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Assessing The Impact of Yogic Balancing Asanas on Core Among High School Students of Indore Division

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Abstract:

Core strength is essential for stability, posture, and functional movement, particularly in adolescents undergoing rapid physical development. This study examines the effect of yogic balancing asanas on core strength among high school students in the Indore division. A total of 60 students aged 14–17 years were selected and randomly assigned to experimental and control groups. The experimental group underwent a 6-week yoga program focusing on balancing asanas such as Vrikshasana, Garudasana, and Natarajasana, while the control group followed a regular physical education routine. Core strength was assessed using the plank hold test and sit-up test. Results indicated a statistically significant improvement in core strength in the experimental group compared to the control group. The study recommends integrating yoga-based balancing practices into school fitness programs for enhanced core stability and overall physical fitness.

Keywords: yoga, core strength, balancing asanas, adolescents, physical education,

Introduction:

Adolescence is a transformative phase characterized by rapid physical, emotional, and cognitive development. During this stage, maintaining and improving core strength is vital, as it serves as the foundation for posture, balance, injury prevention, and efficient movement (Singh & Sharma, 2020). Despite this, physical education in many Indian schools often lacks structured interventions aimed at developing core musculature.

Yoga, an ancient Indian practice integrating physical, mental, and spiritual well-being, has been widely acknowledged for its health benefits. Within its various postures, balancing asanas demand activation of deep stabilizing muscles of the abdomen, back, and pelvis, making them particularly effective for developing core strength (Verma & Choudhary, 2019). Poses such as



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Vrikshasana (Tree Pose), Garudasana (Eagle Pose), and Natarajasana (Dancer Pose) require sustained engagement of the core muscles to maintain equilibrium.

The Indore division in Madhya Pradesh is a major educational district that includes a wide demographic of adolescent learners. Despite the inclusion of yoga in the National Curriculum Framework, there is limited data on its targeted impact on core strength. This study seeks to fill this research gap by evaluating the effects of yogic balancing asanas on core strength among high school students in this region.

Objectives:

1. To evaluate the impact of yogic balancing asanas on the core strength of high school students.
2. To compare core strength levels between students practicing yoga and those following traditional physical education.
3. To identify effective yoga postures that contribute to core strength development.

Hypothesis:

Null Hypothesis (H_0): There is no significant difference in core strength between students who practice yogic balancing asanas and those who do not.

Alternative Hypothesis (H_1): Students who practice yogic balancing asanas will demonstrate significantly greater improvement in core strength compared to those who do not.

Sample and Sampling:

A total of 60 students (30 males and 30 females), aged 14–17 years, were selected from five high schools in the Indore division. The schools included both government and private institutions to ensure diversity. Stratified random sampling was used to account for gender and school type.

Participants were divided into:

Experimental Group ($n = 30$): Received yoga training.

Control Group ($n = 30$): Participated in conventional physical education activities.

All participants were screened for health conditions, and informed consent was obtained from students and guardians.

Method:

Research Design:

The study employed a quasi-experimental pretest-posttest control group design to measure the effectiveness of the yoga intervention.

Yoga Intervention:

The experimental group participated in a 6-week yoga program, conducted five days a week, with each session lasting 45 minutes. The structure was as follows:

Warm-up (5 minutes)

Balancing asanas (30 minutes) including:

Vrikshasana



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Garudasana

Natarajasana

Utthita Hasta Padangusthasana

Cool-down and pranayama (10 minutes)

Sessions were guided by trained yoga instructors.

The control group continued with their standard physical activities such as running, team sports, and calisthenics.

Measurement Tools:

One standard tests were used to assess core strength:

Minute Sit-Up Test – total number of sit-ups completed

Tests were conducted at Week 0 (pretest) and Week 6 (posttest).

Data Analysis:

Statistical analysis was performed using SPSS.

Paired sample t-tests were used to analyze within-group changes.

Independent t-tests compared the posttest results between the experimental and control groups.

A significance level of $p < 0.05$ was considered statistically significant.

Ethical Considerations:

Ethical approval was obtained from the Institutional Ethics Committee of [Your Institution Name]. All participants and their guardians provided informed consent.

Results:

Table 1: Comparison of Pre-Post Mean Bent Knee Sit-ups Scores of High School Students Belonging to Experimental and Control Groups

Groups	N	Bent Knee Situps				Mean Difference	't'
		Pre Test		Post Test			
		Mean	S.D.	Mean	S.D.		
Experimental Group	30	28.20	5.30	30.20	5.15	1.87	5.84, p<.01
Control Group	30	27.40	6.21	28.36	6.85	0.96	2.59, p<.01

Table 1 reveals that the pre-test mean score for high school students of the experimental group on the bent knee sit-ups test was 28.20 ± 5.30 while the post-test mean score for high school students of the experimental group on bent knee sit-ups was 30.20 ± 5.15 . It shows a significant improvement in the bent knee sit-ups performance of high school students after taking part in 6-week balancing yogic asanas program. The mean difference of 1.87 and $t = 5.84$, $p < .01$ supports this finding with a sound statistical backing. Table 4.9 reveals that the pre-test mean score for



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high school students of the control group on the bent knee sit-ups test was 27.40 ± 6.21 while the post-test mean score for high school students of the control group on bent knee sit-ups was 28.36 ± 6.85 . It shows a significant improvement in the bent knee sit-ups performance of high school students in the control group after 6-week study period as compared to their initial performance. The mean difference of 0.96 and $t=2.59$, $p<.01$ supports this finding with a sound statistical backing.

Table 2 shows comparative data on changes in core strength, as assessed by the bent knee sit-ups, between two groups of high school students based on gain score computations.

Table 2: Comparison of Gain Score (Posttest – Pretest) on Bent Knee Sit-ups Performance of High School Students between Experimental and Control Groups

	Experimental Group (N=30)		Control Group (N=30)		't'	Sig.
	Mean	S.D.	Mean	S.D.		
Gain Score (Bent Knee Sit-ups)	2.00	1.87	0.96	2.04	2.04	.05

Perusal of Table 2 indicates that the mean gain score on bent knee sit-ups for the experimental group was 2.00 while it was 0.96 for the control group. The t-value of 2.04, $p<.05$ indicates that after participating in 6 weeks of a balancing yoga program, the core strength in high school students increased significantly as compared to a group of high school students placed in a control group.

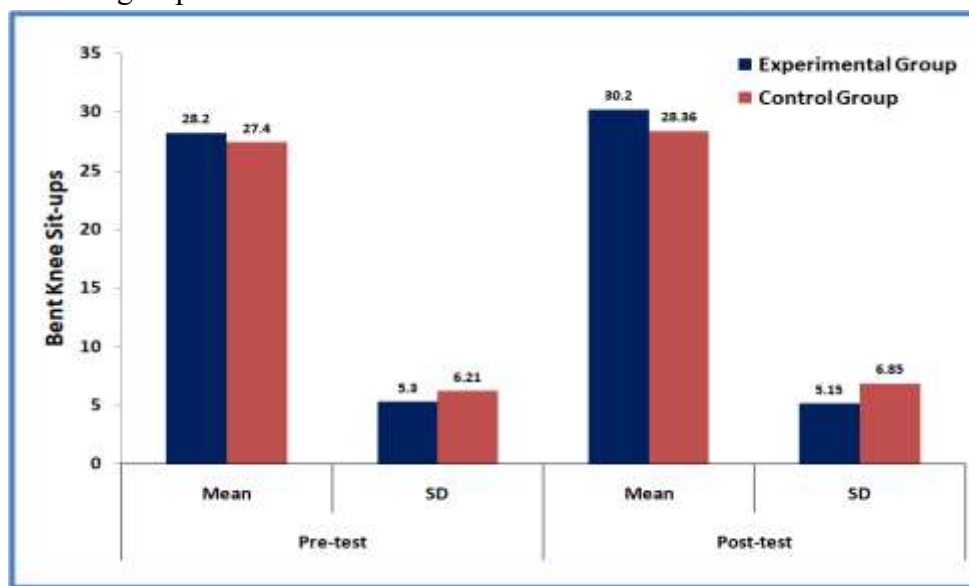


Figure 1: Pre-Post Mean Scores on Bent Knee Sit-ups



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Table 3 presents the results of an Analysis of Covariance (ANCOVA) conducted to compare the post-test performance on the bent knee sit-ups between the experimental and control groups of high school students, while controlling for their pre-test scores.

Table 3: ANCOVA Calculations for Bent Knee Sit-ups Performance of High School Students Controlling for Pre-Test Scores

Source	df	Sum of Squares	Mean Squares	F	Sig.
Pre	01	1910.882	1910.882	488.68	0.01
Groups	01	16.099	16.099	4.11	0.05
Error	57	222.885	3.910		
Total	60	53635.000			

Table 4: Adjusted Mean Scores of High School Students on Bent Knee Sit-ups Performance after Controlling for Pre-Test Scores

Groups	Adjusted Mean
Experimental	29.80
Control	28.76

Covariates appearing in the model are evaluated at the following values Pre test = 27.80

The ANCOVA results indicate that the covariate, i.e., the pre-test scores, had a significant effect on the post-test performance as shown by the F-value of 4.11, which is significant at the .05 level. These statistical data reveal that experimental intervention of 6 weeks of balancing yogic asanas had a statistically significant impact on improving core strength in high school students, even after accounting for the students' initial performance levels.

Table 4 further supports these findings by showing the adjusted mean scores for both groups. After controlling for the pre-test mean of 27.80, the experimental group achieved an adjusted mean score of 29.80, while the control group had a lower adjusted mean of 28.76 on bent knee sit-ups. This indicates that the students in the experimental group improved their core strength to a greater extent than those in the control group, thereby confirming the effectiveness of the 6 weeks of balancing yogic asanas.

In view of the results given in Tables 1, 2, 3 and 4, hypothesis H_{02} is accepted.

Discussion:



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Balancing asanas such as Vrikshasana (Tree Pose), Garudasana (Eagle Pose), and Natarajasana (Dancer Pose) require muscular engagement, postural control, and neuromuscular coordination, which contribute to strengthening the core muscles. According to the principle of progressive overload, the consistent practice of these poses over six weeks gradually challenges and develops the musculoskeletal system, leading to improved strength and stability.

In terms of flexibility, the static stretching nature of balancing asanas helps in lengthening the muscles and connective tissues. This aligns with the SAID principle (Specific Adaptation to Imposed Demands), where the body adapts specifically to the type of physical activity it is repeatedly exposed to. Additionally, Hatha Yoga principles emphasize breath control and mindfulness, which enhance the effectiveness of each posture by improving body awareness and muscle relaxation.

These findings support the view that incorporating structured yogic practices into physical education programs can positively influence students' physical fitness, particularly their core strength, which is foundational for overall motor development and injury prevention.

Recommendations

1. Integrate yogic balancing asanas into the physical education curriculum across high schools.
2. Provide training for physical education teachers in yoga instruction to ensure effective implementation.
3. Encourage further longitudinal studies to examine sustained effects on fitness, posture, and academic performance.
4. Promote community awareness programs highlighting the role of yoga in adolescent health.

Conclusion

The study confirms that practicing yogic balancing asanas significantly improves core strength among high school students. These findings support the inclusion of yoga in school fitness programs to foster physical stability, posture, and overall health. In light of growing sedentary behavior in adolescents, yoga offers a simple, accessible, and culturally relevant solution to enhance fitness.

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