Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol 13: Issue 3
Open Access

Effect of Yoga and Core Exercise on Abdominal Endurance, Flexibility and Weight Management in Overweight College Women

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Cite this paper as: Dibyendu B Samanta, Anindya Bhowmik, Sandeep Kumar (2024) Effect of Yoga and Core Exercise on Abdominal Endurance, Flexibility and Weight Management in Overweight College Women. *Frontiers in Health Informatics, 13* (3), 9963-9973

Abstract
Obesity is a common health issue, and it is becoming more visible globally. The physical activity or exercise will take place as first priority for lifestyle strategies rather than only in dieting. The study objectives were to find out effect of yoga and core exercise on flexibility, abdominal endurance, BMI and waist hip ratio in overweight or obese college women, and second was to compare the effects between yoga and core exercise on the variables in overweight or obese college women. The study was a 12 weeks randomized controlled study design. Total 60 overweight and obese college level women participants were engaged followed by BMI ranged 23-29.5 kg /mt^2. They were randomly divided in three groups yoga, core exercise and control groups. Under an expert supervisor interventions of yoga asanas and core exercise were performed continued for 12 weeks. The abdominal endurance, flexibility, BMI and waist hip ratio were measure initial day (Baseline) and just after of 12 weeks intervention. Study showed significant improvement in abdominal endurance, flexibility, BMI and waist hip ratio in overweight or obese college women in yoga group as well as core exercise group ($p<0.05$), whereas comparative result revealed flexibility was better improved in yoga group than core exercise and other variables were similar effects in yoga and core exercise intervention ($p<0.05$).The both yoga and core exercise methods were effective in abdominal endurance, flexibility improvement and in weight management in overweight and obese women. Yoga training was more effective in flexibility improvement.

Keywords*: Flexibility, Abdominal endurance, Weight management, Yoga, Core exercise, Obesity.*

Introduction

Obesity is a common health issue and it is becoming more visible globally (1).In India overweight and obese trends in the last fifteen years shows increasing from 12.6% to 24% among women and 12.6% to 24% among

males of 15 to 49 years (2). Obesity is primarily caused by a long-term energy imbalance between the ratio of calories consumed to calories expended. It cannot be assigned in a single factor such as overeating. Bases on its risk factors it can be classified in difference grouped such as physical activity, environmental, food consumption, food production, individual psychology and social psychology (3,4). Evident shows obesity increase chronic, low grade, inflammatory state, that equally effect to vascular dysfunction, metabolic dysfunction multiple organ damage and thrombotic disorders. When in reduced 5 to 10 % from total body weight it lead to chance of positive outcomes on health and wellbeing (5). Moreover obesity addresses to joint pain and disorder and also impairment of social and psychological health (6).

The physical activity or exercise will be take place as first priority for lifestyle strategies rather than only in weight loss. In concept of exercise there are no specific recommendation mentioned on type and intensity of exercise. Evident shows regular physical exercise increased physical fitness of obeys individuals (7), sedentary working women (8).Different form of physical exercise having various intensity leading in good for body weight, body fat percentage, lipid profiles, and adipokines of obese (9). Study shows aerobic exercise combination with resistance improved body fat percentage such as total body fat, trunk fat, leg fat, cardiac fitness and muscular fitness of obeys women's (10).

Yoga means union, a popular exercise that combines precise Asanas, Pranayama, and Dhyana or meditation. Asana is defined as physical postures, innumerable postures are present in asanas practises (11). Suryananaskar was equal effective like's circuit training and treadmill waking for weight and physical fitness management (12). The hatha yoga intervention at office place improved musculoskeletal fitness variables push-up, side-bridge and flexibility, and psychological indices state and trait anxiety, quality of life and job satisfaction (13).Hatha yoga addresses positive and healthy metabolic and inflammatory indicators of healthy female adults (14). The muscles such as the spinal, pelvic, and abdomen are called core muscle. This all muscles give strength and power to the entire body (15). Core exercise addresses increased of trunk muscle power, endurance (16) and also spinal stability, hip mobility, and dynamic balance (17).Dynamic balance and flexibility were significantly improved after core exercise among sedentary male and females having normal BMI (18).

Therefore, the first objective of present study was to investigate the effect of yoga and core exercise on abdominal endurance, flexibility, BMI and waist hip ratio of overweight or obese college women. The second objective was to find out comparatively better exercise between yoga and core exercise for the selected variables of the participants.

Methodology

Participants and Study Design

The study was conducted at the Debra Thana Sahid Kshudiram Smriti Mahavidyalaya, located at Debra block in Peaschim Medinipur district in West Bengal. Total 60 overweight women participants were engaged from the various department of Debra Thana Sahid Kshudiram Smriti Mahavidyalaya. Sampling method was purposive, that was set up for the present purpose. Following criteria was followed for participant's selection 1. Women participants age ranged 19 to 24 years, 2. BMI of 23-29.5 kg/m^2 (risen of WHO recommendation BMI classification for Asian peoples) (19).3. Verbal consent of voluntarily participation in the study was taken from all the subjects, and also the verbal consent regarding serious illness in last 3 month was the excluding criteria in the study.

The study was a 12 weeks randomized controlled study design. Selected subjects were randomly engaged into three groups such as yoga group, core group and control group, where n=20 participants in each groups. Yoga and core groups were performed asanas and core exercises as per interventions and control group did not perform any kind of exercise intervention during this period.

The target sample size was 20 participants in each group. Authors confirmed through the reviewed of related trial

of this intervention where target sample size described in the clinical trial's 20 participants for each group.

Assessment of Variables

The first assessment was conducted initial day of the training intervention and second assessment was just after 12 weeks as post data.

Abdominal Endurance (Sit-ups test)

Abdominal endurance assessed used of sit-ups (bent knee) knee (20). The subject asked to performer curl up (sit-up) to touch the elbows of the respective knees and return to lying position. The lying position was flexed her knees less than 90^0 with feet flat on floor approximate 12 inches gap between heels and buttock. The fingers interacted and placed behind of the neck. Sit-ups performed as many times as possible. The every correct attempted were recorded as her scores.

Flexibility

The sit and reach test was conducted for flexibility assessment. Sit and reach test box was used as an aperture. The Wells & Dillon, 1952described procedure for this assessment was followed (21).Subject sit on floor barefoot with against the horizontal cross board of the apparatus, the legs were fully extended. The arms evenly stretched and palms down on the box. The subjects were asked to bend and reach as far forward as possible along the scale with the fingertips and that time instruction was given not to bounce and to hold the position over for one second. Within three appropriate trails highest distance to the nearest 0.5 cm. was recorded as score of the assessment

Body Mass Index (BMI)

BMI was assessed used the formula subjects weight in kg divided by height in metre. In weight and heightmeasurement standard procedure was followed (22).

Waist to Hip Ratio (WHR)

Waist to hip ratio defines proportion of fat storage in the body around the waist and hip. The waist to hip ratio measured used by the calculation waist circumference / hip circumference. Waist circumference and hip circumference was measured followed by standard methods (23).

Intervention

The participants of yoga group were performed asanas and core group were core exercises of 45 minutes in duration, 3 times in per weeks for the 12 weeks period under the supervision of an expert whereas control group were casual in their daily life. The yoga intervention shows in table -1 and core exercises in table – 2.

Table 1 Yoga intervention which was repeated throughout 12 weeks

Yoga Asanas	Duration	Day
Suryanamaskar	10 minutes	Monday
Tadasana	03 minutes	Wednesday
Trikonasana	03 minutes	Friday
Vrkasana	03 minutes	(Time: 4:00 pm
Padahasthasana	03 minutes	to 4:45 pm, every
Bhujangasana	03 minutes	day)
Paschimottanasana	03 minutes	
Ustrasana	03 minutes	
Navasana	03 minutes	
Dhanurasana	03 minutes	
Halasana	03 minutes	
Savasana	05 minutes	

Table 2 Core exercise intervention which was repeated throughout 12 weeks

Core Exercises	Duration	Day
Warm up	10 minutes	Tuesday
Plank	03 minutes	Thursday
Plank push- up hold	03 minutes	Saturday
Crunch	03 minutes	(Time: 4:00 pm
Bird dog plank, opposite arm and leg (left leg & right arm)	03 minutes	- 4:45 pm, every day)
Bird dog plank, opposite arm and leg (right leg & left arm)	03 minutes	
Mountain climber	03 minute	
Plank Jacks	03 minute	
Side Plank (left elbow on floor)	03 minute	
Side Plank (right elbow on floor)	03 minute	

Flutter kicks or leg flutters	03 minute
Cool down	05 minute

Data Analysis

All data were analysed in MS Excel and presented as mean ± standard deviation. Dependent t-test was analysed to compare betweenbaseline and 12 weeksdata. ANOVA followed by post hoc test was analysed to compare among the groups post data as well as baseline data of post intervention significant groups. The $p < 0.05$ was considered as statistical significant.

Result

The all participants were attended all the intervention sessions. Their baseline characteristics of the selected variables were represents in table 3.

Table 3 baseline characteristic of variables of all groups

Parameters	**Yoga group**	**Core group**	**Control group**	**F**	**P (p<0.05)**
Age (year)	21.95 ± 1.7	22.3 ± 1.3	22 ± 1.4		
Weight (kg)	64 ± 1.05	65 ± 2.2	65 ± 1.08	3.8	0.03
BMI (kg/mt^2)	25.5 ± 1.2	26.5 ± 0.3	26.24 ± 1.1	3.54	0.03
Waist hip ratio (cm)	0.74 ± 01	0.79 ± 0.08	0.78 ± 0.07	2.67	0.07
Abdominal endurance (no. of repetitions)	7.1 ± 1.4	7.1 ± 1.1	7.4 ± 1.4	0.28	0.75
Flexibility (cm)	8.3 ± 1.2	6.7 ± 1.4	6.9 ± 1	10.04	0.00

The ANOVA analysis of baseline data revealed weight, BMI and flexibility were significant difference among

three groups yoga, core and control and waist hip ratio and abdominal endurance were insignificant difference among the groups.

Table 4 Comparison between baseline and post intervention

Variable	Baseline (mean±sd)	Pot Intervention (mean±sd)	T	p value p<0.05
Yoga Group				
Abdominal endurance	7.1 ± 1.4	9.5 ± 1.6	8.2	0.00
Flexibility	8.3 ± 1.2	10.4 ± 1.6	7.1	0.00
BMI	25.5 ± 1.2	24.7 ± 0.9	3.9	0.00
Waist hip ratio	0.74 ± 01	0.69 ± 0.01	4.11	0.00
Core Group				
Abdominal endurance	7.1 ± 1.1	9.1 ± 1.3	5.9	0.00
Flexibility	6.7 ± 1.4	8.7 ± 1.8	7.7	0.00
BMI	26.5 ± 0.3	25.3 ± 0.2	4.7	0.00
Waist hip ratio	0.79 ± 0.08	0.73 ± 0.01	6.5	0.00
Control Group				
Abdominal endurance	7.4 ± 1.4	7.6 ± 1.3	0.65	0.25
Flexibility	6.9 ± 1	7.3 ± 1.3	1.3	0.97
BMI	26.24 ± 1.1	26.27 ± 1.1	1.1	0.14
Waist hip ratio	0.78 ± 0.07	0.78 ± 0.01	1.5	0.06

Table 5 ANOVA result of post interventions

Variable	Yoga Group	Core Group	Control Group	F	P P<0.05	Post hoc
Abdominal endurance	9.5 ± 1.6	9.1 ± 1.3	7.6 ± 1.3	8.31	0.00	Yoga=core, Yoga>control, Core>control
Flexibility	10.4 ± 1.6	8.7 ± 1.8	7.3 ± 1.3	19.45	0.00	Yoga>core, Yoga>control Core>control
	24.7 ±	25.3 ±				

BMI	0.9	0.2	26.27 ± 1.1	11.28	0.00	Yoga=core, Yoga>control, Core>control
Waist hip ratio	0.69 ± 0.01	0.73 ± 0.01	0.78 ± 0.01	11.27	0.00	Yoga=core, Yoga>control, Core>control

Effect on Abdominal endurance

Abdominal endurance showed significant improved in yoga group (t=8.2, p=0.00) and also core exercise group (t=5.9, p=0.00) in post intervention compare to baseline. Control group was insignificant difference between baseline and post intervention (t=0.65, p=0.25) between baseline and post intervention (Table 4). The comparative result of ANOVA analysis between yoga and core exercise intervention showed there was no significant difference. Both training were similar effect on abdominal endurance (Table 5).

Effect on Flexibility

There was significant difference in flexibility compared between post intervention and baseline of yoga group (t=7.1, p=0.00) and core exercise group ((t=7.7, p=0.00). Both training interventions significantly improved flexibility. However flexibility of control group was insignificant difference between baseline and post intervention (t=1.3, p=0.97) between baseline and post intervention (Table 4). The comparison between 12 weeks yoga and core exercise training interventions noted yoga was more significantly improved flexibility compare to core exercise (table 5).

Effect on BMI

Post 12 weeks yoga and core exercise training interventions, significant reduction observed in BMI in yoga group (t=3.9, p=0.00)and core exercise group (t=4.7, p=0.00). Whereas in control group it was observed not significant changed (t=1.1, p=0.14) after 12 weeks (Table 4). Post 12 weeks training interventions comparative result of ANOVA analysis (Table 5) addresses there was no significant difference, both 12 weeks training weresimilar effect on BMI.

Effect on Waist hip ratio

There was significantly reduced in waist hip ration in post intervention compare to baseline of yoga group (t=4.11, p=0.00) and core exercise group ((t=6.5, p=0.00). However waist hip ratio of control group was insignificant difference between baseline and post intervention (t=1.5, p=0.06) between baseline and post intervention (Table 4). The comparative result of ANOVA analysis noted there was no significant difference. Both 12 weeks training intervention were similar effect on waist hip ratio (table 5).

Discussion

The WHO recommended specific BMI classification for the Asian peoples due to their tendency to store excess fat in the belly with lower body mass index. Where the BMI range of 23 kg/mt^2 is considered overweight. In present study we examined the effect of yoga and core exercise on flexibility, abdominal endurance, BMI and waist to hip ratio of overweight women and compared the effects between yoga and core exercise.

The findings revealed significantly improved in abdominal endurance and flexibility, significantly reduced in BMI, waist to hip ratio of overweight women after 12 weeks yoga intervention and as well as core exercise intervention. The comparative effect between two training interventions revealed flexibility was significantly more improved in yoga group than in core exercise group, whereas abdominal endurance, BMI and waist to hip

ratio were similar effect between yoga and core exercise interventions.

The previous studies findings are in line with these findings, which defined aged women with continue yoga practices demonstrated better flexibility rather than non-yoga practices (24).Ten weeks hatha yoga intervention for healthy novice women of average aged 22 years, BMI 21.59 kg/mt2 directed improvements in balance, flexibility and core muscle strength but BMI, body fat percentage, resting HR and HRV longer were no changed in same time (25).Yogic exercises intervention among obey females of BMI ranged 23 to 29.9 kg/m2 addressed BMI and body fat mass reduced significantly (26).A randomized controlled trial stated yoga practices in obese males significant effects on anthropometric parameters weight, body mass index, mid upper arm circumferences of left and right arm, waist circumference, hip circumference, waist hip ratio and body fat percentage as well as psychological factors (27).

In an early study of six weeks core strength training noted improvement in flexibility and dynamic balance on sedentary male and female (18).Core training showed significant improvement in abdominal strength, endurance, flexibility in school aged athletes, and comparatively core training was better for flexibility development rather than weight training whereas weight training was better for abdominal strength and endurance development (28).The BMI, waist circumference, waist hip ratio, muscle mass, gait speed and chair stand significantly improved after aerobic and core training along with low calories diet in aged obey women (29).A comparative randomized trail suggested yoga and walking exercise interventions individually benefited to reduce obesity indicated parameters along with postural stability, hand grip strength in obeys women (30).A six weeks interventions addressed yoga asana was better results in

Waist circumference, waist hip ratio and body mass index compared to walking intervention, however except waist hip ration in walk group other variables were significantly improved due to yoga and walking (31).

Conclusion

The study concluded that 12 weeks yoga and core exercise training were effective in improvement in abdominal endurance, flexibility and in weight control of overweight college women. Yoga was better significant improvement in flexibility compare to core exercise and whereas both training were similar effects on abdominal endurance, BMI and waist hip ratio.

Acknowledgements

The authors would like to acknowledge all the participants of this research.

Funding sources

Self-Funded

Ethical Approval

The Departmental Academic Integrated Panel (DAIP) of Department of Physical Education, Swami Vivekanand Subharti University approves the research paper under the core of Practices Governing the EthicalConduct of Research.

References

1. World Health Organization. Obesity: Preventing and Managing the Global Epidemic. Report of a WHO Consultation Presented at: The World Health Organization. Geneva, Switzerland: Publication Flutter Kicks or Leg Flutters WHO/NUT/NCD/98.1;1997.

2. Singh G, Agrawal R, Tripathi N, Verma A. Overweight and obesity, the clock ticking in India? A secondary analysis of trends of prevalence, patterns, and predictors from 2005 to 2020 using the National Family Health Survey. Int J Non-Commun Dis 2023;8:31-45.

3. Lin X, Li H. Obesity: Epidemiology, Pathophysiology, and Therapeutics. Flutter Kicks or Leg Flutters Front. Endocrinol. 2021Sep 6:12:706978. doi: 10.3389/fendo.2021.706978.

4. Masood B, Moorthy M. Causes of obesity: a review. Clinical Medicine. 2023 Jul;23(4):284-291. doi: 10.7861/clinmed.2023-0168.

5. Fruh SM. Obesity: Risk factors, complications, and strategies for sustainable long-term weight management. Journal of the American Association of Nurse Practitioners. 2017 Oct;29(2017): S3–S14. doi: 10.1002/2327-6924.12510.

6. Djalalinia S, Qorbani M, Peykari N, Kelishadi R. Health impacts of obesity. Pak J Med Sci. 2015;31(1):239-242. Dio: http://dx.doi.org/10.12669/pjms.311.7033.

7. Van Baak MA, Pramono A, Battista F, et al. Effect of different types of regular exercise on physical fitness in adults with overweight or obesity: Systematic review and meta-analyses. Obesity Reviews. 2021 May;22(S4):e13239. https://doi.org/10.1111/obr.13239.

8. Ruiz Yaira B, Gonzalez Emilio V. Health-Related Physical Fitness Benefits in Sedentary Women Employees after an Exercise Intervention with Zumba Fitness®. Int. J. Environ. Res. Public Health. 2020 March**;** 17(8):2632. doi:10.3390/ijerph17082632.

9. Oh, D.-H.; Lee, J.-K. Effect of Different Intensities of Aerobic Exercise Combined with Resistance Exercise on Body Fat, Lipid Profiles, and Adipokines in Middle-Aged Women with Obesity. Int. J. Environ. Res. Public Health. 2023 Feb;23;20(5):3991. doi: 10.3390/ijerph20053991.

10. Wen HJ, Liu SH, Tsai CL. Effects of 12 weeks of aerobic exercise combined with resistance training on neurocognitive performance in obese women. Journal of Exercise Science & Fitness.2022 Oct;20(4):291-304.doi: 10.1016/j.jesf.2022.07.001.

11. Iyengar BKS. Light on Yoga. London: The Aquarian Press (1991)

12. Jakhotia KA, Shimpi AP, Rairikar SA, Mhendale P, Hatekar R, Shyam A, Sancheti PK. Suryanamaskar: An equivalent approach towards management of physical fitness in obese females. Int J Yoga.2015 Jan;8(1):27-36. doi: 10.4103/0973-6131.146053.

13. Cheema et al. Effect of an office worksite-based yoga program on heart rate variability: outcomes of a randomized controlled trial. BMC Complementary and Alternative Medicine.2013 Apr;10:13:82. doi:10.1186/1472-6882-13-82.

14. Chen N et al. Effects of 8-Week Hatha Yoga Training on Metabolic and Inflammatory Markers in Healthy, Female Chinese Subjects: A Randomized Clinical Trial.BioMed Research International. 2016 Aug;2016:2-12 dio: 10.1155/2016/5387258.

15. Yoon SD, Hun SD, Park GD. The effect of active core exercise on fitness and foot pressure in Taekwondo club students. J. Phys. Ther. Sci. 2015 Feb; 27(2): 509–511. doi: 10.1589/jpts.27.509.

16. Song BK, Han D, Brellenthin AG. et al. Effects of core strengthening exercise on colon transit time in young adult women. J ExercSci Fit. 2021 Jul;19(3):158-165. doi: 10.1016/j.jesf.2021.02.001.

17. Orgun E, Kurt C, Ozsu İ. The effect of static and dynamic core exercises on dynamic balance, spinal stability, and hip mobility in female office workers. Turk J Phys Med Rehab.2019 Dec 25;66(3):271-280. doi: 10.5606/tftrd.2020.4317.
18. Yakut H, Talu B. The effect of core strength training on flexibility and balance in sedentary healthy young individuals Balt J Health Phys Act. 2021;13(4):89-97.doi: 10.29359/BJHPA.13.4.09.

19. WHO/IASO/IOTF. The Asia-Pacific perspective: redefining obesity and its treatment. Health Communications Australia: Melbourne. 2000.

20. Rayes ABR, de Lira CAB, Viana RB, Benedito-Silva AA, VanciniRL, Mascarin N, Andrade MS. The effects of Pilates vs. aerobic training on cardiorespiratory fitness, isokinetic muscular strength, body composition, and functional tasks outcomes for individuals who are overweight/obese: a clinical trial. PeerJ.2019 Feb;7:e6022. doi: 10.7717/peerj.6022.

21. Wells KF, Dillon EK. 1952. The sit and reach_a test of back and leg flexibility. Research Quarterly for Exercise and Sport 23:115-118.doi: 10.1080/10671188.1952.10761965.
22. Johnson Barry L and Nelson Jack K (1988), Practical Measurements for Evaluation in Physical Education, Delhi: Surjeet Publications, (3ED).

23. Telles S, Naveen VK. Balkrishna A, Kumar S. Short term health impact of a yoga and diet change program on obesity. Med SciMonit. 2010 Jan;16(1):CR35-40.

24. Wong Sarah SS, Liu TW, Ng Mei S. Health status of aged women with or without the experience of practicing yoga. BMC Women's Health. 2023; 23:524. Available from:https://doi.org/10.1186/s12905-023-02586-8

25. Csala B, Szemerszky R, Körmendi J, Köteles F and Boros S. Is Weekly Frequency of Yoga Practice Sufficient? Physiological Effects of Hatha Yoga Among Healthy Novice Women. Front. Public Health.2021 Oct;9:702793. doi: 10.3389/fpubh.2021.702793.

26. Na Nongkhai MP, Yamprasert R, Punsawad C. Effects of Continuous Yoga on Body Composition in Obese Adolescents. Evid Based Complement Alternat Med. 2021 Aug; 25(2021):6702767. doi: 10.1155/2021/6702767.

27. Rshikesan PB, Subramanya P. Effect of Integrated Approach of Yoga Therapy on Male Obesity and Psychological Parameters-A Randomised Controlled Trial. Journal of Clinical and Diagnostic Research. 2016;10(10): KC01-KC06. doi: 10.7860/JCDR/2016/21494.8727.

28. Kumar R, Zemkova E. The Effect of 12-Week Core StrengtheningandWeight Training on Muscle Strength, Endurance and Flexibility in School-Aged Athletes. Appl. Sci. 2022;12(24):12550. Available from: https://doi.org/10.3390/app122412550.

29. Gad El-Hak et al. Efficacy of Aerobic and Core Exercise Training on Improving Muscle Mass and Physical Performance in Postmenopausal Women with Sarcopenic Obesity. Journal of Cardiovascular Disease Research. 2021; 12(5): 802-813.

30. Telles S. et al.: A Comparative Controlled Trial Comparing the Effects of Yoga and Walking for Overweight and Obese Adults.Med SciMonit, 2014 May; 20: 894-904. doi: 10.12659/MSM.889805. (PMCID: PMC4051462)

31. Khan S, Agrawal R, Memon S. Comparison of Effect of Yoga versus Aerobic Exercise on Waist Circumference, Waist-Hip Ratio and Body Mass Index in Overweight and Obese Adult Individuals. Kathmandu Univ Med J. 2022;77(1):38-42.