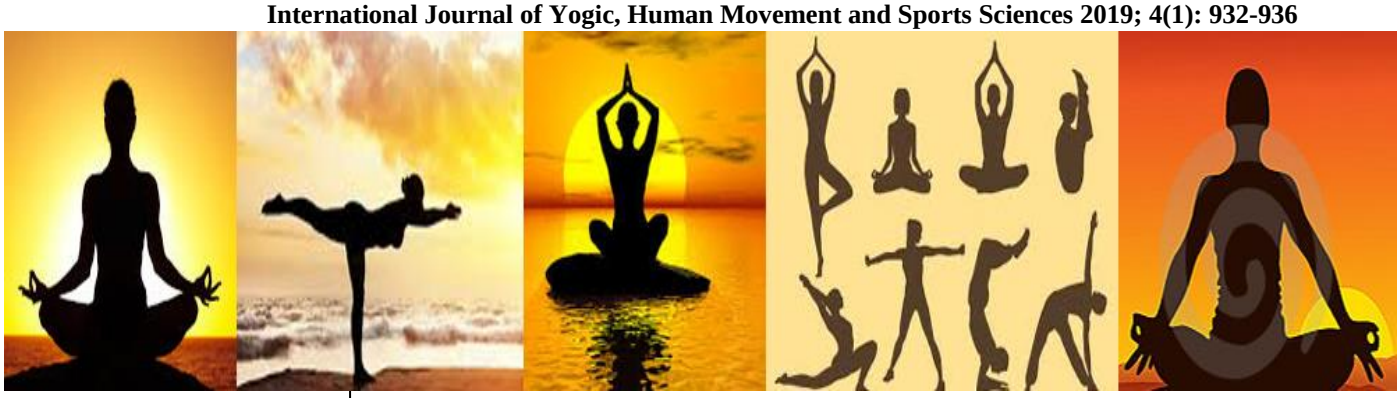
International Journal of Yogic, Human Movement and Sports Sciences 2019; 4(1): 932-936



**ISSN: 2456-4419**
**Impact Factor: (RJIF): 5.18**
Yoga 2019; 4(1): 932-936

www.theyogicjournal.com
Received: 20-11-2018
Accepted: 22-12-2018

**Dr. Y Wise Blessed Singh**
Assistant Professor, Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu, India

**Correspondence**
**Dr. Y Wise Blessed Singh**
Assistant Professor, Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu, India

# Relative effect of yogic practice versus physical exercises on maximum oxygen consumption of untrained men

## Dr. Y Wise Blessed Singh

**Abstract**
The purpose of the study was to find out the relative effect of yogic practice versus physical exercise on maximum oxygen consumption of inter-collegiate athletes. To achieve the purpose of the study the investigator selected forty five untrained men as subject in the age group of 40 years to 45 years. They were divided into three equal groups of fifteen each (n=15) at random. Group-I performed yogic practice, group-II performed physical exercise and group-III acted as control. The data collected from the experimental and control groups on maximum oxygen consumption was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post-test. Further, percentage of changes was calculated to find out the chances in selected dependent variables due to the impact of experimental treatment. ANCOVA was used to find out the adjusted mean difference between the groups. The result of the study reveals that due to the effect of yogic practice and physical exercise the maximum oxygen consumption of the untrained men was significantly improved. It is also concluded that no significant differences existed between yogic practices and physical exercise groups in improving the maximum oxygen consumption of untrained men.

**Keywords:** Yogic practice and physical exercise, maximum oxygen consumption

## Introduction
In this competitive world, many people find it hard to dedicate time for physical activities like exercises, although one of their first priorities is to stay in perfect shape. Most of them talk about the importance of physical activity in our daily lives. Research consistently shows that regular physical activity, combined with healthy eating habits, is the most efficient and healthy way to control weight. Whether an individual is trying to lose weight or maintain it, they should understand the important role of physical activity and include it in their lifestyle. Physical activity helps to control weight by using excess calories that otherwise would be stored as fat. The calories of food that we eat and use each day regulates our body weight. Everything one eats contains calories, and everything one does including sleeping, breathing, and digesting food uses calories. Any physical activity in addition to what one normally does will use extra calories.

Yoga has been practiced for thousands of years and during all this time, people found there to be many and varied benefits of yoga. Furthermore, they conducted investigations, in order to clearly establish the areas in which people can obtain recognizable health benefits, in an extended practice. The information found after conducting the investigations was grouped in three categories, establishing that yoga practitioners are likely to observe improvements in physiological, psychological, and biochemical aspects.

It is a common misconception that yogic exercises are physical exercises. But the basic differences of yoga and exercises are words that are often confused as one and the same, there is a lot of difference between the two words. Yoga is a School of philosophy whereas exercise pertains to the development muscles of the human body by training them properly. The performance of yoga postures does not contribute to the development of muscles, whereas exercising the body in the gym contributes a lot to the toning of the muscles. Yoga aims at the attainment of mental purity. It is all about the regulation of breathing technique called Pranayama and asnas postures.

Exercise aims at building up stamina on the other hand yoga needs regular practice to attain perfection. Yoga must have a Guru or a Teacher to impart the knowledge of yoga to you. On the other hand one need not learn exercises from a trainer. These are some of the differences between yoga and exercises. Exercise is also a type of physical activity, but there is the intent and purpose of improving certain aspects of health. Exercise is planned physical activity that leads to visible improvement in health and general well-being. Physical exercises are repetitive movements whereas yoga exercise involves very little movement and only postures maintained for a period of time. Physical exercises lay emphasis on strong movements of muscles whereas yoga opposes violent movements.

Yogic postures tone up the body and the mind whereas physical exercise affects mainly the body. The caloric requirement in yogic asanas varies from 0.8 to 3calories per minute while the caloric requirement of a physical exercise varies from 3 to 20 calories per minute. The main purpose of physical exercise is to increase the circulation of the blood and the intake of oxygen. This can be done by yoga's simple movements of the spine and various joints of the body with deep breathing, but without violent movements and asanas, the various blood vessels are pulled and stretched and blood is equally distributed to every part of the body. The stretch and blood is equally distributed to every part of the body. The stretched muscles and ligaments during yoga practices are immediately relaxed muscles. Fatigue appears after doing physical exercises. In order to assess the training impact on maximum oxygen consumption among untrained men, the investigator selected yoga and physical exercise as the independent variable. Information related to the impact of yoga and physical exercise among untrained men is scanty. So the present study is planned.

## Methodology

### Selection of Subject

To achieve the purpose of the study the investigator selected forty five untrained men as subject in the age group of 40 years to 45 years. They were divided into three equal groups of fifteen each (n=15) at random. Group-I performed yogic practice, group-II performed physical exercise and group-III acted as control. All the subjects selected for the experimental treatment was subjected to medical evaluation and certification from a doctor ensuring their health capacities to undergo the training program.

### Training Programme

The training program was scheduled for one session a day each session lasted between forty five minutes to one hour Approximately. Training programme was administered to the untrained men for twelve weeks with six training units per week. The experimental group-I performed yogic practice and group-II performed physical exercise. The yogasana exercise included in this training programme were Sugasana, Vajrasana, Viparitakarani, Sarvangasana, Bhujangasana, Matsyasana, Ardha matsyendrasana, Trikonasana, Vrksasana, and Savasana respectively. The training programme was conducted in the morning sessions from 6 `O`clock onwards.

The physical exercise protocol consisted of three set of fourteen aerobic exercises, starting with slow followed by fast repetitions. Repeated exercises were performed, alternating left and right sides. To fix the training load for the experimental groups the subjects were examined for their exercise heart rate in response to different work bouts, for proposed repetitions and sets, alternating with active recovery based on work-rest ratio. The subject's training zone was computed using Karvonen formula and it was fixed at 50%HRmax to 80%HRmax. The work rest ratio of 1:1 between exercises and 1:3 between sets was given.

### Collection of the Data

The pretest data was collected prior to the training programme and posttest data was collected immediately after the twelve weeks of yogic practice and physical exercise, from the experimental groups and a control group.

### Experimental Design and Statistical Technique

The data collected from the experimental and control groups on selected dependent variables was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post-test. Further, percentage of changes was calculated to find out the chances in selected dependent variables due to the impact of experimental treatment. Further, the data collected from the three groups prior to and post experimentation on selected dependent variable was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups are involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post-test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 for significance.

## Result

The descriptive analysis of the data showing mean and standard deviation, range, mean differences, 't' ratio and percentage of improvement on maximum oxygen consumption of experimental and control groups are presented in table-1.

**Table 1:** Descriptive Analysis of the Pre and Post Test Data and 'T' Ratio on Maximum oxygen consumption of Experimental and Control Groups

| Group | Test | Mean | Standard Deviation | Range | Mean Differences | 't' ratio | Percentage of Changes |
|---|---|---|---|---|---|---|---|
| Yogic Practices Group | Pre test | 2.99 | 0.15 | 0.47 | 0.18 | 10.27* | 6.02% |
| | Posttest | 3.17 | 0.18 | 0.60 | | | |
| Physical Exercises Group | Pre test | 2.98 | 0.14 | 0.48 | 0.24 | 3.48* | 8.05% |
| | Posttest | 3.22 | 0.27 | 1.11 | | | |
| Control Group | Pre test | 3.01 | 0.14 | 0.44 | 0.04 | 2.04 | 1.33% |
| | Posttest | 2.97 | 0.16 | 0.55 | | | |

Table t-ratio at 0.05 level of confidence for 14 (df) =2.15

Table-1 shows that the mean, standard deviation, range and mean difference values of the pre and post test data collected from the experimental and control groups on maximum oxygen consumption. Further, the collected data was statistically analyzed by paired't' test to find out the significant differences if any between the pre and post data.

The obtained‘t’ values of yogic practices and physical exercises groups are 10.27 and 3.48 respectively which are greater than the required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that significant differences exist between the pre and posttest means of experimental groups on maximum oxygen consumption.

The result of the study also produced 6.02% percentage of changes in maximum oxygen consumption due to yogic practices, 8.05% of changes due to physical exercises and 1.33% of changes in control group.

The pre, post and adjusted posttest mean values of experimental and control groups on maximum oxygen consumption is graphically represented in figure- 1.

The percentage of changes on maximum oxygen consumption of experimental and control groups is graphically represented in figure-2.

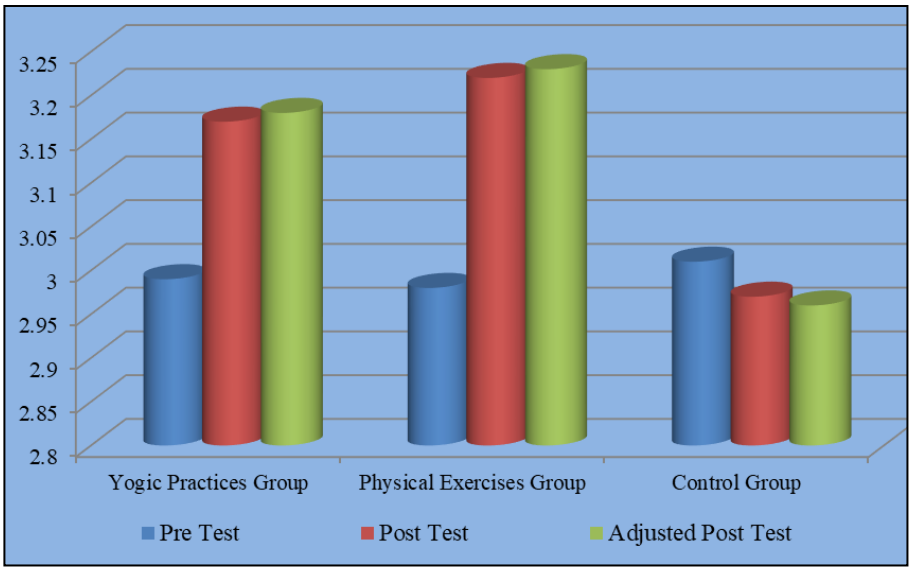



**Fig 1:** Diagram Showing the Mean Values on Maximum Oxygen Consumption of Experimental and Control Groups

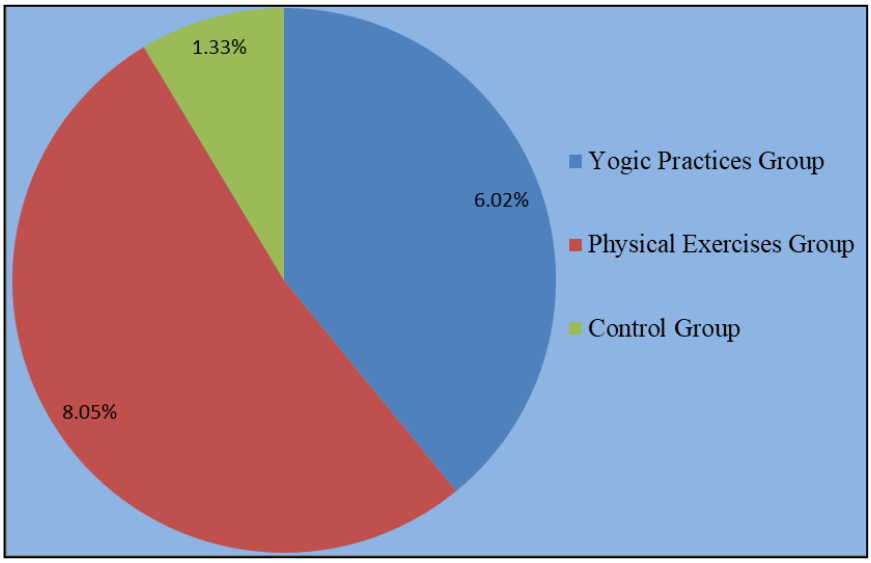



**Fig 2:** Pie Diagram Showing the Percentage of Changes on Consumption of Experimental and Control Groups

The pre and post test data collected from the experimental and control groups on maximum oxygen consumption is statistically analyzed by using analysis of covariance and the results are presented in table–2.

**Table 2:** Analysis of Covariance on Maximum Oxygen Consumption of Experimental and Control Groups

| | Yogic Practices Group | Physical Exercises Group | Control Group | SoV | Sum of Squares | Df | Mean squares | ‘F’ ratio |
|---|---|---|---|---|---|---|---|---|
| Pre-test Mean SD | 2.99 | 2.98 | 3.01 | B | 0.004 | 2 | 0.002 | 0.105 |
| | 0.15 | 0.14 | 0.14 | W | 0.857 | 42 | 0.020 | |
| Post-test Mean SD | 3.17 | 3.22 | 2.97 | B | 0.535 | 2 | 0.268 | 6.09* |
| | 0.18 | 0.27 | 0.16 | W | 1.846 | 42 | 0.044 | |
| Adjusted Post-test Mean | 3.18 | 3.23 | 2.96 | B | 0.625 | 2 | 0.313 | 11.65* |
| | | | | W | 1.100 | 41 | 0.027 | |

(Table value required for significance with degrees of freedom 2 & 42, 2 & 41 is 3.23)
*Significant at 0.05 level of confidence

Table-2 shows that the pre-test means and standard deviation on maximum oxygen consumption of yogic practices, physical exercises and control groups are 2.99 ± 0.15, 2.98 ± 0.14 and 3.01 ± 0.14 respectively. The obtained 'F' value 0.105 of maximum oxygen consumption is lesser than the required table value of 3.23 for the degrees of freedom 2 and 42 at 0.05 level of confidence, which proved that the random assignment of the subjects were successful and their scores on maximum oxygen consumption before the training were equal and there was no significant differences.

The post-test means and standard deviation on maximum oxygen consumption of yogic practices, physical exercises and control groups are 3.17 ± 0.18, 3.22 ± 0.27 and 2.97± 0.16 respectively. The obtained 'F' value of 6.09 on maximum oxygen consumption was greater than the required table value of 3.23 at 2, 42 DF at 0.05 level of confidence. It implied that significant differences exist between the three groups during the post-test on maximum oxygen consumption.

The adjusted post-test means on maximum oxygen consumption of yogic practices, physical exercises and control groups are 3.18, 3.23 and 2.96 respectively. The obtained 'F' value of 11.65 on maximum oxygen consumption is greater than the required table value of 3.23 for the degrees of freedom 2 and 42 at 0.05 level of confidence. Hence, it is concluded that significant differences exist between the adjusted post-test means of yogic practices, physical exercises and control groups on maximum oxygen consumption. Since, the obtained 'F' value in the adjusted post-test means is found to be significant, the Scheffe's test is applied as post hoc test to find out the paired mean difference, and it is presented in
table-3.

**Table 3:** Scheffe's Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Maximum Oxygen Consumption

| Yogic Practices Group | Physical Exercises Group | Control Group | Mean Difference | Confidence Interval |
|---|---|---|---|---|
| 3.18 | 3.23 | | 0.05 | 0.15 |
| 3.18 | | 2.96 | 0.22* | 0.15 |
| | 3.23 | 2.96 | 0.27* | 0.15 |

*Significant at 0.05 level

As shown in table-3 the Scheffe's post hoc analysis proved that significant mean differences existed between yogic practices and control groups, physical exercises and control groups on maximum oxygen consumption. Since, the mean differences 0.22 and 0.27 are higher than the confident interval value of 0.15 at 0.05 level of significance. However, no significant mean differences existed between yogic practices and physical exercises groups since, the mean differences 0.05 is lesser than the confident interval value of 0.15 at 0.05 level of significance.

Hence, it is concluded that due to the effect of yogic practices and physical exercises the maximum oxygen consumption of the subjects is significantly improved. It is also concluded that no significant differences existed between yogic practices and physical exercises groups in improving maximum oxygen consumption.

## Discussion

The results of this study is in conformity to the findings of Usha and Rajesh (2002) [21], who found considerable improvement in pulse rate and other physiological variables after ten weeks of asanas programmes. The development of physiological variables through yoga training is supported by the findings of Telles *et al*., (1997) [20]; Cox *et al*., (2001) [8]; Rigla *et al*., (2000) [16]; and Dengel *et al*., (1998) [9].

Yogic practices demonstrated a significant difference in heart rate, with breathing practices and asanas lowering heart rate significantly so yogic practices into a lower-impact workout may be beneficial. Chaya *et al.,* (2008) [4] reported that long-term practice of yogic asanas along with pranayama and meditation causes reduced sympathetic activity resulting in reduced metabolic rate and greater metabolic efficiency in yoga practitioners. Hagins *et al.,* (2007) [7] suggested that yoga is a mind-body practice where practice of physical postures is combined with control of breathing, meditation along with stretching exercise, isometric exercise, and dynamic exercises of skeletal muscles. Raub (2002) [15] find that Practice of hatha yoga may help control such physiological variables as blood pressure, respiration, HR and metabolic rate to improve overall exercise capacity

Physical exercise refers to the variety of exercise that stimulates heart function and lungs activity for a time period sufficiently long to produce beneficial changes in the body. The heart is always able to deliver sufficient oxygen rich blood to muscles. So that they can derive energy from fat and glycogen aerobically, since it increases the efficiency of heart circulation and muscles. The above findings of the study are also confirmed by the following findings of Angelopoulos *et al*., (1993); and spodaryk, (1993) [19].

Short-term daily conditioning protocol of aerobic exercise program induces significant improvements in both aerobic capabilities and anaerobic performance (Sartorio *et al*., 2003) [17]. The focus of aerobic training is to progressively overload the cardio respiratory system and not the musculoskeletal system. In response to an aerobic training program, Type I and II muscle fibers have been shown to remain the same (Bell *et al*., 2000; McCarthy *et al*., 2002) [2, 13], increase (Nelson, 1990) [14], and decrease in size (Kraemer *et al*., 1995) [12]. More consistent and well documented adaptations to aerobic training include increases in capillary and mitochondrial densities (Crenshaw, 1991) as well as oxidative enzyme activity (Bell, 2000; Nelson, 1990) [2, 14] all of which contribute to the enhanced delivery, extraction, and utilization of oxygen by skeletal muscle.

## Conclusion

The result of the study reveals that due to the effect of yogic practices and physical exercise the maximum oxygen consumption of the untrained men was significantly improved. It was also concluded that no significant differences existed between yogic practices and physical exercise groups in improving maximum oxygen consumption of untrained men.

## Reference

1. Angelo Poulos TJ *et al.* Effect of repeated exercise bouts on High Density Lipoprotein Cholesterol and its sub fractions HDL2-C and HDL3-C" International Journal of

Sports Medicine. 1993; 14(4):179-238.
2. Bell GJ, Syrotuik D, Martin TP, Burnham R, Quinney HA. Effect of concurrent strength and endurance training on skeletal muscle properties and hormone concentrations in humans, European Journal of Applied Physiology. 2000; 81:418–427.
3. Brandon Raphael. Peak Performance, 2011. www.google.co.in.
4. Chaya MS, Nagendra HR. Long-term effect of yogic practices on diurnal metabolic rates of healthy subjects, Int J Yoga. 2008; 1:27–32.
5. Cope Haley, 2011. www.google.co.in.
6. Cowen VS, Adams TB. Heart rate in yoga asana practice: a comparison of styles, Journal of Body Work and movement Therapies. 2007; 11(1):91-95.
7. Cowen Virginia S, Adams Troy B. Physical and perceptual benefits of yoga asana practice: Results of a Pilot Study, Journal of Body Work and Movement Therapies. 2005; 9(3):211-219.
8. Cox KL *et al.* Long term effects of exercise on Blood Pressure and Lipids in healthy Women aged 45-65 years. The Sedentary Women Exercise Adherence Trail (SWEAT), J Hypertens. 2001; 19(10):33-43.
9. Dengel DR *et al.* Improvements in blood pressure, glucose metabolism and lipoprotein lipids after aerobic exercises plus weight loss in obese, hypertensive middle aged men, Metabolism. 1998; 47(9):1075-82.
10. Hagins M, Moore W, Rundle A. Does practicing hatha yoga satisfy recommendations for intensity of physical activity which improves and maintains health and cardiovascular fitness? BMC Complement Altern Med. 2007; 7:40.
11. Harinath K, Malhotra AS, Pal K, Prasad R, Kumar R, Kain TC *et al.* Effects of hatha yoga and omkar meditation on cardiorespiratory performance, psychologic profile, and melatonin secretion, J Altern Complement Med. 2004; 10:261–8.
12. Kraemer WJ, Patton JF, Gordon SE, Harman EA, Deschenes MR, Reynolds K *et al.* Compatibility of high-intensity strength and endurance training on hormonal and skeletal muscle adaptations, Journal of Applied Physiology. 1995; 78(3):976-989.
13. McCarthy JP, Pozniak MA, Agre JC. Neuromuscular adaptations to concurrent strength and endurance training, Medicine and Science in Sports and Exercise. 2002; 34:511-519.
14. Nelson AG, Arnall DA, Loy SF, Silvester LJ, Conlee RK. Consequences of Combining Strength and Endurance Training Regimens. Physical Therapy. 1990; 70:287-294.
15. Raub JA. Psychophysiologic effects of Hatha Yoga on musculoskeletal and cardiopulmonary function: A literature review. J Altern Complement Med. 2002; 8:797–812.
16. Rigla M *et al.* Effect of physical exercise on lipoprotein a) and low density lipoprotein modifications in type 1 and type 2 diabetic patients, Metabolism. 2000; 49(5):640-7.
17. Sartorio A, Lafortuna CL, Silvestri G, Narici MV. Effects of short-term, integrated body mass reduction program on maximal oxygen consumption and anaerobic alactic performance in obese subjects, Diabetes Nutr Metab. 2003; 16(1):24-31.
18. Sasi AK, Sivapriya DV, Thirumeni S. Effects of surya namaskar on cardiovascular and respiratory parameters in school students. Recent Res Sci Tech. 2011; 3:19–24.
19. Spodaryk. Haematological and iron related parameters of male endurance and strength trained atheletes, European journal of Applied Physiology and Occupational Physiology. 1993; 67(1):66-70.
20. Telles S *et al.* Comparison of changes in autonomic and respiratory parameters of girls after yoga and games at a community home. Percept Mot. Skills. 1997; 84(1):251-7.
21. Usha, Rajesh. Physical and physiological components of boys between age group 12-16 years. Journal of Sports and Sports Sciences. 2002; 25(1):50-56.