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

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Abstract:
Flexibility is a vital component of physical fitness and plays a significant role in adolescent development. With the increasing academic pressure and sedentary lifestyle among students, there is a growing need to integrate fitness-enhancing activities into school programs. This study investigates the effects of yogic balancing asanas on the flexibility of high school students in the Indore division. A quasi-experimental design was employed involving 60 students aged 14 to 17 years. The participants were divided into experimental and control groups. The experimental group underwent a 6-week yoga training program focusing on balancing asanas such as Vrikshasana, Garudasana, and Natarajasana. Flexibility was assessed using the Sit-and-Reach Test before and after the intervention. The findings revealed a significant improvement in flexibility among students in the experimental group compared to those in the control group. The study recommends incorporating yoga into school physical education to improve student health and physical development.

Keywords: yoga, flexibility, balancing asanas, adolescents, physical education.

Introduction:

Physical fitness is essential during adolescence as it directly impacts growth, posture, physical coordination, and psychological well-being. Among the various components of fitness, flexibility is crucial for joint mobility and injury prevention. A lack of flexibility may lead to muscular imbalances, poor posture, and reduced athletic performance (Sharma & Singh, 2020). In India, school-based physical education often lacks structured interventions targeting flexibility.

Yoga, an indigenous system of physical, mental, and spiritual practices, has gained global recognition for its multifaceted benefits. Balancing asanas, such as Vrikshasana (Tree Pose),

Garudasana (Eagle Pose), and Natarajasana (Dancer Pose), engage various muscle groups and promote static and dynamic stretching, which contribute significantly to flexibility (Kumar & Verma, 2019).

The Indore division, an important educational zone in Madhya Pradesh, presents a culturally and socioeconomically diverse adolescent population. With limited integration of yoga in school fitness programs, this study addresses the need to empirically assess the impact of yogic balancing asanas on the flexibility of high school students in Indore..

Objectives:

1. To evaluate the pre- and post-intervention flexibility levels of high school students.
2. To determine the impact of yogic balancing asanas on flexibility in adolescents.
3. To compare flexibility outcomes between students practicing yoga and those undergoing regular physical education.

Hypothesis:

Null Hypothesis (H_0): There is no significant difference in the flexibility of high school students who practice yogic balancing asanas compared to those who do not.

Alternative Hypothesis (H_1): There is a significant improvement in the flexibility of high school students who practice yogic balancing asanas 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

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:

The Sit-and-Reach Test was used to measure lower back and hamstring flexibility. Scores were recorded before and after the 6-week period for both groups.

Data Analysis:

Statistical analysis was performed using SPSS.

In order to find out effect of balancing yogic asanas on flexibility and core strength of the subject one tailed "t" test and analysis of covariance were applied.

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 Sit and Reach Test Scores of High School Students Belonging to Experimental and Control Groups

Groups	N	Sit and Reach Test				Mean Difference	't'
		Pre Test		Post Test			
		Mean	S.D.	Mean	S.D.		
Experimental Group	30	29.76	7.14	32.73	7.62	2.96	8.97, p<.01

Control Group	30	28.43	8.80	28.76	9.02	0.33	1.26, p>.05

Table 1 reveals that the pre-test mean score for high school students of the experimental group on the sit and reach test was 29.76±7.14 while the post-test mean score for high school students of the experimental group on the sit and reach test was 32.73±7.62. It shows a significant improvement in sit and reach performance of high school students after taking part in 6-week balancing yogic asanas program. The mean difference of 2.96 and t=8.97, p<.01 supports this finding with a sound statistical backing.

Table 1 reveals that the pre-test mean score for high school students of the control group on the sit and reach test was 28.43±8.80 while the post-test mean score for high school students of the control group on the sit and reach test was 28.76±9.02. It shows no significant improvement in the sit and reach performance of high school students in the control group. The mean difference of 0.33 and t=1.26, p>.05 supports this finding with a sound statistical backing.

Table 2 shows comparative data on changes in flexibility, as assessed by the Sit and Reach Test, between two groups of high school students through computed gain scores.

Table 2: Comparison of Gain Score (Posttest – Pretest) on Sit and Reach Test 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 (Sit and Reach Test)	2.96	1.80	0.33	1.44	6.22	.01

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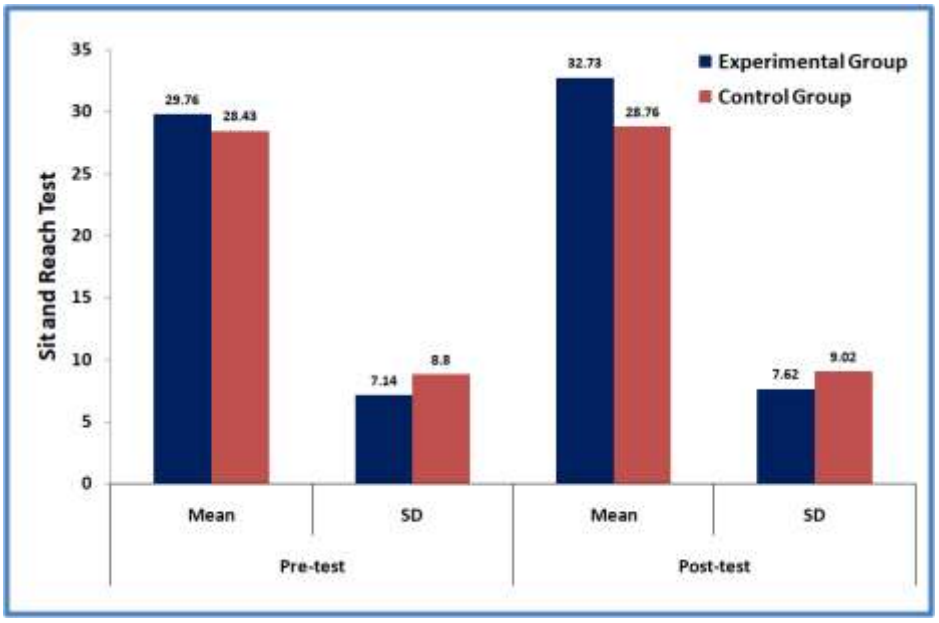

Figure 1: Pre-Post Mean Scores on Sit and Reach Test for Both Groups

Perusal of Table 2 indicates that the mean gain score on the sit and reach test for the experimental group was 2.96 while it was 0.33 for the control group. The t-value of 6.22, $p<.01$ indicates that after participating in 6 weeks of balancing yoga asanas, the flexibility in high school students increased significantly as compared to the group of high school students placed in the control group.

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

Table 3: ANCOVA Calculations for Sit and Reach Test Performance of High School Students Controlling for Pre-Test Scores

Source	df	Sum of Squares	Mean Squares	F	Sig.
Pre	01	3895.422	3895.422	1443.58	0.01
Groups	01	100.979	100.979	37.42	0.01
Error	57	153.811	2.698		
Total	60	61019.000			

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Table 4: Adjusted Mean Scores of High School Students on Sit and Reach Test Performance after Controlling for Pre-Test Scores

Groups	Adjusted Mean
Experimental	32.02
Control	29.44

Covariates appearing in the model are evaluated at the following values Pre test = 29.10

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 37.42, $p<.01$. These statistical data reveals that experimental intervention of 6 weeks balancing yogic asanas had a statistically significant influence on improving flexibility performance, even after accounting for the students' initial performance levels on sit and reach test.

Table 4 further supports these findings by showing the adjusted mean scores for both groups. After controlling for the pre-test mean of 29.10, the experimental group achieved an adjusted mean score of 32.02, while the control group had a lower adjusted mean of 29.44 on the sit and reach test performance. This indicates that the students in the experimental group improved their flexibility to a greater extent than those in the control group, thereby confirming the effectiveness of the 6-week balancing yoga asanas.

Given the results in tables 1, 2, 3 and 4, hypothesis H_{01} is accepted.

Hypothesis H_2, There will be a significant effect of selected balancing yogic asanas on the core strength of high school students. A paired sample t-test was employed, and its results are given.

Discussion:

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 flexibility which is foundational for overall motor development and injury prevention.

Conclusion

This study concludes that yogic balancing asanas significantly improve flexibility in high school students. The integration of such practices into school routines can serve as a cost-effective and culturally relevant method to enhance adolescent fitness. Given the positive outcomes, yoga—particularly balancing postures—should be considered a vital component of school-based physical education programs in the Indore division and beyond.

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