

ORIGINAL RESEARCH

Study on the effects of short-term yoga practice on body composition, physical fitness, physiological variables, nutritional and mental health status of medical students of SKMCH, Muzaffarpur, Bihar**Dr. Santosh Kumar¹, Dr. Neera Kumari²**¹Tutor, ²Assistant Professor, Department of Physiology, Sri Krishna Medical College, Muzaffarpur, Bihar, Patna, India**Corresponding Author: Dr. Santosh Kumar**

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Email: santosh2k4nmch@gmail.comReceived: 18th May, 2024Accepted: 8th June, 2024**Abstract:**

Background: Yoga is a holistic practice known to improve physical, mental, and emotional well-being. This study investigates the effects of short-term yoga practice on body composition, physical fitness, physiological variables, nutritional status, and mental health of medical students at SKMCH, Muzaffarpur, Bihar.

Materials and Methods: A total of 100 medical students participated in this study, conducted from February 2022 to August 2022 at SKMCH, Muzaffarpur, Bihar. Participants were divided into a yoga group (n=50) and a control group (n=50). The yoga group underwent a structured yoga program consisting of asanas, pranayama, and meditation for 30 minutes daily, 5 days a week, for six months. Baseline and post-intervention assessments included body composition (BMI, body fat percentage), physical fitness (flexibility, muscular strength), physiological variables (heart rate, blood pressure), nutritional status (dietary intake assessment), and mental health (stress and anxiety levels measured by validated questionnaires).

Results: The yoga group showed significant improvements in body composition, with a decrease in BMI (from 24.5 ± 2.3 to 23.0 ± 2.0 , $p < 0.05$) and body fat percentage (from $22.5\% \pm 3.5\%$ to $19.0\% \pm 3.0\%$, $p < 0.05$). Physical fitness parameters, such as flexibility (sit and reach test improved from $20.0 \text{ cm} \pm 5.0 \text{ cm}$ to $25.0 \text{ cm} \pm 4.0 \text{ cm}$, $p < 0.01$) and muscular strength (handgrip strength increased from $25.0 \text{ kg} \pm 5.0 \text{ kg}$ to $30.0 \text{ kg} \pm 4.5 \text{ kg}$, $p < 0.01$), also improved significantly. Physiological variables showed a reduction in resting heart rate (from $75 \text{ bpm} \pm 5 \text{ bpm}$ to $70 \text{ bpm} \pm 4 \text{ bpm}$, $p < 0.05$) and systolic blood pressure (from $120 \text{ mmHg} \pm 10 \text{ mmHg}$ to $115 \text{ mmHg} \pm 8 \text{ mmHg}$, $p < 0.05$). Nutritional status improved with a more balanced dietary intake, and mental health assessment indicated a reduction in stress (stress scores decreased from 15 ± 5 to 10 ± 4 , $p < 0.01$) and anxiety levels (anxiety scores decreased from 10 ± 4 to 6 ± 3 , $p < 0.01$). The control group did not exhibit significant changes in these parameters.

Conclusion: Short-term yoga practice has a beneficial impact on body composition, physical fitness, physiological variables, nutritional status, and mental health among medical students. Incorporating yoga into daily routines can enhance overall well-being and support the demanding lifestyle of medical students.

Keywords: Yoga, Body Composition, Physical Fitness, Physiological Variables, Nutritional Status, Mental Health, Medical Students, SKMCH, Muzaffarpur.

Introduction

Yoga, an ancient practice originating in India, encompasses physical postures (asanas), breathing techniques (pranayama), and meditation, aimed at harmonizing the body, mind, and spirit (1). The practice of yoga has gained global recognition for its potential health benefits, which include improvements in physical fitness, mental health, and overall well-being (2). Medical students often face significant stress and lifestyle challenges, making them ideal candidates for interventions that promote holistic health (3).

Research indicates that regular yoga practice can lead to significant improvements in body composition, including reductions in body mass index (BMI) and body fat percentage (4). Additionally, yoga has been shown to enhance physical fitness parameters such as flexibility and muscular strength (5). Physiological benefits of yoga practice include reductions in resting heart rate and blood pressure, which are indicative of improved cardiovascular health (6).

Mental health benefits of yoga are well-documented, with studies demonstrating its effectiveness in reducing stress and anxiety levels (7). This is particularly relevant for medical students, who experience high levels of stress due to the demanding nature of their studies and clinical responsibilities (8). Furthermore, yoga has been associated with improved dietary habits and nutritional status, contributing to overall health and wellness (9).

Despite the growing body of evidence supporting the benefits of yoga, there is limited research specifically focusing on its impact on medical students in the Indian context. This study aims to fill this gap by investigating the effects of short-term yoga practice on body composition, physical fitness, physiological variables, nutritional status, and mental health of medical students at SKMCH, Muzaffarpur, Bihar. By providing empirical evidence, this study seeks to highlight the potential of yoga as a valuable intervention for improving the health and well-being of medical students.

Materials and Methods

Study Design and Participants This study was a randomized controlled trial conducted at SKMCH, Muzaffarpur, Bihar, from February 2022 to August 2022. A total of 100 medical students were recruited and randomly assigned to either the yoga group (n=50) or the control group (n=50). Inclusion criteria included students aged 18-25 years, enrolled in the MBBS program, and willing to participate in the study. Exclusion criteria included any history of chronic disease, current participation in other structured exercise programs, or prior experience with yoga.

Intervention The yoga group participated in a structured yoga program consisting of asanas (physical postures), pranayama (breathing exercises), and meditation. Sessions were conducted for 30 minutes daily, 5 days a week, over six months. Certified yoga instructors led the sessions, ensuring consistency and adherence to the program. The control group did not engage in any form of structured physical activity during the study period.

Assessments were conducted at baseline and after six months of intervention. The following parameters were measured:

1. **Body Composition:**
 - **Body Mass Index (BMI):** Calculated as weight in kilograms divided by height in meters squared.
 - **Body Fat Percentage:** Measured using a bioelectrical impedance analysis device.
2. **Physical Fitness:**
 - **Flexibility:** Assessed using the sit and reach test.
 - **Muscular Strength:** Measured using a handgrip dynamometer.
3. **Physiological Variables:**
 - **Resting Heart Rate:** Measured using a heart rate monitor after 5 minutes of rest.
 - **Blood Pressure:** Systolic and diastolic blood pressure measured using a digital sphygmomanometer.
4. **Nutritional Status:**
 - **Dietary Intake:** Assessed using a 24-hour dietary recall method and analyzed for macronutrient and micronutrient intake.
5. **Mental Health:**
 - **Stress Levels:** Measured using the Perceived Stress Scale (PSS).
 - **Anxiety Levels:** Assessed using the Generalized Anxiety Disorder-7 (GAD-7) questionnaire.

Statistical Analysis Data were analyzed using SPSS version 25.0. Descriptive statistics were used to summarize the data. Paired t-tests were conducted to compare pre- and post-intervention values within groups. Independent t-tests were used to compare changes between the yoga and control groups. A p-value of <0.05 was considered statistically significant.

Results

The study included 100 medical students, with 50 in the yoga group and 50 in the control group. The results are presented in tables summarizing the changes in body composition, physical fitness, physiological variables, nutritional status, and mental health status after six months of intervention.

Table 1: Changes in Body Composition

Parameter	Yoga Group (n=50)	Control Group (n=50)
	Baseline	Post-Intervention
BMI (kg/m ²)	24.5 ± 2.3	23.0 ± 2.0**
Body Fat (%)	22.5 ± 3.5	19.0 ± 3.0**

Table 2: Changes in Physical Fitness

Parameter	Yoga Group (n=50)	Control Group (n=50)
	Baseline	Post-Intervention
Flexibility (cm)	20.0 ± 5.0	25.0 ± 4.0**
Muscular Strength (kg)	25.0 ± 5.0	30.0 ± 4.5**

Table 3: Changes in Physiological Variables

Parameter	Yoga Group (n=50)	Control Group (n=50)
	Baseline	Post-Intervention
Resting Heart Rate (bpm)	75 ± 5	70 ± 4*
Systolic BP (mmHg)	120 ± 10	115 ± 8*

Table 4: Changes in Nutritional Status

Parameter	Yoga Group (n=50)	Control Group (n=50)
	Baseline	Post-Intervention
Balanced Diet Score	60 ± 10	75 ± 8*

Table 5: Changes in Mental Health Status

Parameter	Yoga Group (n=50)	Control Group (n=50)
	Baseline	Post-Intervention
Stress Score (PSS)	15 ± 5	10 ± 4**
Anxiety Score (GAD-7)	10 ± 4	6 ± 3**

*Significant at $p < 0.05$ **Significant at $p < 0.01$

Description of Results

1. Body Composition:

- The yoga group exhibited a significant reduction in BMI (from 24.5 ± 2.3 to 23.0 ± 2.0 , $p < 0.01$) and body fat percentage (from $22.5\% \pm 3.5\%$ to $19.0\% \pm 3.0\%$, $p < 0.01$) compared to the control group, which showed no significant changes.

2. Physical Fitness:

- There was a significant improvement in flexibility (from $20.0 \text{ cm} \pm 5.0 \text{ cm}$ to $25.0 \text{ cm} \pm 4.0 \text{ cm}$, $p < 0.01$) and muscular strength (from $25.0 \text{ kg} \pm 5.0 \text{ kg}$ to $30.0 \text{ kg} \pm 4.5 \text{ kg}$, $p < 0.01$) in the yoga group, while the control group did not exhibit significant changes.

3. Physiological Variables:

- The yoga group showed a significant decrease in resting heart rate (from $75 \text{ bpm} \pm 5 \text{ bpm}$ to $70 \text{ bpm} \pm 4 \text{ bpm}$, $p < 0.05$) and systolic blood pressure (from $120 \text{ mmHg} \pm 10 \text{ mmHg}$ to $115 \text{ mmHg} \pm 8 \text{ mmHg}$, $p < 0.05$). The control group did not show significant changes.

4. Nutritional Status:

- The balanced diet score improved significantly in the yoga group (from 60 ± 10 to 75 ± 8 , $p < 0.05$), indicating better dietary habits post-intervention. The control group showed no significant changes.

5. Mental Health Status:

- Stress levels, as measured by the PSS, decreased significantly in the yoga group (from 15 ± 5 to 10 ± 4 , $p < 0.01$). Anxiety levels, assessed using the GAD-7, also

reduced significantly (from 10 ± 4 to 6 ± 3 , $p < 0.01$). The control group did not exhibit significant changes in stress or anxiety levels.

These results suggest that short-term yoga practice significantly improves body composition, physical fitness, physiological variables, nutritional status, and mental health among medical students.

Discussion

The findings of this study demonstrate that short-term yoga practice significantly improves various health parameters among medical students. These results are consistent with previous research highlighting the benefits of yoga on physical and mental health (1,2).

Body Composition The significant reduction in BMI and body fat percentage in the yoga group aligns with previous studies that report similar outcomes (3). Yoga's combination of physical postures and controlled breathing likely contributes to increased caloric expenditure and improved metabolic function, leading to reductions in body weight and fat mass (4).

Physical Fitness Improvements in flexibility and muscular strength observed in the yoga group are supported by existing literature (5). Yoga postures (asanas) enhance muscle strength and joint flexibility through various stretching and strengthening exercises (6). These findings suggest that even short-term yoga interventions can effectively enhance physical fitness levels, which is critical for the demanding lifestyle of medical students (7).

Physiological Variables The significant decrease in resting heart rate and systolic blood pressure among yoga practitioners indicates improved cardiovascular health (8). Yoga's emphasis on pranayama (breathing exercises) and meditation may promote relaxation and reduce sympathetic nervous system activity, leading to these beneficial cardiovascular changes (9). These results are consistent with studies showing that yoga can lower blood pressure and improve heart rate variability (10).

Nutritional Status The improvement in balanced diet scores suggests that yoga practice positively influences dietary habits. Previous research has indicated that mindfulness practices, such as those incorporated in yoga, can lead to more mindful eating behaviors and better dietary choices (11). This holistic approach to health promotion is particularly relevant for medical students, who often experience irregular eating patterns due to academic pressures (12).

Mental Health The significant reductions in stress and anxiety levels among the yoga group corroborate the well-documented mental health benefits of yoga (13). Medical students are known to experience high levels of stress and anxiety, which can negatively impact their academic performance and overall well-being (14). Yoga's integrative approach, combining physical exercise with mental relaxation techniques, provides a comprehensive strategy for managing stress and improving mental health (15).

Limitations Despite these positive findings, the study has several limitations. The sample size was relatively small and limited to a single institution, which may affect the generalizability of the results. Additionally, the study relied on self-reported dietary intake and mental health assessments, which may be subject to bias. Future research should include larger, multi-center trials with objective measures of dietary intake and mental health.

Conclusion In conclusion, short-term yoga practice significantly improves body composition, physical fitness, physiological variables, nutritional status, and mental health among medical students. These findings support the inclusion of yoga as a regular practice in medical education to enhance the overall health and well-being of students. Further research is warranted to explore the long-term benefits of yoga and its potential role in preventive healthcare for medical professionals.

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