

Effect of Step Aerobics on Body Composition and Endurance in Cycling

Anoop Sebastian^a, Bestine C Michael^b, Benny Kuriakose^c.

^aAssistant Professor, Christ College of Physical Education, Irinjalakuda Research Scholar, Tamilnadu Physical Education and Sports University, Chennai, India

^bAssistant Professor, Dept. of Physical Education, St Xaviers College, Vaikom (Research Scholar, University of Calicut) India

^cAssociate Professor, Department of Physical Education St. Stephens College, Uzhavoor, Kerala India

Abstract

The study was aimed to assess the effect of step aerobics on the body composition and endurance in cycling. The study was an experimental study with thirty cyclists, of which fifteen belonged to the experimental group, wherein the six weeks of step aerobics training was given. The control group were of fifteen in number and were given usual training. The cardio respiratory endurance, cycling endurance performance, body fat, lean body mass and Body Mass Index were tested using Cooper test, 4km cycling and Tanita body composition analyzer. The pre-tests and post tests were conducted for the two groups. The result showed that Cardiorespiratory endurance and Lean Body mass were improved as a result of six weeks of step Aerobics. Participation in six weeks step Aerobics did not bring about any change in Body Mass Index. Cycling endurance performance was not improved following six weeks step Aerobics.

INTRODUCTION

Sports are a social phenomenon. Sports are as old as human society and it has achieved a universal following in modern times. Every human being has the killer instinct in him. He has a desire to run faster, jump higher and farther, throw farther and exhibit greater strength, endurance and skill. The aim of sports is to develop this killer instinct to its extremes in a socially acceptable manner. During the last few decades the standard of sports and games has improved to its extremes. The cause of this tremendous improvement is the introduction of scientific approach. Due to the innovations brought by different sport sciences, now there are number of scientific method to improve each and every quality which determines the performance in all games and sports. At the same time, the development is according to the rate of demand of each sport.

Aerobic Exercise

Aerobic activities are those activities which are carried out in a slow and steady manner where by the circular-respiratory system is able to supply ample amount of oxygen to the working muscles. These are endurance type of activities and can be constituted for a long time without under fatigue.

Improved Muscle Health

Aerobic exercise stimulates the growth of tiny blood vessels (capillaries) in the muscles. This help the body more efficiently deliver oxygen to the muscles and remove from them irritating metabolic waste products, such as lactic acid. This can lessen the pain if we have chronic muscle pain, fibromyalgia or chronic low back pain.

Aerobic Metabolism

Aerobic glycolysis occurs when O₂ is available to breakdown pyruvate which yields ATP through chemical reactions that occur in the Krebs Cycle and the Electron Transport system. As in anaerobic metabolism, glucose may be obtained from stored glycogen, glycogen stores are plentiful and therefore glycogen depletion is only a concern for cyclists who are continuously exercising for more than 90 minutes or intermittent exercise over substantially longer periods of time in order to reduce the chances of depleting glycogen reserves during a contest, athletes often 'carbo load' prior to the event. This involves manipulating the carbohydrate content of one's diet in order to maximize glycogen stores.

Cardiorespiratory Endurance

Cardio-respiratory endurance is the ability of lungs, heart and blood vessels to deliver adequate amounts of oxygen and nutrients to the cells to meet the demands of prolonged physical activity. During prolonged physical activities and individuals with a high level of cardiorespiratory endurance are able to deliver the required amount of oxygen to tissues with relative ease.

Statement of the Problem

The purpose of this study was to determine the effect of step aerobics on body composition and endurance performance in cycling and cardiorespiratory endurance.

Hypothesis

It was hypothesized that there will be a significant effect in the body composition, cardiorespiratory endurance of cyclists following six weeks of step aerobics.

Significance of the Study

- Determining the body composition and endurance performance of cyclist
- Provide information to coaches and cyclist to develop specific training program for cyclist.

Delimitations of the study

- The study was delimited to 30 boys and girls of cycling academies in Kerala.
- The ages ranged from 15-18 years.

Limitations of the study

The life style, habits and nutritional intake of the subject was beyond the control of the investigator which was considered as the limitation of the study.

Definition and Explanations of Terms

Cyclist: One who rides the cycles is called cyclist. For the purpose of this study cyclists are those who participate in competitive cycling.

Aerobic capacity: Aerobic capacity is maximal rate at which an individual can consume oxygen during the performance of all out exhaustive exercise which is the best index of cardiorespiratory fitness.

Endurance : Endurance is the ability to do sport movement with the desired quality and speed under condition of fatigue.

Step Aerobics Exercise: Step aerobics is continuous stepping on Aerobic step performed to music with efficient intake and utilization of oxygen over an extended period of time.

Body Fat: Fat fold thickness and actually the thickness of the double fold of skin and subcutaneous adipose tissue at specific sites on the body.

Sample of the study

Thirty cyclists between the age group of 15-18 years were selected as the subjects for the study. They were randomly assigned to an experimental and a control group of fifteen each. The cyclists were from the district of Idukki in Kerala.

Method and tool adopted for the study

The purpose of the study was to determine the effect of 10 weeks of step Aerobics Program on selected variables such as cardiorespiratory endurance, cycling endurance performance, Body fat, Lean body mass, Body mass index. The subjects of this study were 30 cyclists. They were assigned to two groups, of an experimental group (n=15) and a Control group (n=15). The experimental group participated in step Aerobics for a period of 6 weeks. The control group did not participate in step Aerobics training, but they participated in regular cycling training.

All subjects were tested on the selected variables such as cardiorespiratory endurance, cycling endurance performance, Body fat, Lean body mass, Body mass index before and after six weeks of step Aerobics. Cardiorespiratory Endurance tested by cooper test measured in Meters. The cycling endurance performance tested by 4km cycling measured in second. The Body fat, Lean body mass and Body mass index were measured by TANITA Body Composition analyzer. A value was printed in the slip.

Reliability of the data

The reliability of data was measured by ensuring instrument, reliability, tester competency and subjects reliability.

Instrument Reliability: The instruments used for this study were calibrated and standardized ones. The TANITA body composition analyzer and stop watch were used for this purpose.

Tester Competency and Reliability of Tests: Tester reliability was established by test-retest process where by consistency of results was obtained by product moment correlation. The data was collected from a random selection of fifteen subjects in both experimental and control group.

Collection of data

It was intended to study the effect of step aerobics on body composition and endurance performance of cyclist. The data pertaining to selected body composition such as body fat, LBM, BMI Cardio Respiratory Endurance and cycling performance were collected by the appropriate test and measurement procedures prior to and after six weeks of training program for the experiment group while the control group was tested during the same period.

Administration of the tests

Body composition

Purpose: The purpose of this test was to measure the body compositions such as body fat, Lean body Mass and Body Mass Index

Equipment : TANITA Body Composition analyzer

Procedure: A standardized TANITA Body composition analyzer was used for measuring the body fat, Lean Body Mass and Body Mass Index. After setting the equipment, the subjects weight of clothing, sex, age, and height and sex were entered. The subject stood on the machine. The value of body fat, BMI, LBM were printed the slip. The derived values of Body fat, LBM and BMI were printed in the slip.

Scoring : Body fat in percentage (Body Fat, Lean Body Scoring Mass, Body Mass Index

Cooper's 12 minutes Run / Walk

Purpose : To measure cardio-respiratory endurance.

Equipments : Stopwatch or clock with sweep second hand Whistle or Starter's pistol, track/Football field or some running area marked 80 so that distance traveled in 12 minutes can be calculated easily

Procedures: Subjects were assembled behind the starting line. As the starting signal was given they run / walk as far as possible with in 12 minutes. As the signal to stop

was given, the subject should remain at the spot long enough for test administrator's to record the distance covered. Ample time was given for stretching and warm-up as well as post-test cool down.

Scoring: Score is distance in meter covered in 12 Scoring minutes. Distance in yard is converted in to meters

4km cycling test

Purpose : To measure the cycling Endurance

Equipment : Stop watch or clock with sweep seconds whistle or starting pistol.

Procedure: Subjects were assembled behind the starting line. At the starting signal they started cycling to the 4km distance. Time was taken when they crossed the 4km mark time taken to cover 4km, distance was recorded. Ample time was given for stretching and warm up as well as post-test cool down.

Scoring : The time was recorded in second.

Administration of Training Program

The subjects were divided randomly into two groups A and B. A group acted as experimental group and group B as control group. The experimental group was given training program thrice a week for a period of 6 weeks. The intensity of the training program was increased after every 2 weeks. The experimental group underwent step aerobics session thrice a week ie on Mondays, Wednesdays and Fridays for a period of six weeks. The step aerobics session included warming up, work out and limbering down sessions for a duration of 35 mins. The intensity was increased after every 2 weeks.

Warm Up

The warming up exercise was done for 7 minutes. static stretches was done during warm up. Warming up session included walking on the spot, head roll, and arm rotation, squeezing of fingers hip rotation, trunk bending exercise, hamstring stretch, bending forward, calf stretch and ankle rotation.

Work Out

The work out was done for 20-25 minutes, which included step aerobics that is basic left, basic right, V. left, V. right, Tums, Curls, knee lifts, over the top, corner to corner, diagonal across the top. In the later stages the intensity and duration of the training period were increased.

Analysis of data and the result of the study

The data pertaining to the Body Fat, Lean Body Mass, Body Mass Index, Cardio Respiratory Endurance and Cycling Endurance of the experimental and control group were tested by 't'test. Significant differences were seen in experimental group following six week step Aerobics Program in cardiorespiratory endurance, Body fat and lean body mass. No changes were seen in the case of cycling endurance performance and Body Mass Index. Six week of step aerobics may not be sufficient enough to bring about an increase in cycling performance and Body Mass Index.

CONCLUSIONS

The results of the study seem to permit the following conclusions.

1. Cardiorespiratory endurance was improved as a result of six weeks of step Aerobics.
2. Cycling endurance performance was not improved following six weeks step Aerobics.
3. Body fat was reduced as a result of participating in six weeks of step Aerobics.
4. Lean Body mass was improved as a result of participation in six weeks of step Aerobics.

5. Participation in six weeks step Aerobics did not bring about any change in Body Mass Index.

Recommendations of the study

In the light of the conclusions drawn; the following recommendations are made.

1. The competitive cyclists can incorporate step aerobic sessions in their fitness workout
2. Similar studies may be taken steps with wand held weights for aerobics.
3. Similar studies may be undertaken for a longer period.
4. Similar studies may be conducted on other sports and games.
5. Further study can be done by including more variables.

References

Albright, C L. "Effect of a Six-Month Aerobic Exercise Training Program on Cardiovascular Responsivity in Healthy Middle-Aged Adults". *The Journal of Psychometric Research* 36(1), (January 1992).

Aurobindo, Letters on yoga. Pondicherry: Reflection on Hindu Spirituality Heritage Publishers, Part II, 1984.

Balasaheb Panth. Sooryanamaskaram. Harmony Books, Kozhikode, 2013.

Bucher, Charles .A. Foundations of Physical Education and Sports. London: C. V. Mosby Company, 1983.

Bucher, Charles. A and E William. Practice Fitness for College men Life. Missouri: C.V. Mosby Company Publishing, 1985.

De Geus, E. J. et. al, Regular Exercise and Aerobic Fitness in Relation to Psychological Make-Up and Physiological Stress Reactivity. Amsterdam, Netherlands: Vrije Universities, 1993.

Haneefa, K.P, Jobin Jose. Yoga: Chikisayum Abyasanavum. Sujeevanam Publications, Kohinoor: 2012

Hawking, Stephen and Leonard Mlodinow. The Grand Design. Bantam Books, New York: 2010.

Noshamani. S, Swasthavritam, Keralabhasha Institute Thiruvananthapuram, 1996.

Patanjali. Yoga Sutra. Trans. Kumaranashan. Kottayam: NBS, 1973

Sreedharan, P. K, Yogadarshanam Noottandukaliloode. Mathrubhumi Bookhouse Kozhikode. 2013

Swami Shanthi Dharmananthaswaraswai. The Holistic Yoga. DC Books Koayam: 2009.

Swami, Yogic Management of Common Diseases. Yoga Publications Trust

Vijayaraghavan. N, Yogayiloode Rogashamanam. Manorama Books Kottayam: 2012