



Original article

Effect of Yogasana and Pranayama on weight, muscle strength and endurance in young Male Medical Students

Thirupathi C¹, Aanandha Subramaniam K^{2*}

^{1,2}Institute of Physiology and Experimental Medicine, Madras Medical College, Chennai, India.

ABSTRACT

Introduction: Yoga is well known for its contribution towards maintenance of normal health since Vedic period. Yoga practice has been beneficial in improving muscle power and muscular endurance. Medical students have been shown to exhibit early risk factors for chronic diseases due to lack of exercise and stress due to their curriculum. Hence the study was designed to assess the effect of Yogasana and Pranayama on weight, Muscle strength and endurance among young medical students. **Materials and Methods:** 60 male first year MBBS students volunteers age ranging from 17 to 19 years, studying at Madras Medical College, Chennai were recruited for present study. They were taught yoga and allowed to practice yoga daily for 45 minutes for 10 weeks. Parameters like weight, BMI, chest expansion, Respiratory rate, hand grip strength and endurance were recorded before and after the study. **Results:** A significant reduction in weight, increase in chest expansion, hand grip strength and endurance were recorded with p value < 0.001. No significant change in BMI, respiratory rate was observed. **Conclusion:** Yogasana and pranayama are beneficial form of exercise in medical students to reduce weight and improve muscle strength and endurance.

KEYWORDS: Yogaasana, medical students, hand grip strength and endurance.

INTRODUCTION

Yoga is well known for its contribution towards maintenance of normal health since vedic period. Asana means posture, and consists of bodily manipulations such as changing in postures of body and stretching of muscles and joints. Pranayama means breathing exercises and regulates the flow of Prana a subtle form of vital energy in the body. Now-a-days yoga has become very popular alternative medicine for its minimal expenditure and simplicity. Yoga practice has been proved to have beneficial effect of improving muscle power and muscular endurance [1].

Even though Medical college students have a better knowledge about healthy lifestyle and dietary habits than other college students [2], they have been shown to exhibit early risk factors for chronic diseases due to lack of exercise and stress due to their curriculum [3]. Stress resultant cortisol is associated with increased consumption of high fat and high-sugar foods, which may cause increase in weight [4,5].

Male students are more prone to obesity than female students because they are less interested in nutritional advice and healthy physical activities [6]. Keeping these factors in

mind the present study was designed to assess the effect of Yogasana and Pranayama on weight, Muscle Strength and endurance among young male medical students.

MATERIALS AND METHODS

60 male MBBS students volunteers with no previous exposure of yoga training, age ranging from 17 to 19 years, studying at Madras Medical College, Chennai were motivated and recruited for present study. Students with medical or surgical illness were excluded from the study.

After briefing about the study protocol, informal consent was obtained from them. The subjects were taught the following asanas and pranayama during the training period of 2 weeks.

Sukhasana, Ardha Padmasanam, Vajrasana, Bhujangasana, Salabhasana, Pavanamuktasana, Dhanurasana, Halasana, Sarvangasana, Shantiasana, Mukh bhastrika, Anulomaviloma, Surya Nadi bhedhana Prānāyāmā Chandra Bedhana Pranayama and Nadisodhana Pranayama [7].

After the training period, 45 minutes practice sessions were held regularly from Monday to Friday for a total duration of 10 weeks under expert Supervision to the yoga group. They were insisted to have their lunch as early as possible so as to do the asanas at 4.00 p.m. The practice sessions started every day at 4.00 p.m with prayer followed by relaxation exercise, and then asanas and Pranayama the whole exercise lasting 40 minutes. In practice schedule, each pose was held for 30 seconds and a short period of rest was given between the poses.

The following parameters were recorded, before and after study period.

Anthropometric Evaluation

Weight, BMI, chest expansion and respiratory rate were measurement.

Hand grip strength (HGS), Hand grip endurance(HGE)

These parameters were measured with the dominant hand by gripping the partially inflated cuff of a mercury manometer while the subject was sitting comfortably in a chair. The arm was extended in front at the shoulder level and kept

horizontal to the ground. HGS was measured by measuring the level of manometer when the subjects gives his maximum effort. For determining HGE, the subject was asked to maintain 1/3 rd of HGS in a sustained squeeze for as long as possible and the time (sec) was noted [8]. For each parameter, three trials at three minutes intervals were done and highest of the three values was used for statistical analysis.

Statistical analysis:

The data was analysed using student paired 't' test. P values of less than 0.05 was accepted as significant.

RESULTS

Yogasan and pranayama training produced a significant ($p < 0.05$) reduction in weight, increase in chest expansion, HGS and HGE in subjects (Table.1). No significant change in BMI, respiratory rate was observed.

Table.1 The parameters before and after Yogasana and Pranayama

	preyoga	postyoga	P value
	Mean ± SD	Mean± SD	
Weight*	59.63 ± 10.77	56.27 ± 10.73	0.0184
Body Mass Index	20.39 ± 3.03	20.30 ± 3.17	0.8268
Respiratory Rate/min	18.70 ± 1.99	17.47 ± 1.55	1
Chest expansion * in cms	6.03 ± 1.71	6.50 ± 1.70	0.01819
Hand Grip Strength*	189.53 ±33.89	203.93 ± 26.09	0.001
Hand Grip Endurance*	125.77±19.51	154.30 ±20.32	0.001
* p value < 0.05 (significant)			

DISCUSSION

A significant increase in HGS and HGE may be due to increase in muscle strength and endurance after undergoing yogasana [1,8]. Some of the yogic postures in our study involves sustained isometric contraction of the shoulder, chest and arm muscles, which may improve the strength and endurance of these muscles.[4,8]

Medical students even though have greater knowledge than other college students about healthy life style and other food habit, they are highly prone to various chronic non communicable diseases due to lack of time and stress. Stress by stimulating cortisol release increases craving for high fat and sugar diet, making the individual at risk of obesity and associated metabolic syndrome. Most of medical students

due to lack of time skip their morning breakfast, this habit is associated with high incidence of obesity and cardiovascular consequences[9,10] Male students are more prone to become obese due to their carelessness about weight, desire for heavy physique and muscularity in comparison to female students. [11]

In this study a significant reduction in weight was recorded, this may be due to yoga induced reduction in stress, improving physical and psychic effects[12,13]. Yoga led to a healthy reconnection with food, physical empowerment, and increased awareness [14]. Yoga elevates the mood, reduces the stress in contrast with other modality of exercise, which is more concerned in terms of calories in take and output, environment and other physiological

aspects. [15] Yoga by reducing the stress, it down regulates the HPA axis. this results in reduced production of cortisol and resultant craving for high fat and sugar diet.[12]

CONCLUSION

yogasana and prayanama are form of exercise useful in medical students to reduce weight and improve their muscle power and endurance. Hence it is recommended that they along with their busy curriculum as to be trained and encouraged to practice yoga daily to improve their life pattern. HGS and HGE are simple methods to assess skeletal muscle strengths and nutritional status. These tests can be used to determine the effectiveness of health – promoting programs like yoga training. They can also be used as an objective clinical measures for determining the severity of the disease process and effectiveness of rehabilitation programs. Hence, there is a need to carry out further studies on these parameters in normal subjects and patients with neuromuscular and nutritional disorders.

REFERENCES

1. Shiraishi JC, Bezerra LM. Effects of yoga practice on muscular endurance in young women. *Complement Ther Clin Pract.* 2016 ;22:69-73.
2. Irazusta A, Gil S, Ruiz F, Gondra J, Jauregi A, Irazusta J, et al. Exercise, physical fitness, and dietary habits of first-year female nursing students. *Biol Res Nurs.* 2006;7:175–86.
3. Sajwani RA, Shoukat S, Raza R, Shiekh MM, Rashid Q, Siddique MS, et al. Knowledge and practice of healthy lifestyle and dietary habits in medical and non-medical students of Karachi, Pakistan. *J Pak Med Assoc.* 2009;59:650–5.
4. G. Oliver, J. Wardle, and E. L. Gibson. Stress and food choice: a laboratory study. *Psychosomatic Medicine* 2000; 62(6): 853–865.
5. S. S. Schiffman, B. G. Graham, E. A. Sattely-Miller, and M. Peterson-Dancy. Elevated and sustained desire for sweet taste in African-Americans: a potential factor in the development of obesity. *Nutrition* 2000;16(10): 886–893.
6. von Bothmer MI, Fridlund B. Gender differences in health habits and in motivation for a healthy lifestyle among Swedish university students. *Nurs Health Sci* 2005; 7: 107-18.

7. *Yogasanas* : Published by Yogasana Aalayam, Chennai, 4th Edition, 1999;1 – 127.

8. Madan Mohan, Anandha Bhavanani, Prakash. Effect of yoga and Prānāyām on hand grip strength and hand grip endurance, maximum respiratory pressure, pulmonary function test on a group of school students. *Indian J Physiol Pharmacol.* 2003; 47(4):387 – 392.

9. Ortega RM, Redondo MR, Lopez-Sobaler AM, Quintas ME, Zamora MJ, Andres P, et al. Associations between obesity, breakfast-time food habits and intake of energy and nutrients in a group of elderly Madrid residents. *J Am Coll Nutr* 1996; 15: 65-72.

10. Sakata K, Matumura Y, Yoshimura N, Tamaki J, Hashimoto T, Oguri S, et al. Relationship between skipping breakfast and cardiovascular disease risk factors in the national nutrition survey data. *Nippon Koshu Eisei Zasshi* 2001; 48: 837-41.

11. Pope HG Jr, Gruber AJ, Mangweth B, Bureau B, deCol C, Jouvent R, et al. Body image perception among men in three countries. *Am J Psychiatry*, 2000; 157: 1297-301.

12. E. J. Brunner, T. Chandola, and M. G. Marmot. Prospective effect of job strain on general and central obesity in the Whitehall II study. *The American Journal of Epidemiology.* 2007;165(7): 828–837.

13. Ross A, Brooks A, Touchton-Leonard K, Wallen G. A Different Weight Loss Experience: A Qualitative Study Exploring the Behavioral, Physical, and Psychosocial Changes Associated with Yoga That Promote Weight Loss. *Evid Based Complement Alternat Med.* 2016;2016:2914745.

14. McIver S., McGartland M., O'Halloran P. Overeating is not about the food': women describe their experience of a yoga treatment program for binge eating. *Qualitative Health Research.* 2009;19(9):1234–1245.

15. Emery C. F., Olson K. L., Lee V. S., Habash D. L., Nasar J. L., Bodine A. Home environment and psychosocial predictors of obesity status among community-residing men and women. *International Journal of Obesity* 2015;39(9):1401–1407.

*Corresponding author: Dr. K. Anandha Subramaniam
E-Mail: anandsundari7780@gmail.com