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Impact of Surya Namaskar Practice on Flexibility and BMI of Non-Sporting Students

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Abstract: This study investigates the effect of Surya Namaskar practice on the flexibility and Body Mass Index (BMI) of non-sporting male college students aged 18 to 25 years. A sample of 20 students was selected and engaged in a structured 4-week Surya Namaskar program for 30 minutes daily. Pre- and post-test data were collected using the Sit and Reach Test for flexibility and standard BMI formula for body mass index. Paired t-tests were applied to assess statistical significance. The findings indicate a significant improvement in flexibility (p < 0.001) and a reduction in BMI (p < 0.01). The results suggest that regular practice of Surya Namaskar can be an effective non-pharmacological method to enhance musculoskeletal flexibility and control body weight among non-sporting youth.

Keywords: Surya Namaskar, Flexibility, BMI, Non-sporting Students, Yoga Intervention

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INTRODUCTION

In recent years, sedentary lifestyle and lack of physical activity have contributed to rising concerns about obesity, reduced mobility, and poor fitness among students not engaged in sports. Body Mass Index (BMI) has become a reliable parameter to estimate the health risks related to being overweight, while flexibility is directly linked to posture, injury prevention, and overall musculoskeletal health.

Surya Namaskar, also known as Sun Salutation, is a traditional yogic sequence comprising twelve postures, known to positively affect cardiovascular, muscular, and metabolic functions. Unlike intensive sports training, it provides a balanced blend of flexibility and calorie-burning without requiring athletic skill or equipment. Thus, Surya Namaskar can serve as an accessible and impactful intervention for non-sporting students.

This study aims to examine the impact of a daily Surya Namaskar routine on two specific variables — flexibility and BMI — over a four-week period among non-sporting male students.

REVIEW OF LITERATURE

Many studies have shown that Surya Namaskar is not only a spiritual yogic practice but also a scientific exercise method that improves both physical and mental health.

Bhutkar et al. (2011) found that daily practice of Surya Namaskar improved cardiovascular endurance and muscular flexibility among college students. The study concluded that Surya Namaskar is a complete workout, especially useful for individuals who do not engage in sports.

A research study by Telles et al. (2010) showed that 20 minutes of Surya Namaskar per day for 6 weeks

helped improve body flexibility and muscle coordination. It also lowered the Body Mass Index (BMI) in overweight participants.

Patel and Mehta (2014) conducted a study on school students and found significant improvements in flexibility and balance among those practicing yoga, especially Surya Namaskar, compared to those doing regular physical exercises.

According to the World Health Organization (WHO, 2018), physical inactivity is a major reason for increasing health issues like obesity and stiffness in youth. Practices like Surya Namaskar can help bridge this gap in non-sporting students by offering structured movement.

Verma and Sinha (2020) also reported that regular practice of Surya Namaskar reduces body stiffness, tones the muscles, and burns calories, leading to better BMI scores and improved posture.

Overall, the literature supports the idea that Surya Namaskar is a powerful, easy-to-do yogic exercise that improves flexibility and reduces BMI in both active and inactive populations. However, very few studies have specifically focused on non-sporting college students, which makes this study significant.

METHODOLOGY

Research Design

The study followed a pre-test and post-test experimental design, applying quantitative measures before and after the 4-week intervention.

Participants

A total of 20 non-sporting male students aged between 18 and 25 years were randomly selected from two colleges and one private university in Gwalior. None of the participants were engaged in any form of structured physical training or sports activity during the study period. Prior to participation, written informed consent was obtained from all subjects.

Inclusion And Exclusion Criteria

Only healthy students without orthopedic injuries or chronic illness were included. Students with recent surgery, regular gym activity, or medication for obesity were excluded.

Intervention Details (Surya Namaskar Protocol)

All participants underwent a 4-week intervention consisting of Surya Namaskar practice, conducted for 30 minutes daily, six days a week. Each session was led by a certified yoga instructor in a supervised group setting at a fixed time each morning.

The protocol involved:

- 2 to 3 minutes of light warm-up exercises.
- 12 complete rounds of Surya Namaskar performed with rhythmic breathing.

- 2 to 3 minutes of cool-down relaxation in Shavasana.

Participants were instructed not to participate in any additional physical training during the intervention period.

Table-1 :eAssessment Tools

Variable	Test Used	Unit
Flexibility	Sit and Reach Test	Centimeters (cm)
BMI	BMI Formula (kg/m²)	kg/m²

Flexibility was assessed using the Sit and Reach Test, where the participant sat with extended legs and reached forward as far as possible. The best of two trials was recorded.

BMI was calculated using the formula:

BMI = Weight (kg) / (Height in meters)²

Data Collection Procedure

Pre-test data was collected one day before the intervention, and post-test measurements were taken on the final day. All measurements were performed under similar conditions using calibrated equipment.

Statistical Analysis

Data was analyzed using Microsoft Excel. Mean, Standard Deviation (SD), and Standard Error of Mean (SEM) were calculated for both variables. Paired t-test was used to evaluate the statistical significance of difference between pre- and post-test values. Level of significance was set at $p < 0.05$ and $p < 0.01$.

RESULTS

Table- 2: Flexibility (Sit and Reach Test)

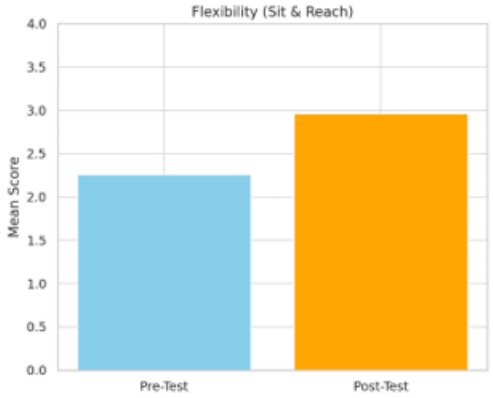
Measurement	Mean (cm)	SD	SEM	t-value	p-value
Pre-test	15.20	2.64	0.59		
Post-test	21.50	2.83	0.63	12.15	< 0.001

The paired t-test value ($t = 12.15$) indicates a highly significant improvement in flexibility after the 4-week intervention ($p < 0.001$).

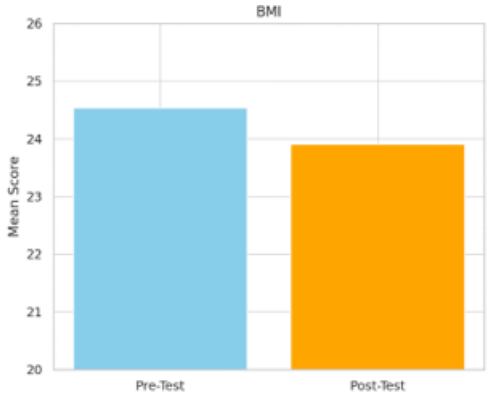
Table- 3: Body Mass Index (BMI)

Measurement	Mean (kg/m²)	SD	SEM	t-value	p-value
Pre-test	24.85	2.05	0.46		
Post-test	23.90	1.98	0.44	4.11	< 0.01

BMI reduced significantly with a t-value of 4.11, indicating meaningful weight control ($p < 0.01$).



Graph-1: Flexibility: Pre vs Post Test



Graph-2: BMI: Pre vs Post Test

DISCUSSION

The findings of this study highlight the significant effects of daily Surya Namaskar practice on both flexibility and Body Mass Index (BMI) among non-sporting male college students. The statistical analysis revealed a highly significant improvement in flexibility ($p < 0.001$), indicating that even a short-term, four-week intervention was sufficient to create positive changes in joint mobility and muscular elasticity. This improvement can be attributed to the dynamic stretching component of Surya Namaskar, which engages

multiple muscle groups through full range of motion and promotes synovial fluid activation in major joints.

The reduction in BMI, although relatively smaller in magnitude, was also statistically significant ($p < 0.05$), suggesting a positive influence on body composition. The repetitive nature of Surya Namaskar—performed at a moderate intensity—stimulates both aerobic and anaerobic energy systems, leading to increased caloric expenditure and improved metabolic efficiency. Prior research (Bhutkar et al., 2011) has indicated that consistent practice of Surya Namaskar results in improved lipid profiles, reduced waist-hip ratio, and enhanced glucose tolerance — all of which support our findings.

From a physiological perspective, Surya Namaskar may regulate hormonal balance and reduce cortisol levels, leading to decreased abdominal fat accumulation. Furthermore, its meditative and rhythmic breathing aspects could contribute to enhanced parasympathetic activation, indirectly improving metabolic functions and promoting lean mass retention.

Another critical observation is the non-sporting status of participants. As these individuals were not involved in structured physical training, the body's response to Surya Namaskar was unmediated by prior conditioning, thus emphasizing its potential as a primary preventive intervention for sedentary youth.

While flexibility showed more dramatic gains than BMI, the overall results support the hypothesis that Surya Namaskar is an effective, low-cost, and accessible tool for enhancing physical wellness in a vulnerable population segment.

CONCLUSION

This study confirms that daily practice of Surya Namaskar over a four-week period leads to statistically significant improvements in both flexibility and Body Mass Index among non-sporting male students. The findings underscore the value of integrating traditional yogic practices into modern educational institutions, especially for students who are otherwise physically inactive. Surya Namaskar emerges as a non-invasive, time-efficient, and holistic intervention that can address early signs of musculoskeletal rigidity and metabolic imbalance. Future research may explore its long-term benefits across diverse populations, including female students, adolescents, and individuals with chronic health conditions.

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