academic performance among school students. Students who practiced pranayama regularly demonstrated better concentration and improved academic achievement compared to those who did not practice. The study highlighted the importance of breathing exercises in enhancing learning ability.

Banerjee (2017) investigated the influence of yoga on concentration, retention, recognition and mental balance among students. The findings revealed significant improvement in concentration and other cognitive abilities after yoga training. The study concluded that yoga is beneficial for students' mental development and another by Ambareesha and Srikaram (2017) studied the combined effects of pranayama and other yogic practices on cognitive functions among medical students. The results showed positive changes in concentration and mental performance, although the improvements were not statistically significant.

Joice, Manik and Sudhir (2018) examined the impact of yoga practice on attention, concentration and memory among medical students. After twelve weeks of yoga training, students showed significant improvements in all three areas. The researchers concluded that yoga practice helps improve cognitive functioning and academic performance.

Saoji, Raghavendra and Manjunath (2019) reviewed several studies on pranayama and mental health. Their review found that regular pranayama practice improves attention, concentration, emotional stability and stress management. The authors suggested that pranayama can be used as an effective tool for enhancing mental well-being.

Sharma et al. (2022) investigated the immediate effect of Ujjayi Pranayama on attention and anxiety among university students. The study found that students showed better attention and reduced anxiety after practicing pranayama. The researchers concluded that pranayama helps improve concentration by promoting mental relaxation.

Nautiyal et al. (2024) examined the effects of Om chanting, Bhramari Pranayama and Nadi Shodhana Pranayama on cognitive functions among students. The results indicated improvements in attention, memory and concentration after the intervention. The study highlighted the positive role of pranayama in enhancing cognitive performance and another by Narang et al. (2024) studied the effect of yoga on concentration, memory and attention among young adults. The findings revealed significant improvement in concentration and attention after regular yoga practice. The researchers recommended incorporating yoga and pranayama into educational institutions to support students' academic and mental well-being.

Research Gap: The review of literature shows that yoga and pranayama have positive effects on concentration, attention, memory and academic performance. However, most studies have been conducted among school students, medical students or general adult populations. Very few studies have specifically examined the effectiveness of pranayama on concentration among degree college students. In addition, many studies have investigated yoga as a whole, including asanas, meditation and pranayama together, rather than focusing only on pranayama practices. Therefore, there is a need to study the effectiveness of selected pranayama practices on concentration levels among degree college students. The present study aims to fill this gap and provide scientific evidence regarding the role of pranayama in improving concentration among college students.

3. SIGNIFICANCE OF THE STUDY

The present study is significant because it examines the effectiveness of pranayama practices in enhancing concentration among college students. Concentration is a critical determinant of academic achievement and cognitive performance. Identifying effective methods for improving concentration can contribute to better learning outcomes, improved academic performance and enhanced psychological well-being. The findings of this study may provide scientific support for incorporating pranayama into educational and wellness programs within colleges and universities. Since pranayama techniques are simple, economical and non-invasive, they can be practiced easily by students without specialized equipment or extensive training. Regular practice may help students to manage stress, improve attention and enhance cognitive functioning. The study may also benefit physical education teachers, yoga instructors, counselors and educational administrators by providing evidence regarding the effectiveness of pranayama as a cognitive enhancement strategy. Furthermore, the findings can contribute to the growing body of literature on yoga and mental health and support national initiatives promoting yoga as a preventive and promotive health practice. In addition, this research may serve as a foundation for future studies investigating the influence of pranayama on other aspects of student development, including memory, academic achievement, emotional intelligence, stress management and psychological resilience. By examining the relationship between pranayama and concentration among college students, the study contributes to the scientific validation of traditional Indian yogic practices in contemporary educational settings.

4. STATEMENT OF THE PROBLEM

The problem chosen for this research is to find out benefits of Pranayama to enhancing concentration among degree college students and the title is: **“EFFECTIVENESS OF PRANAYAMA PRACTICE ON CONCENTRATION LEVELS OF COLLEGE STUDENTS”**

5. METHODOLOGY

The present study was conducted to examine the effectiveness of pranayama practice on the concentration levels of college students. An experimental research method was adopted for the study. The independent variable was pranayama practice, while concentration was considered as the dependent variable. The study aimed to determine whether regular practice of pranayama could improve the concentration ability of college students. The subjects for the study were selected from Government First Grade College, Vijayanagar, Bengaluru. A total of 40 undergraduate students were chosen as participants through simple random sampling. Only those students who had not participated in any regular sports training, yoga practice, gym training or other structured physical activity programmes during the previous six months were included in the study. The selected participants voluntarily agreed to take part in the investigation.

To assess concentration ability, the Two-Letter Cancellation Test developed by Kumar and Telles (2009) was used. This test is widely used to measure concentration, attention and mental focus. The participants were required to identify and cancel specific target letters from a sheet containing randomly arranged letters within a given time period. Higher scores indicated better concentration ability. Before

the commencement of the training programme, all participants were administered the concentration test and the scores obtained were recorded as pre-test scores. After the pre-test, the subjects underwent a structured pranayama training programme for a period of eight weeks. The training programme consisted of selected pranayama techniques such as Nadi Shodhana Pranayama, Bhramari Pranayama, Sheetal Pranayama and Sheetkari Pranayama. The training sessions were conducted five days a week under the supervision of a qualified instructor. Each session lasted approximately 30 minutes, including warm-up, pranayama practice and relaxation. After the completion of the eight weeks training programme, the participants were again administered the Two-Letter Cancellation Test under similar conditions. The scores obtained were recorded as post-test scores. The pre-test and post-test scores were then compared to determine the effectiveness of the pranayama intervention on concentration ability.

The collected data were analyzed using appropriate statistical techniques. Mean and standard deviation were calculated to describe the data, while the dependent (paired) t-test was used to compare the pre-test and post-test scores of concentration. The statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) Version 25.0 and Microsoft Excel 2017. The level of significance was fixed at 0.05 and 0.01 levels for testing the hypothesis. The results obtained from the analysis were used to interpret the effect of pranayama practice on the concentration levels of college students.

6. DATA ANALYSIS

Table-1: Paired 't' test results of Pranayama practices of Experimental Group with reference to Concentration of college going students (N=20, df=19).

Variable	Test	Mean	Standard Deviation	Obtained 't' Value	Sig. Level
Concentration	Pre	34.250	3.193	5.28**	0.01 level
	Post	38.900	4.266		

df=19, **Significant at 0.01 level; Table Value is 2.88

Table 1 presents the paired t-test results of the experimental group with respect to concentration among college students. The mean concentration score of the experimental group increased from 34.250 ± 3.193 in the pre-test to 38.900 ± 4.266 in the post-test after undergoing eight weeks of pranayama practice. The obtained t-value was 5.28, which was greater than the table value of 2.88 required for significance at the 0.01 level. Therefore, the difference between the pre-test and post-test scores was found to be statistically significant.

The findings indicate that the pranayama training programme produced a positive effect on the concentration levels of the participants. The increase in the mean score from pre-test to post-test demonstrates that regular practice of pranayama helped improve the ability of college students to focus and maintain attention. Hence, it can be inferred that pranayama practice was effective in enhancing concentration among the students of the experimental group.

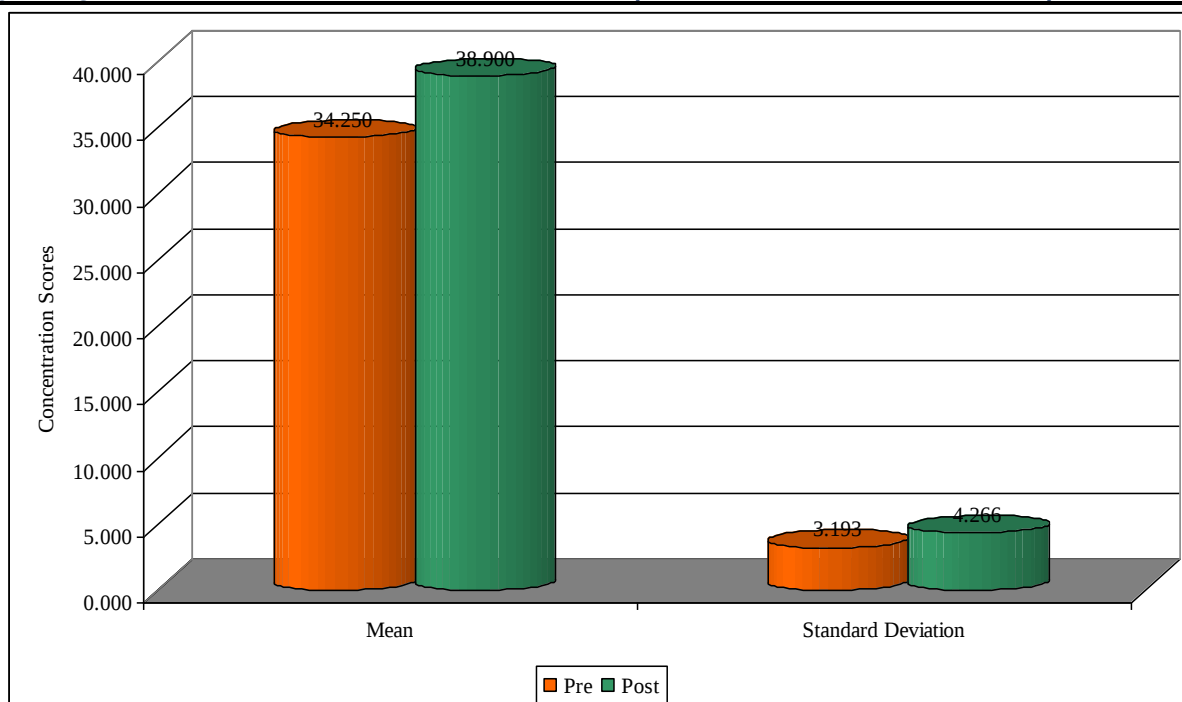


Fig1: Comparison of Concentration average scores of pre and post tests of college going students belongs to Experimental Group (Pranayama practice).

Table-2: Paired 't' test results of traditional approach of Control Group with reference to Concentration of college going students (N=20, df=19)

Variable	Test	Mean	Standard Deviation	Obtained 't' Value	Sig. Level
Concentration	Pre	32.800	3.188	1.48	NS
	Post	33.650	3.344		

NS= Not Significant, df=19, Table Value is 2.09.

Table 2 presents the paired t-test results of the control group with respect to concentration among college students. The mean concentration score increased slightly from 32.800 ± 3.188 in the pre-test to 33.650 ± 3.344 in the post-test. However, the obtained t-value was 1.48, which was lower than the table value of 2.09 required for significance at the 0.05 level.

Since the obtained t-value did not reach the required level of significance, the difference between the pre-test and post-test scores was not statistically significant. This indicates that there was no meaningful improvement in the concentration levels of the control group during the study period. The slight increase in the mean score may be attributed to normal variations rather than any specific intervention. Therefore, it can be concluded that the concentration levels of students who did not participate in pranayama practice remained largely unchanged.

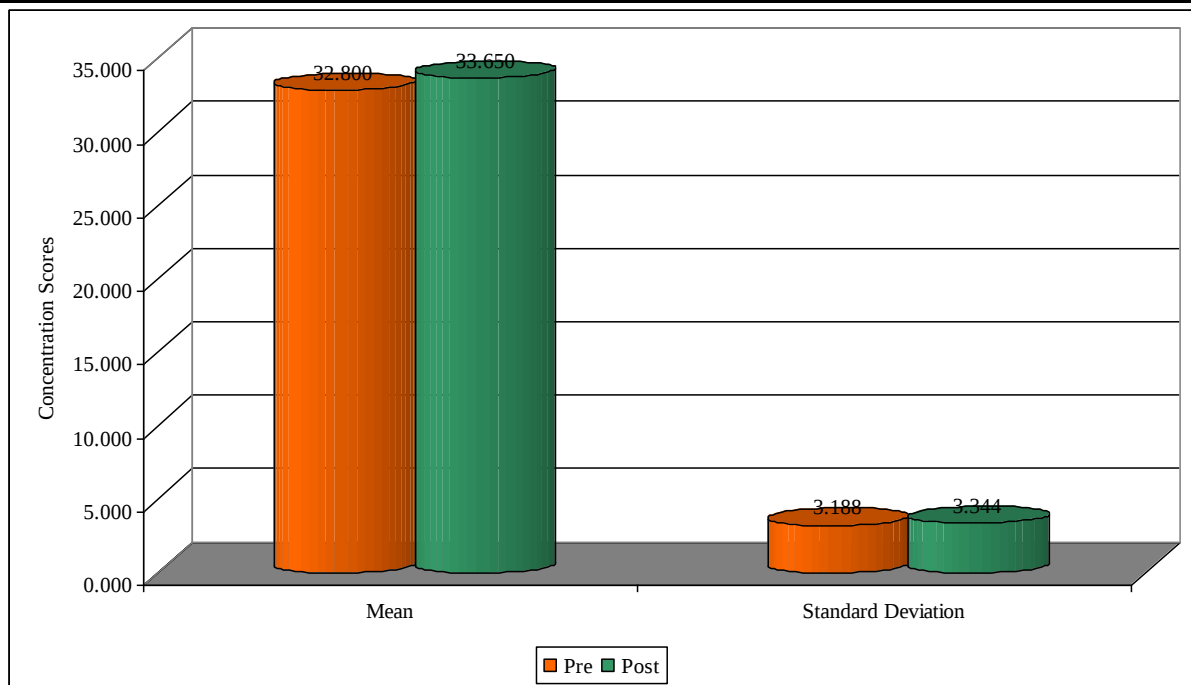


Fig.2: Comparison of Concentration average scores of pre and post tests of college going students of Control Group (Non practice of Pranayama).

Table-3: independent Samples 't' test results related to means scores of pre and post tests between experimental and control group with reference to Concentration of college going students (N=40, df=38).

Test	Group	Mean	Standard Deviation	Obtained 't' Value	Sig. Level
Pre-Test	Control Group	32.800	3.188	1.44 ^{NS}	Not Significant
	Experiment Group	34.250	3.193		
Post-Test	Control Group	33.650	3.344	4.33**	0.01 level
	Experiment Group	38.900	4.266		

df=38, NS=Not Significant; **Significant at 0.01 level; Table Value is 2.59

Table-3 shows the comparison of concentration scores between the experimental group and the control group. In the pre-test, the control group obtained a mean score of 32.800 ± 3.188 , while the experimental group obtained a mean score of 34.250 ± 3.193 . The obtained t-value was 1.44, which was not significant. This indicates that both groups were similar in their concentration levels before the commencement of the pranayama training programme.

In the post-test, the control group recorded a mean score of 33.650 ± 3.344 , whereas the experimental group recorded a higher mean score of 38.900 ± 4.266 . The obtained t-value was 4.33, which was significant at the 0.01 level. This indicates a significant difference between the two groups after the training period. The higher concentration score of the experimental group shows that the pranayama training programme was effective in improving concentration among college students. Therefore, it can be concluded that regular practice of pranayama significantly enhanced the concentration levels of the students in the experimental group compared to the control group.

7. FINDINGS

Based on the analysis and interpretation of data, the following findings were obtained:

1. The experimental group showed a significant improvement in concentration after eight weeks of pranayama practice. The mean concentration score increased from 34.250 in the pre-test to 38.900 in the post-test and the obtained t-value (5.28) was significant at the 0.01 level.
2. The control group did not show a significant improvement in concentration during the study period. The mean score increased only slightly from 32.800 in the pre-test to 33.650 in the post-test and the obtained t-value (1.48) was not significant.
3. The post-test concentration score of the experimental group was considerably higher than that of the control group.
4. The results indicate that pranayama practice had a positive and significant effect on the concentration levels of college students.
5. The study confirmed that regular practice of pranayama can be used as an effective method for enhancing concentration among undergraduate students.

8. DISCUSSION OF RESULTS

The purpose of the study was to investigate the effectiveness of pranayama practice on the concentration levels of college students. The findings revealed a significant improvement in concentration among students who participated in the pranayama training programme for eight weeks. The experimental group demonstrated a substantial increase in concentration scores from pre-test to post-test, whereas the control group did not show any meaningful change. The improvement observed in the experimental group may be attributed to the physiological and psychological benefits of pranayama practice. Regular pranayama helps regulate breathing patterns, improves oxygen supply to the brain, reduces stress and promotes mental calmness. These changes enhance attentional control and mental focus, which are essential components of concentration.

The findings of the present study are consistent with earlier studies conducted by Telles, Singh and Balkrishna (2013), Sharma, Gupta and Bijlani (2013), Joice, Manik and Sudhir (2018) and Narang et al. (2024), who reported that yoga and pranayama practices significantly improve attention, concentration, memory and cognitive performance. The present investigation further supports the view that pranayama is an effective yogic practice for enhancing concentration among students. The absence of significant improvement in the control group indicates that normal academic activities alone may not be sufficient to bring about substantial changes in concentration levels. Therefore, the findings emphasize the importance of incorporating structured pranayama practices into students' daily routines to improve cognitive functioning and academic performance.

9. CONCLUSION

Based on the findings of the study, it can be concluded that pranayama practice is effective in improving concentration among college students. The experimental group showed significant improvement in concentration after participating in an eight-week pranayama training programme, whereas the control group did not demonstrate any significant change. The results clearly indicate that regular practice of pranayama contributes to enhanced mental focus, attentional control and concentration ability. Therefore, pranayama can be considered an effective, simple, economical and non-pharmacological method for improving cognitive functioning among college students. The study supports the inclusion of pranayama practices in educational institutions as part of student wellness and mental health programmes.

10. SUGGESTIONS AND IMPLICATIONS

10.1 Suggestions for Future Research

1. Similar studies may be conducted with a larger sample size to obtain more generalizable results.
2. Future research may include students from different colleges, universities and geographical regions.
3. Comparative studies may be conducted to examine the effects of different pranayama techniques on concentration and other cognitive variables.
4. Similar investigations may be undertaken on male and female students separately to identify possible gender differences.
5. Future studies may examine the effects of pranayama on other psychological and cognitive variables such as memory, attention, academic achievement, stress, anxiety and emotional well-being.
6. Long-term intervention studies may be conducted to determine the sustained effects of pranayama practice.
7. Experimental studies combining pranayama with meditation or yoga postures may also be undertaken to examine their combined effects on concentration.

10.2 Educational Implications

1. Pranayama practices may be incorporated into college wellness programmes to improve students' concentration and academic performance.
2. Physical education teachers and yoga instructors may use pranayama as an effective tool for enhancing students' cognitive functioning.
3. Colleges and universities may organize regular yoga and pranayama sessions to promote mental health and academic success among students.
4. Pranayama can be recommended as a simple and gainful strategy for managing academic stress and improving focus among young adults.
5. The findings provide scientific support for integrating traditional yogic practices into higher education settings as part of a holistic approach to student development.
6. Educational institutions may collaborate with yoga experts to develop structured programmes aimed at improving concentration, well-being and overall quality of life among students.

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