

Impact of 4 Weeks Yogasana Protocol on Cardiovascular Endurance in Adolescent Amateur Badminton Player: An Experimental Study

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Abstract: Background: Badminton requires both aerobic and anaerobic fitness along with speed, power, agility, flexibility, strength and technical skills to compete in a match. a high level of cardio vascular endurance is critical for optimal performance especially for amateur player and prime factor in competing at the elite level (i.e., Fast Recovery between Points) in all racket sports. it is important to improve cardio -vascular endurance of amateur badminton players. Aim: This study investigates the effectiveness of 4weeks yogasana protocol on cardio-vascular endurance in amateur badminton players. Method: The experimental study was conducted with 60 subject out of which 26 are females and 34 are males with age group between 13 to 17 years amateur badminton players. subjects were selected according to inclusion criteria, written consent was taken. The cooper 12 minute walk/run test was used to evaluate cardiovascular endurance pre and post intervention. Analysis was done using microsoft excel and graphpad. Result: A Paired t-test Was Conducted To Compare The Pre And Post Hr Max Values For Cardiovascular Endurance, Showing A P Value <0.0001, Considered Extremely Significant. Conclusion: This Study Shows That Yogasana Protocol Effectively Enhances Cardiovascular Endurance in Amateur Badminton Players Aged Between 13 To 17 Years.

Keywords: Badminton, Yoga, Cardiovascular Endurance, Amateur Badminton Player, Exercise Protocol

1. Introduction

Badminton is a game that can be played as individual or with team of two, using rackets and shuttlecocks, which can be played in an open or closed field, court is divided by 2 half by net in middle.

The badminton game is hitting the shuttlecock with racket through the net so that it falls on the opponent's badminton court of play and trying to prevent the opponent from doing the same with various shots, techniques ranging from relatively slow to very fast and accompanied by deceptive movements.

This sport trains accuracy, agility and strategy in the game. Badminton is a type of sport that is played using a net, a racket, a shuttlecock.

In order to get optimal performance in the game of badminton, in addition to various shots or techniques each player must have strength, speed, agility, flexibility, accuracy, endurance.

The trainer has prepared a training program that will be include such as racket holding techniques, service, dropshots, drive strokes, forehand backhand strokes and physical exercises.[1]

The rectangular court is 44 feet and 17 feet for singles, 20 feet wide for doubles. (Bwf Guideline)

Cardio-Vascular Endurance

Cardio-Vascular Endurance refers to the ability of the heart and lungs to deliver oxygen to working muscles during

continuous physical activity, which is an important indicator of physical health.

Vo₂max is accepted as criterion measure of cardio-respiratory fitness.

Vo₂ Max is the maximum rate of oxygen consumption achievable during physical exertion.

Variety of test may use to estimate Vo₂max.

In This Study, Cooper 12 Min Walk/ Run Test (Field Test) Should Be Done To Estimate Vo₂max. [2]

Endurance is the ability of a person to continuously move with his whole body for a long time and with a moderate to fast tempo without any significant feeling of fatigue. general endurance is related to cardiovascular endurance.[1]

The term endurance or endurance in the world of sports is known as the ability of an athlete's to fight fatigue during an activity or work. understanding endurance in terms of muscle work is the ability to work muscles or a group within a certain period of time, while the understanding of endurance from the energy system is the ability to work organs of the body within a certain period of time.[1]

About Yogasana

Yoga is mostly a spiritual discipline based on an extremely subtle science which primary focus on bringing harmony between mind and body.

It is an mixture of art and science for healthy living. the word "yoga" is derived from the Sanskrit literature yuj meaning "to join", "to unite". according to yogic literature, the practice of

yoga leads to the union of individual consciousness with universal consciousness.

Yoga is beneficial for physical fitness, musculoskeletal health and cardio-vascular health, stress relieving and helps to maintain peace. [3].

Yogasana Protocol [7],[8],[9]

4 Weeks Protocol, 3 Days A Week. Protocol For 30 Min. Start With Warm Up Exercises For 5mins (Marching In Place, Breathing Exercise). Each Asana Hold For 30 Sec, 10 Sec Rest Between Each Asana.4 Sets Of Each Asana .End With Cool Down Exercise For 5min (Shavasana ,Stretching, Breathing Exercise)

Yogasana

- 1) Tadasana
- 2) Vikrasana
- 3) Utkatasana
- 4) Gomukhasana
- 5) Ushtrasana
- 6) Bhujangasana
- 7) Paschimottasana
- 8) Shavasana

The aim of study is to study the effectiveness of 4weeks yogasana protocol on cardio-vascular endurance in amateur badminton players. (3 alternated days a week).

2. Materials & Methods

Study Design: Experimental Study.

Sample Size: 60

Sampling Method: Convinient Sampling

Study Population: Amateur Badminton Players.

Study Setting: Badminton Academies In Pune.

Intervention Duration: 4 Weeks,3 Days A Week,30 Min Protocol.

Selection Criteria:

Inclusion Criteria

- Both Male and Female
- Age – 13 to 17 Years
- Those who join badminton classes recently (within 6 month) [5]
- Subject is only taking training for badminton.
- Normal BMI (18.5-24.9kg/M²) ACSM Guideline
- Those who have fair and below fair cardiorespiratory fitness based upon cooper test normative values [6]

Exclusion Criteria:

- Recently on medication
- Recent fractures
- Any diagnosed respiratory cardiac condition
- Obese or underweight subject
- Participant undergoing any other physical training protocol such as gym, gymnastics, karate.
- Individuals with any neurological condition
- Individuals who are actively participated in specific school sports.

Procedure:

Study began after obtaining ethical clearance approval from the committee. Visited various badminton coaching classes in and around Pune. The amateur badminton players according to inclusion criteria of study were selected.

The procedure and importance of study was explained to selected subject. Then written consent was taken by subject. Cooper 12 min walk/run test was conducted to collect pre-program CVS endurance data of each subject.

Yogasana training of 4 weeks,3 times in a week in group session was taken. After end of program, cooper 12 min walk/run test was taken again. Data was collected and pre and post test result will be compared to know effectiveness.

Outcome Measure:

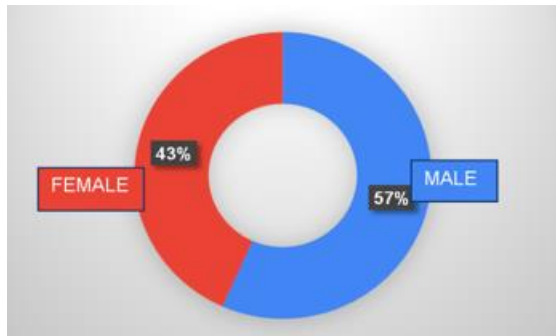
Cooper 12 Min Walk/Run Test Estimate Performance Normative Value
 $Vo_{2max} = (35.97 * Miles) - 11.29$ [2]

Age/gender	Very poor	Poor	Fair	Good	Excellent	Superior
13-19 years						
Males	≤1.29	1.30-1.37	1.38-1.56	1.57-1.72	1.73-1.86	≥1.87
Females	≤0.99	1.00-1.18	1.19-1.29	1.30-1.43	1.44-1.51	≥1.52

Age/gender	Very poor	Poor	Fair	Good	Excellent	Superior
13-19 years						
Males	≤34.9	35.0-38.3	38.4-45.1	45.2-50.9	51.0-55.9	≥56.0
Females	≤24.9	25.0-30.9	31.0-34.9	35.0-38.9	39.0-41.9	≥42.0

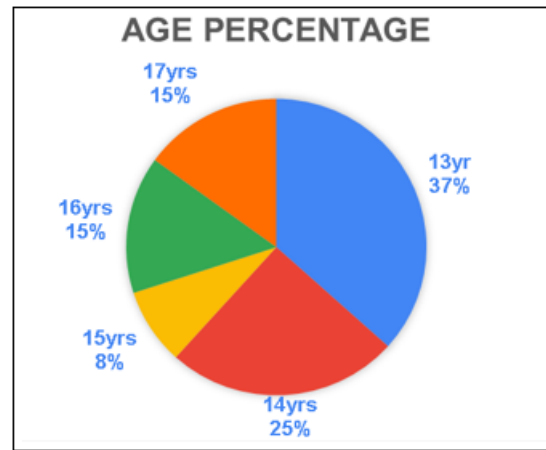
3. Result

Pie Chart represent gender distribution of subjects participated in study.



Total 60 Participants.
No. of Females Are 26.
No. of Males Are 34

Pie chart representation of age group distribution of subjects participated in study.



Age (Yrs)	13	14	15	16	17
Total No.	22	15	5	9	9

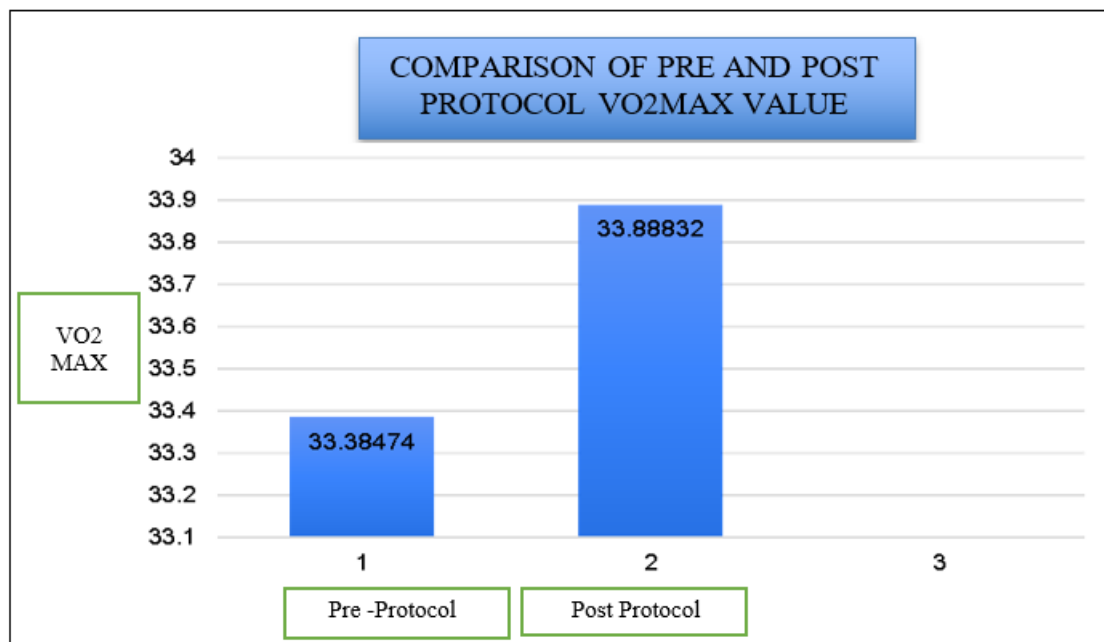
Comparison of Pre and Post Hr Max Values in amateur badminton players.

Group	Pre Protocol	Post Protocol
Mean	33.38474	33.88832
Sd	4.041857	3.964839
N	60	60

Cooper 12 Min Walk/Run Test Hr Max Values.	Pre Protocol Mean Score+ Sd	Post Protocol Mean Score +Sd	Standard Deviation	T Value	P Value	Results
	33.384+4.04	33.888+3.96	0.35	11.188	<0.0001	Extremely Significant

This study evaluated 60 subject out of which 26 are females and 34 are male with age group between 13 to 17 years. Data Was Analyzed using Microsoft excel. mean, standard deviation, Paired T-Test was done to Compare the Pre and

Post Hr Max Values for Cardiovascular Endurance Which Showed P Value <0.0001 (95%Confidence Level) which is considered extremely significant.



4. Discussion

The study aims to explore the potential benefits of integrating a yogasana protocol into the training session of amateur badminton players to find out whether yogasana protocol is effective in increasing cardiovascular endurance.

In this study total 60 amateur badminton players aged between 13 to 17 both male and female participated. the result show that yogasana protocol has significant effect on cardiovascular endurance of amateur badminton players.

Vo2 Max. is important measure for physical performance as well as for the health in general. it is an index of cardio

respiratory fitness. Vo2 Max can be determined using variety of exercise and field test. High Vo2 Max requires integration of all of pulmonary, cardiovascular and neuromuscular function. So, vo2 max is a basic important measure of physiologic functional capacity for exercise.

Improvement in aerobic power may contribute to recovery from anaerobic performance both by supplementing anaerobic energy during the competition and by providing aerobically produced energy at a faster rate during the recovery period.[4]

It is important to improve cardio -vascular endurance of amateur badminton player to improve game. and as very little study has been done for yogasana protocol for improving endurance in badminton, it is important to study the effectiveness of same.

Previous studies stated, Bera T. K and Rajapurkar M. V in 19935 reported significant improvement in cardiovascular endurance as a result of yoga training in college student. Raju p.s. et al (1997) have found a significant improvement in oxygen consumption per unit work after yoga training. Increase in vo2 max is seen, it suggests of better utilization of oxygen at cellular level.[9]

The Results of the Evaluation of Vo2 Max indicate that all the physically untrained subjects had a Vo2 Max Value of less than 2.41 L/Kg/Min, while all the subjects practicing yoga had A Vo2 Max of more than 3.76 L/Kg/Min. The Vo2 Max was found to be significantly higher in the case group in the present study. the findings in our study are in accordance with a previous study by gupta et al. [10]

Vagal activity is improved after practicing yoga. this likely happens via stimulation of dermal, subdermal pressure receptors that are innervated by vagal afferent fibers.

Yoga poses involve stretching and twisting movements which stimulate blood flow throughout body, which enhances more oxygen and nutrient delivered more efficiently to muscle enhancing overall cardiovascular function.

Yoga training requires controlled breathing which improves efficiency of gas exchange in lungs. yoga activates parasympathetic nervous system leading to lowered resting heart rate.

Overall there was cardiovascular endurance to increase after 4 weeks of yogasana protocol in amateur badminton players. the difference in cardiovascular endurance was statistically significant. This indicates that 4 weeks yogasana protocol had a sizable impact on cardiovascular endurance and it also improves players overall performance.

However, this study has some limitations including sample homogeneity: the study's inclusion criteria limited the sample to individuals with normal BMI within a narrow age range (13 to 17 years), which may limit the generalizability of the findings to other population.

Potential Confounding Factors: The study may not have accounted for all potential confounding variables that could

influence cardiovascular endurance, such as participants' dietary habits.

Future scope for this study is to take long-term follow-up: conducting a follow-up study to assess the sustainability of the improvements observed in cardiovascular endurance after the completion of the 4-week yogasana protocol.

Integration into training programs: integrating yoga practices into the regular training regimen of amateur badminton players and evaluating its effects on overall performance, injury prevention, and mental well-being.

The same protocol could be implemented in different population.

5. Conclusion

This Study Demonstrates that 4 Weeks Yogasana Protocol Effectively Increases Cardiovascular Endurance In Amateur Badminton Players Aged Between 13 To 17 Years.The Findings Suggested That Incorporating Yogasana Into Training Regimens Could Be Beneficial For Players Seeking To Improve Cardiovascular Endurance.Further Research Is Recommended To Explore Longterm Effects And Applicability To Different Population.

Declaration by Authors

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References

- [1] The Relationship Of Endurance And Agility With Badminton Playing Skills of Badminton Extracurricular Students at Sma N 1 Seyegan In The Academic Year 2019/2020 Galih Pamungkas1,*, Yudik Prasetyo1 , Amat Komari1 1 Faculty Of Sport Sciences, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia. The Online Journal of Recreation And Sport – April 2015 Volume 4, Issue 2
- [2] Exercise Testing Book
- [3] Ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy (Ayush) Publisher Director Morarji Desai National Institute Of Yoga Ministry Of Ayush, Govt. Of India.
- [4] Effect Of Badminton Specific Training Versus Badminton Match on Aerobic Fitness Mert Aydoğmuş1, Erkal Arslanoğlu2, Tarık Özmen3. ©Journal Of Sports Science And Medicine (2011) 10, 528-533
- [5] Evaluating A Computer Based Skills Acquisition Trainer to Classify Badminton Players Minh Vu Huynh And Anthony Bedford Rmit University, Melbourne, Australia ©Journal Of Sports Science And Medicine (2011) 10, 528-533

- [6] Correlation Between Obesity And Cardio Respiratory Fitness Prabha Setty 1, Bv Padmanabha2, Br Doddamani3 1department Of Physiology, Vinayaka Mission's Kirupananda Variyar Medical College, Salem, Tamil Nadu, India 2 Department Of Physiology, Azeezia Medical College, Kollam, Kerala, India 3 Department Of Physiology, Kamineni Institute Of Medical Sciences, Narketpally, Andhra Pradesh, India Doi: 10.5455/Ijmsph.2013.2.298-302 Received Date: 05.01.2013 Accepted Date: 09.01.2013
- [7] Publication/347840091 Effect Of Yogasanas Practices On Endurance Of College Students Article · December 2020.Anidya Bhowmik,Seva Bharati Vidyalaya Jhargram.
- [8] Publication/280622744 The Comparison Of Some Physical and Physiological Features Of Elite Youth National And Amateur Badminton Players Article · January 2012.Aziz Gucluover,Erkan Demirkan,Mehmet Kutlu.
- [9] International Journal Of Recent Trends In Science And Technology, Issn 2277-2812 E-Issn 2249-8109, Volume 6, Issue 3, 2013 Pp 119-121 Copyright © 2013, Statperson Publications, International Journal Of Recent Trends In Science And Technology, Issn 2277-2812 E-Issn 2249-8109, Volume 6, Issue 3, 2013 Effect Of Yogic Exercises On Aerobic Capacity (Vo2 Max) Vinayak P. Doijad1 , Prathamesh Kamble2 , Anil D. Surdi3.
- [10] Exploring The Effect of Yoga on Exercise Endurance As Assessed By Cardiorespiratory Efficiency Tests In Exercise Physiology Laboratory: A Pilot Study Ruchi Kothari, Gaurav Mittal, Prashanth A, Pradeep Bokariya 1. Department Of Physiology, Mahatma Gandhi Institute of Medical Sciences, Wardha, Ind 2. Department Of Anatomy, Mahatma Gandhi Institute of Medical Sciences, Wardha, Ind Review Began 04/21/2023 Review Ended 04/26/2023 Published 04/29/2023 © Copyright 2023
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