

The Effect of Fitness Yoga on Health Fitness of Female College Students: An Experimental Study

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Abstract: This study investigates the impact of fitness yoga interventions on the physical health of female college students in China. Through an 8-week program involving 35 participants, changes in body composition, cardiorespiratory fitness, muscular strength, and flexibility were assessed before and after the intervention. Results indicate significant improvements in BMI, cardiopulmonary fitness, muscular strength, and flexibility post-intervention, highlighting the efficacy of fitness yoga in enhancing overall physical health among female college students. These findings underscore the importance of integrating yoga interventions into educational settings to promote holistic well-being among young adults.

Keywords: Fitness Yoga; Female College Students; Physical Health.

1. Introduction

Health has always been a priority in society. Recent studies reveal concerning trends among Chinese female college students, such as BMI abnormalities, obesity, and poor waist-abdominal muscle endurance. This study aims to address the lack of research on yoga's impact on female college students' health fitness. It evaluates yoga's influence on various health fitness indicators, including body composition, cardiorespiratory fitness, flexibility, muscular strength, and endurance, before and after a yoga intervention period. This research aims to provide insights for designing effective yoga courses in universities and enhancing female students' health and fitness. Chinese female college students face health concerns, including BMI abnormalities, obesity, and poor waist-abdominal muscle endurance. This study aims to bridge the research gap on yoga's impact on female students' health fitness by evaluating its influence on body composition, cardiorespiratory fitness, flexibility, muscular strength, and endurance before and after a yoga intervention period.

2. Methodology

The study employs a quasi-experimental design, focusing on teaching fitness yoga to female college students. It combines yoga postures with health fitness knowledge. The aim is to explore the impact of fitness yoga on health fitness and provide guidance for college students' well-being.

2.1. Research Design

The research was conducted at Guangdong Jiangmen Chinese Medicine College, China, and the National Student Physical Fitness Testing Center in Guangdong Province. 35 female college students without yoga experience volunteered for 8 weeks of fitness yoga training, attending twice a week for 80 minutes each. Before and after the experiment, students' health and fitness indicators were tested. The study follows a single-blind experiment, with students unaware of the program's content. Fitness yoga content includes warm-up, basic poses, and relaxation techniques.

2.2. Research Instruments

In this study, various tests were conducted to assess

different aspects of physical fitness. Body Mass Index (BMI) was used to measure body composition, while cardiorespiratory fitness was evaluated through the 800-meter running test and lung capacity measurement. Muscle fitness was assessed using the 1-minute sit-up test, and flexibility fitness was measured with the sit and reach test.

The tests were conducted in accordance with national standards for physical fitness and health testing, with trained professionals from the Physical Fitness Testing Center overseeing the process. Subjects received theoretical instruction and test training to minimize measurement errors. The health fitness test was conducted at the beginning and end of the 8-week teaching period.

For the BMI test, weight and height measurements were used to calculate BMI according to the formula: $BMI = \text{weight} \div \text{height}^2$. Cardiorespiratory fitness was assessed using Vital Capacity, with subjects exhaling into a mouthpiece until all gases were expelled. Muscle fitness was evaluated through the 1-minute sit-up test, and flexibility was measured using the sit and reach test, which assessed mobility in the torso, hip, and lumbar spine joints.

Testing equipment and methods were standardized, ensuring accuracy and reliability of the experimental data. Each test was carefully explained to the subjects, who wore lightweight, close-fitting sportswear during testing for optimal performance.

2.3. Data Gathering and Treatment

The researcher will obtain approval from school authorities to use college students and facilities for the study. Upon approval, the experimental process will begin, with the researcher providing essential details such as date, time, and location. Participants will be briefed on their roles, and health and fitness tests will be conducted according to standardized protocols.

This study utilized Excel and SPSS26.0 software for statistical analysis. Test data on health and fitness indicators pre- and post-experiment will undergo analysis using frequency, percentage, weighted mean, standard deviation, and paired t-tests. The effect of fitness yoga teaching on female college students' health and fitness will be analyzed. Results will be presented as mean \pm standard deviation, with

significance levels of $P < 0.01$ indicating very significant differences, $P < 0.05$ indicating significant differences, and $P > 0.05$ indicating no significant differences.

3. Results

3.1. Physical Fitness level Before Intervention

Table 1. Level of Physical Fitness Prior to Intervention

Category	Test	Mean	SD
Body Mass Index	BMI (kg/m ²)	19.37	2.13
Cardiopulmonary Fitness	Vital Capacity (ml)	2484.49	368.55
	Running - 800 meters (seconds)	258.46	16.57
Muscular Fitness	Standing Leap (cm)	163.77	14.10
	One-Minute Sit-Ups (reps)	35.77	4.91
Flexibility	Sit-and-Reach (cm)	20.14	5.02

Table 1 provides an overview of the initial physical fitness level of female university participants before the intervention. It categorizes various fitness aspects, including Body Mass Index (BMI), Cardiopulmonary Fitness, Muscular Fitness, and Flexibility. The data shows mean scores and standard deviations for each test. Notably, participants exhibited a consistent BMI around 19.37 kg/m². Cardiopulmonary Fitness, measured by Vital Capacity and an 800-meter run, displayed moderate variability and relatively uniform performance, respectively. Muscular Fitness tests, Standing Leap and One-Minute Sit-Ups, indicated consistent jumping ability and abdominal strength across the group. Flexibility, assessed by the Sit-and-Reach test, showed a wider range of levels. These findings establish a baseline for participants' fitness levels pre-intervention, essential for assessing subsequent changes.

Table 2. Status of Fitness Yoga Training Prior to Intervention

Category	Tests	Mean	SD
Regulation of Breathing Method	Deep Breathing Test	19.91	1.50
Fitness and Stability of Core Muscles	Elbow Plank (seconds)	40.31	8.84
Flexibility and Balances	Splits (cm)	13.49	5.00
	Trendelenburg Test (seconds)	18.97	2.99
Fat Content and Body Mass	Waist-Hip Ratio	0.70	0.02

Table 2 outlines participants' fitness status before engaging in yoga training. It evaluates Regulation of Breathing Method, Fitness and Stability of Core Muscles, Flexibility and Balances, and Fat Content and Body Mass. The Deep Breathing Test revealed uniform breathing regulation abilities among participants. Core Muscle Fitness, assessed by the Elbow Plank test, showed some variability. Flexibility, measured by the Splits and Trendelenburg Test, indicated moderate flexibility levels and consistent balance abilities, respectively. The Waist-Hip Ratio showed highly consistent body composition among participants. These baseline

measures provide insight into participants' health and fitness before yoga training, crucial for evaluating intervention effects.

3.2. Result of Fitness Yoga Training on level of Female University Students After 8 weeks of Fitness Yoga Exercise

Table 3. Level of Physical Fitness Post Intervention

Category	Test	Mean	SD
Body Mass Index	BMI (kg/m ²)	19.15	1.63
Cardiopulmonary Fitness	Vital Capacity (ml)	2839.43	230.10
	Running - 800 meters (seconds)	258.74	16.46
Muscular Fitness	Standing Leap (cm)	165.34	13.72
	One-Minute Sit-Ups (reps)	37.49	4.29
Flexibility	Sit-and-Reach (cm)	23.74	4.01

Table 3 illustrates the physical fitness levels of female university participants following an 8-week fitness yoga program. The data shows improvements across various categories, including Body Mass Index (BMI), Cardiopulmonary Fitness, Muscular Fitness, and Flexibility. While BMI slightly decreased, Cardiopulmonary Fitness, indicated by increased Vital Capacity and relatively stable running performance, showed significant enhancement. Muscular Fitness tests displayed improvements in both jumping ability and abdominal strength, while Flexibility notably increased post-intervention. Overall, the results demonstrate positive changes in participants' physical fitness levels after completing the yoga training program.

Table 4. Status of Fitness Yoga Training Post Intervention

Category	Tests	Mean	SD
Regulation of Breathing Method	Deep Breathing Test	18.20	1.18
Fitness and Stability of Core Muscles	Elbow Plank (seconds)	47.51	5.22
Flexibility and Balances	Splits (cm)	8.40	3.40
	Trendelenburg Test (seconds)	22.49	2.72
Fat Content and Body Mass	Waist-Hip Ratio	0.69	0.03

Table 4 presents the fitness yoga training outcomes of the same group post-intervention. The Regulation of Breathing Method category indicates improved breathing efficiency, reflecting a key aspect of yoga practice. Core Muscle Fitness notably improved, as evidenced by increased Elbow Plank durations and reduced variability. Flexibility and Balances improved, with participants achieving better splits and balance performances. Additionally, there was a positive shift in Fat Content and Body Mass, suggesting healthier body composition changes. These findings underscore the beneficial effects of fitness yoga on core stability, flexibility, balance, and body composition among participants. Similar results were found by other researchers, affirming the

significance of fitness yoga interventions in enhancing overall physical health and well-being.

3.3. Difference in the Level of Physical Fitness Status before and after and the Yoga Fitness experience

Table 5. Comparison of Pretest and Posttest Level of Physical Fitness

Physical Fitness Test	Pretest	Posttest	Mean Difference	T-Value	P-Value	Interpretation/ Decision
BMI	19.37	19.15	0.22	2.24*	0.03	Significant/ Reject H0
Vital Capacity	2484.49	2839.43	-354.94	-10.43*	0.00	Significant/ Reject H0
Running - 800 meters	258.46	258.74	-0.29	-0.90	0.37	Not significant/ Accept H0
Standing Leap	163.77	165.34	-1.57	-2.84*	0.01	Significant/ Reject H0
One-Minute Sit-Ups	35.77	37.49	-1.71	-6.91*	0.00	Significant/ Reject H0
Sit-and-Reach	20.14	23.74	-3.60	-11.32*	0.00	Significant/ Reject H0

*Significant at .05

The comparative analysis presented in Table 5 examines the differences in physical fitness status before and after a yoga fitness intervention. The table outlines various physical fitness tests, including BMI, vital capacity, running endurance, muscular strength, and flexibility, detailing the mean scores, mean differences, T-values, P-values, and interpretation of results.

For BMI, there was a significant decrease post-intervention, indicating improvements in body composition. Vital capacity showed a notable increase, reflecting enhanced cardiopulmonary fitness. While running endurance did not show significant changes, tests for muscular strength and flexibility demonstrated significant improvements post-intervention.

Table 6. Comparison of Pretest and Posttest Status of Fitness Yoga

Physical Fitness Test	Pretest	Posttest	Mean Difference	T-Value	P-Value	Interpretation/ Decision
Deep Breathing Test	19.91	18.20	1.71	5.329*	.000	Significant/ Reject H0
Elbow Plank (seconds)	40.31	47.51	-7.20	-5.675*	.000	Significant/ Reject H0
Splits (cm)	13.49	8.40	5.09	9.618*	.000	Significant/ Reject H0
Trendelenburg Test (seconds)	18.97	22.49	0.01	2.472*	.019	Significant/ Reject H0
Waist-Hip Ratio	0.70	0.69	1.71	5.329*	.000	Significant/ Reject H0

*Significant at .05

In contrast, Table 6 presents a comparative analysis of pretest and posttest status of fitness yoga. Tests include deep breathing, core muscle stability, flexibility, balance, and body composition. All tests showed significant improvements post-intervention, with strong statistical significance across the board.

The results underscore the positive impact of both the yoga fitness intervention and fitness yoga training on participants' physical fitness. Significant improvements were observed in breathing regulation, core muscle stability, flexibility, balance, and body composition, indicating the effectiveness of the interventions in enhancing various aspects of physical health and well-being.

These findings align with previous research demonstrating the beneficial effects of yoga exercise on cardiorespiratory function, balance, flexibility, stress relief, and overall physical fitness. Therefore, the interventions offer promising strategies for improving physical health and fitness among college students.

3.4. Insights/ Observation of Participants in Yoga Class involvement

Table 7. Reason for Joining Fitness Yoga Class

Options	Frequency	Percentage
Invigorate health effectively	7	20.00
Coping with stress	7	20.00
Get in shape and lose weight	14	40.00
Increase flexibility	7	20.00
Total	35	100.00

Table 7 provides insights into the motivations of 35 individuals who joined a fitness yoga class. The reasons for participation include invigorating health (20%), coping with stress (20%), getting in shape and losing weight (40%), and increasing flexibility (20%). These motivations reflect a diverse range of goals, with physical fitness and stress management being predominant.

Table 8. Perceived Benefits of Fitness Yoga Class (Multiple Response)

Options	Frequency
Body composition (BMI)	10
Cardiopulmonary Fitness	23
Flexibility	32
Muscular Fitness	18
Sensitive quality	13
Balanced quality	18

Table 8 outlines the perceived benefits of the fitness yoga class among participants. The most commonly acknowledged benefits include flexibility (32 participants), cardiopulmonary fitness (23 participants), and muscular fitness (18 participants). This highlights the multifaceted benefits of yoga beyond just flexibility, encompassing aspects of cardiovascular and muscular health.

Table 9. Satisfaction with Schedule of Fitness Yoga Class

Options	Frequency	Percentage
Greatly satisfied	22	62.85
Fairly satisfied	12	34.29
Generally Satisfied	1	2.86
Total	35	100.00

Table 10. Difficulty of Fitness Yoga Class

Reasons	Frequency	Percentage
Very easy	1	2.86
Comparatively simple	5	14.29
Moderation	25	71.43
Rather difficult	4	11.42
Total	35	100.00

Table 11. Satisfaction with Teaching Content of Fitness Yoga Class

Reasons	Frequency	Percentage
Greatly satisfied	17	48.57
Fairly satisfied	18	51.43
Total	35	100.00

Regarding satisfaction, Table 9 indicates that the majority of participants (62.85%) are greatly satisfied with the class schedule, while Table 10 shows that most participants (71.43%) find the class difficulty to be moderate. Additionally, Table 11 demonstrates high levels of satisfaction with the teaching content, with nearly half of the participants greatly satisfied and the other half fairly satisfied.

Table 12. Satisfaction with the Instructor of Fitness Yoga Class

Options	Frequency	Percentage
Greatly satisfied	23	65.71
Fairly satisfied	11	31.43
Generally Satisfied	1	2.86
Total	35	100.00

Table 13. Content of Fitness Yoga Class Meeting Expectation

Options	Frequency	Percentage
Completely conform	11	31.43
Relatively match	22	62.86
Generally meet	2	5.71
Total	35	100.00

Participants also express high satisfaction with the instructor, as shown in Table 12, with 65.71% greatly satisfied and 31.43% fairly satisfied. Furthermore, Table 13 reveals that the fitness yoga class content generally meets or exceeds the expectations of the majority of participants, with 62.86% feeling that it relatively matches their expectations.

Table 14. Continuing Fitness Yoga Class

Options	Frequency	Percentage
Yes	32	91.43
No	3	8.57
Total	35	100.00

Table 15. Preferred Mode Fitness Yoga Class

Options	Frequency	Percentage
Offline course	30	85.71
Online course	3	8.57
AI Body Sensation Yoga	2	5.72
Total	35	100.00

The overwhelming majority of participants (91.43%) intend to continue with the fitness yoga class, as indicated in Table 14. Moreover, Table 15 shows a clear preference for offline courses (85.71%), suggesting a preference for in-person learning over online or AI-enhanced options.

Table 16. Length of Time Doing Yoga

Options	Frequency	Percentage
Under 30 minutes	6	17.14
30-60 minutes	15	42.86
1-2 hours	14	40.00
Total	35	100.00

Table 17. Awareness on the Coordination of Postural Movements

Options	Frequency	Percentage
Attention Action	7	20.00
Focus on breathing	3	8.57
Coordinate your movements with your breathing	25	71.43
Total	35	100.00

In terms of practice duration, participants generally spend between 30 minutes to 2 hours on yoga sessions, as shown in Table 16, reflecting a commitment to incorporating yoga into their routines. Finally, Table 17 indicates that most participants (71.43%) are aware of coordinating their movements with their breathing during yoga practice, highlighting the importance of breath-body connection in their practice.

Overall, these observations underscore the positive experiences and perceived benefits of participants in the fitness yoga class, indicating a high level of satisfaction, commitment, and engagement with the practice.

4. Findings and Discussion

4.1. Summary of Findings

4.1.1. Health Fitness and Yoga Fitness Status prior to Intervention

Before any intervention, a thorough assessment of participants' health and fitness status was conducted. This assessment aimed to provide a comprehensive overview of the group's fitness levels, encompassing parameters such as Body Mass Index (BMI), cardio-pulmonary fitness, muscular fitness, and flexibility. The findings revealed minimal variability across most categories, indicating a relatively homogeneous group in terms of physical fitness. However, standard deviations were noted to understand the range of abilities within each test, essential for interpreting subsequent intervention results.

4.1.2. Fitness Yoga Status before Intervention

Similar to the health fitness assessment, the study examined participants' fitness yoga status before any intervention. This pre-intervention snapshot offered valuable insight into participants' baseline fitness levels, laying the groundwork for evaluating the impact of the subsequent yoga intervention. Again, minimal variability was observed among participants, reinforcing the notion of a relatively homogeneous group in terms of physical fitness. This baseline assessment provided essential context for interpreting post-intervention results.

4.1.3. Statistical Comparison between Pretest and Posttest Physical Fitness and Fitness Yoga Measurements

Following the establishment of baseline fitness levels, the study conducted a detailed statistical comparison between pretest and posttest physical fitness and fitness yoga measurements. Various physical fitness tests were subjected to statistical scrutiny, including BMI, vital capacity, running performance, muscular strength, and flexibility. Through meticulous examination of mean differences, T-values, P-values, and the rejection or acceptance of null hypotheses, researchers identified notable improvements post-intervention, particularly in areas such as cardiopulmonary fitness, muscular strength, and flexibility.

4.1.4. Observations of Participants in Joining Yoga Class

Qualitative insights and observations regarding participants' motivations for joining yoga classes and their experiences post-intervention were also explored. Through surveys and interviews, researchers gained valuable insights into participants' reasons for engaging in yoga, perceived benefits, satisfaction levels with various aspects of the yoga program (such as scheduling, teaching content, and instructor quality), and intentions to continue practicing yoga in the future. These qualitative findings provided rich context and nuanced understanding, complementing the quantitative data.

4.2. Conclusion

Firstly, the standard requirements for physical health and fitness yoga are clearly outlined, providing a basis for experimental procedures. Secondly, the comparison between pre- and post-intervention measures indicates significant improvements in all physical fitness tests related to the yoga intervention. Thirdly, integrating health fitness tests into the monitoring and intervention of students' physical health can enhance efficiency and accuracy, while incorporating fitness yoga as an intervention aligns with the goals of "Healthy China" by promoting health invigoration, stress management, and increased flexibility. Finally, the motivations for joining yoga classes reflect common perceived benefits, highlighting a balanced set of expectations among participants.

Table 18. Develop an overall goal communication plan

AREAS	Specific Objectives	Strategies	Persons Involved	Time Frame	Budget	Expected outcome
Stimulate Enthusiasms of down to top level management	To provide Psychological environment for reasonable promotion of Fitness Yoga	Engolve potential staff in orientation meetings, Recognize early successful fitness Yoga staff practitioners who bring honors to the school and a object of tribute form alumni, parents and management Provide incentives and benefits to yoga pioneers.	Fitness Yoga teacher, Coaches, Community celebrity Practicing yoga,	monthly	500k yuan	Increased membership Who are satisfied and continue to stay in school
Enrich Health fitness And Yoga training content	To revisit and review PE curriculum, that may foster enrichment on its content or after classes activity that could be legitimized for credits, particularly for those who are working.	Benchmark, Do school visits and enroll in Yoga class that attract a lot of attendees. Observe their methods and strategies. Provide support for a recital on students creativity on various Yoga styles.	Senior Yoga students, Yoga enthusiast, Yoga Expert	End of term break	50K yuan	Increased Yoga enthusiast
Management support	To orient milestone of Fitness yoga development To school and community.	Invite Management representatives to one of the practice sessions or class activities. Be seen and heard in one of much celebrated Yoga fitness gatherings Use social media to disseminate School activities for increased viewership in China network. Participation for demonstration and exhibition of Yoga club in cultural affairs activities.	School managers, Fitness yoga teachers, Senior Yoga students	End of term activities	50k yuan	Supportive school management, Expanded membership

4.3. Recommendation

Based on the findings and conclusions drawn, recommendations are proposed as follows:

Given the study's alignment with the objectives of "Healthy China," governmental support is crucial to reinforce regulatory oversight and clarify leadership roles within educational institutions.

To ensure ethical recruitment and maximize anticipated benefits, rigorous supervision of youth involvement is imperative, necessitating standard protocols and clear delineation of responsibilities.

Efforts should focus on developing scientifically grounded teaching methodologies tailored to the specific needs of college students, particularly females, thereby capitalizing on emerging opportunities.

Expanding the study to include male participants in yoga programs can enrich talent pools and provide a more comprehensive understanding of yoga's impact.

Adopting a competitive approach can enhance the study's influence and broaden its reach.

Integration of technology into yoga training can elevate performance standards, offering high-quality experiences accessible anytime, anywhere, thereby contributing to China's economic growth.

5. Enhancement Program of Fitness Yoga for “Healthy China”

5.1. Rationale

After reflecting on the development of fitness yoga in schools from a health perspective, it's crucial to analyze its relationship with stakeholders such as the government, social organizations, the market, and enthusiasts. Understanding grassroots factors and aligning with "Healthy China" goals requires a comprehensive plan for youth training. This plan must address resistance factors to ensure successful implementation of fitness yoga for overall well-being.

5.2. General Objectives:

Stimulate the work enthusiasm of the persons involved in the plan.

Provide enriching content and strategies with competition elements to improve the level of Yoga as a sport or a health fitness entity.

Enlist support from the management and grassroots level in the school and use the students to spread the good news to the community, to nation and the world.

5.3. Plan of Implementation

The researcher maybe task to implement the Plan of Activities for The Fitness Yoga, in coordination with the PE department.

The involved persons shall be decided with the management in order to establish collegial atmosphere in the locale.

Initial meetings can be held with policies, responsibilities and calendared activities be congruent with the campus wide activities to ensure coordinated and collaborative scheme for order and support.

Regular meetings be held presided by school designate staff and later they can work independently from the proposed plan of Fitness yoga innovations.

Budget allotment be of primary consideration for the plans to get going.

Reports or progress report be part of a yearly accomplishment report to ensure its continuity.

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