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The comparative study on vital capacity of high school volleyball and handball players of Mangalore Taluk of Karnataka state

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Abstract

The objective of the study is to analyse “The comparative study on vital capacity of high school volleyball and handball players of Mangalore taluk of Karnataka state. For the study of experiment a test know as spirometry or pulmonary function test has been used. A systematic study and approach was made to collect the data. A spirometer was used to measure pulmonary function test or vital capacity of volleyball and hand ball players. This was used to assess how well player’s lungs work, by measuring air inhale and exhale. The spirometer was also used to diagnose lung capacity and breathing capacity of these players. The result recorded the total lung capacity or vital capacity. Ten Taluk level winners of volleyball and Ten Taluk level winners of handball, belonging to Mangalore Taluk served as subjects for this study. Proper orientation was provided to the subjects prior to the test administration. Vital capacity means the amount of air which the lungs can store and also capacity to involve in a physical activity for a longer period with the help of oxygen. Lung is a pair of respiratory organ in a human body where in exchange of oxygen and carbon dioxide takes place and the amount of air which the lungs can store the capacity of an individual to involve in a physical activity for a longer period of time with the help of the oxygen.

Keywords: Vital capacity, high school, volleyball and handball players, Mangalore Taluk, Karnataka state

Introduction

Physical Education is an important part of education. The physical refers to body with reference to various bodily characteristics like physical strength, physical development, physical process, physical health, and physical appearance. It refers to body as contrasted to mind. Therefore, when education is added to the physical and used as physical education, the process of education moves along with physical activities. Physical education encompassing a large number of physical activities is concerned with human movements. Physical education is primarily concerned with physical development and mental development. It enables the child to have total physical growth and development to lead a happy and prosperous life as an adult member of the community. Fitness it should not be surprising state that physical fitness and exercise improve long term health. Studies have shown that sedentary people have twice the risk of respiratory diseases than active people, as well as, a higher risk of stroke, lungs cancer and back injuries. A regular physical activity helps to prevent lung diseases and increase the function of the breathing process, build muscles and endurance, enhance flexibility, thus protecting the body from injury. Consistent physical activity has also been known to reduce blood pressure, blood lipids, glucose tolerance thus helping prevent respiratory diseases and diabetes, hypertension, heart diseases. When you engage in physical activities you burn calories. The more intense the activity, the more calories you burn and improve the breathing process. Exercises combat health condition and diseases, such as inflammatory lungs, asthma, respiratory diseases. chronic obstructive pulmonary diseases, lungs cancer, respiratory syncytial virus diseases etc. Asthama diseases infect the airways leading to the loss of control over the muscles that line the bronchi-bronchioles. The athlete starts to contract faster and stronger leading to difficulty breathing. In fact regular physical activity can help you prevent or manage a wide range of health problems and concerns.

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Regular physical activity can improve respiratory system and boost your endurance. Exercise and physical activity deliver oxygen and nutrients to your entire human body system, tissues and help respiratory system work more efficiently. When your lungs and heart work more efficiently, you have more energy to go about your daily chores.

Aerobic endurance is the ability to exercise whole body for a long period of time like jogging, walking, when to reach anaerobic zone your body cant supply enough oxygen for your muscles because of starved reserve fuel and waste product such as lactic acid accumulate. This makes your body stiff. Muscular strength is a capacity of bodies muscles to generate large amount of force. Having good muscle endurance is crucial for every fitness activity.

Respiratory system is a set of a organs that allow a person to breath and exchange oxygen and carbon dioxide throughout the body. In humans nasal passages, larynx, trachea, bronchial tubes and lungs are the respiratory organs. The main organ is lungs. Respiratory system is very essential to sports activities. Shortness of breath is major limitation in most athletes, but in about a third muscle fatigue is an even greater problem. Although exercise does not improve lung function, training helps many athletes with lung diseases by strengthening lung muscles thus improving endurance and reducing breathlessness. Proper warm up and cool down may prevent or reduce the incidence of injuries and induced asthma. The main function of the respiratory system is gaseous exchange. Fast moving exercise causes your heart and breathing rates to increase, delivering fresh oxygen to your blood stream and energy to muscles. Your lung capacity can be increased through regular aerobic workouts, but only to modest amount. According to Doctor Tim Hoakes author of 'The love of running', "consult your primary care physician to determine which forms of exercises would benefit you". Regular aerobic exercise strengthens and tones the lungs and heart, enabling the pulmonary system to increase the maximum amount of oxygen that lung can handle. Exercise can make muscles stronger and improves the range of motion in joints, assisting you in performing tasks that require physical activity. The average person's lung capacity can be improved only 5% to 15% even with frequent intense aerobic workouts. According to Noakes everyone is born with a specific maximum lung capacity called Vo_2 maximum, which refers to the rate of oxygen flow when your heart rate increases. During aerobic exercise your oxygen consumption increases. This provides the necessary energy to your muscle for the strengths activity. Maintaining a healthy weight, increasing the body efficiency, improving the state of mind, energy system, practice skills, muscular endurance through physical exercises that engage large muscle groups is a sustained effort that raises your heart rate and increasing your breathing process. Lungs become more efficient in delivering oxygen to the blood removing carbon dioxide waste. The muscles support your lungs and the diaphragm gets stronger.

It is observed that there difference in physical fitness between volleyball and handball players. The researcher is coming from sports background and is very much interested to know any difference in physical fitness and lung capacity among the volleyball and handball players. Hence the researcher is motivated to take this study "A comparative study on Vital capacity of volley ball and hand ball players of high school boys under the age of 14-16 years".

Statement of the problem

"The comparative study on vital capacity of high school volleyball and handball players of Mangalore Taluk of Karnataka state.

The Significance of Study

1. The result of the study may help physical education teachers, coaches, doctors, trainers and sports professionals to know the level of vital capacity for volleyball and handball players.
2. This study may help to compare and analyse the vital capacity between the volleyball and handball players.
3. This study may help to know the current status of the vital capacity.
4. This study may be helpful to offer ideas and prepare training method for improving vital capacity.
5. Helps to improve efficiency in specific activities.
6. This study will be useful to suggest exercise for improving breathing process.
7. This study will help the players to choose their sport based on their vital capacity and fitness levels.

Delimitations

- ❖ This study was delimited to Mangalore Taluk.
- ❖ This study was pertaining for high school boys under 14-16 years only.
- ❖ This study is includes only state syllabus high school students.
- ❖ This study was delimited only for Volley ball players and Hand ball players of high school level.

Limitations

- The health status of players while conducting the test was beyond the control of investigators.
- The status of mind of the students was also not taken into much importance
- The psychological conditions and nutritional status of the subjects were not measured in this study.
- The interest enthusiasm, fitness of the plays while conducting test was beyond the control of the investigators.
- Living conditions, atmosphere, socio economic and diet factors were not considered.
- To get the best out of the subjects during the periods no special incentives were employed.

Hypothesis

$H_0 \rightarrow$ There is no significant difference between vital capacity of volleyball &

Handball players

$H_1 \rightarrow$ It was hypothesized that is a significant difference between vital capacity

Of volleyball and hand ball players

Objectives of the study

- ❖ To find out the vital capacity of volleyball and hand ball high school players.
- ❖ To compare the volleyball and handball players based on their vital capacity
- ❖ To test whether there is a significant difference between the vital capacities of volleyball & handball players.

A research study will have many objectives to be fulfilled but the current research being time bound and limited to an academic achievement. Only a few objectives are stated above.

Definitions of related terms

Vital capacity

Vital capacity refers to the maximum amount of air the person is capable of expelling from their lungs after maximum inhalation. This is equal to the sum of inspiratory reserve volume you can measure a person's vital capacity using a regular or wet combining this with the other physiological measurements, you can measure the vital capacity to help determine if the patient is suffering from lung diseases. Note that physical exercise can help to increase vital capacity while smoking decreases it.

Normal Vital Capacity

Adult have a vital capacity between 3.5ltr. The vital capacity an individual exhibits will vary based on their height, weight, sex, age and ethnicity. A low vital capacity associated with a disability, ability or chronic respiratory disease.

Exercise: Physical exertion of sufficient, intensity, duration and frequency to achieve or maintain fitness or other health or athletic objectives.

Endurance: Nutrition and fitness Guru Dr. Philip Waffatone consider endurance to be a study state level of activity, where one can develop and sustain relatively high speed at sub maximum effort overtime the ability to develop higher speed while remaining predominately aerobic increasing the percent fat burning and decreasing the dependence on carbohydrate utilization with training.

Funk and Wagnall's dictionary defines endurance as the capacity or power to endure, ability to suffer pain, hardship or other percentage of stress without succumbing patient fortitude.

Lungs: Pair of respiratory in human body where in exchange of oxygen and carbon dioxide takes place with the environment.

Spiro meter: An instrument for measuring the air capacity of the lungs, measuring air inhaled into and exhaled out of the lungs. It provides a simple way of determining or measuring the breathing capacity by means of a spirometer. Result can record total being capacity that is vital capacity. Spiro meter is a common test used to assess how well your lungs work by measuring how much air you inhale/exhale. Spiro meter is used to diagnose Asthama. Chronic obstructive pulmonary disease and other conditions that effect breathing.

Sports: Sports are a physical activity that is governed by a set of rules or customs and is often engaged competitively. A particular form of activity, a form of recreational games. It is an activity involving physical exertion and skills that is governed by a set of rules and regulations and often undertaken competitively. It is an active pass time recreation.

Physical education: Barrow defines physical education as an education and through human movement where many of educational objectives are achieved by means of big muscle activities involving sports games, gymnastic, dance and physical exercise.

Cardio Respiratory Ability: According Queen Elizabeth cardio respiratory endurance is the ability of the body circulatory and respiratory systems to supply fuel and oxygen during sustained physical activity.

Fitness: The condition of being physically fit and healthy. Diseases and lack of fitness are closely related. It is the quality of being suitable to fulfill a particular role or task.

Lung volume and lung capacity: It refers to the volume of air associated with different phases of the respiratory cycle lung volume are directly measured. Lung capacities are inferred from lung volumes. The average total lung capacity of an adult male is about 6 ltr of air. Tidal breathing is normal, resting breathing. The tidal volume is the volume of air that is inhaled or exhaled in only a single such breath. The average human respiratory rate is 30-60 breath per minute at birth decreasing to 12-20 breaths per minute in adults.

Respiratory System: System for taking in oxygen and giving off carbon dioxide through the nose, nasal passage, pharynx, larynx, trachea, bronchi and lungs. The main function is for gas exchange between oxygen and carbon dioxide which is process called respiration, the main organ is the "lungs".

Methodology

The study intends to find out the lung capacity of high school volleyball and hand ball players (boys) below 16 years of age, in Mangalore Taluk. For the study of experiment a test known as spirometer or pulmonary function test has been used. A systematic study and approach was made to collect the data. A spirometer was used to measure pulmonary function test or vital capacity of volleyball and hand ball players. This was used to assess how well player's lungs work, by measuring air inhaled and exhaled. The spirometer was also used to diagnose lung capacity and breathing capacity of these players. The result recorded the total lung capacity or vital capacity. The procedure of collecting data has been presented in this chapter.

Subjects: Ten Taluk level winners of volleyball and Ten Taluk level winners of handball, belonging to Mangalore Taluk served as subjects for this study. Proper orientation was provided to the subjects prior to the test administration.

Physical fitness status of volleyball and hand ball players

The sportsman exercise regularly in the ground or stadium and involve in activities such as running, jumping, throwing, stretching and playing of the game. All these activities ensure that the players are physically fit and enhance their performance in their respective sport.

Apparatus: Spiro meter, weighing machine, stadiometer, nasal clip, mouth flow meter.

Place of Testing: The test was conducted on the subjects at A.J. Institute of Medical Science Mangalore.

Measurement: Three values were taken for selected parameters of all subjects and the best of these values was recorded.

Method of Data Collection

Measurement of lung capacity by pulmonary function test was done under the supervision of doctors, Lab technician and investigator. Clear demonstration and explanation was given

to the subject by the lab technician and investigator and they were well educated regarding the procedure and method that was to be followed prior to and during the administration of the test.

Method of using Spiro meter instrument

- Hold the mouth flow device by the handle.
- Before each use, make sure the spirometer is reset to starting value.
- Subject is asked to sit straight, their mouth should be empty, ensure normal breathing condition.
- Subject should put the mouth piece in the mouth and seal the lips and teeth lightly around the mouth piece.
- Lab technician should close the nasal breathing with the help of nose clip.
- Subject should take three normal inhalation and exhalation. Following this process they should take deep inhalation and forceful exhalation.
- We should blow out as hard as we can, Remember a “deep breath” or ‘fast breath’. Fast is better than a “slow blow”.
- Note the reading values when the flow of breathing is maximum.
- Record the best readings on a vital graph sheets.
- Lab technician should take subjects height and weight before conducting test.

Procedure: Subject is asked to sit in proper position (back straight) take normal three inhalation and exhalation, then go to the deep inhalation of maximum volume of air from the atmosphere and forcefully blow it through the mouth flow device simultaneously bending the upper body slightly forward.

When the air is blown through the mouth piece reading graph shows on the screen the P.F.T (Pulmonary Function Test) vital capacity of the subject. Lung capacity was measured with the subject in sitting or standing posture. Each subject was oriented to the procedure by a preliminary test trail, followed by the actual test. An attempt was made to motivate each subject to produce maxima effort prior and during each test. The best of the trail measured recorded was taken.

Analysis and Interpretation of the Data and Discussion

This investigation was meant to compare the lung capacity of high school volleyball players and handball players. Ten volleyball players and ten handball players from different high schools were taken as subjects for this study. Their lung capacity was measured by using spirometer. The statistical analysis to which the data was subjected has been presented in this chapter. The data analysis for the present research was done quantitatively with the help of descriptive statistics. The descriptive statistical techniques like mean, standard deviation

and t-test were used to find out significant difference between the variables were used during data analysis.

Table 1: Vital Capacity of High School Volleyball Players

SI No	Name	Vital Capacity
1	Shashank	80
2	Rovin	88
3	Ethan	94
4	Yajnesh	105
5	Jithesh	118
6	Rahul K	69
7	Rahul	95
8	Jemin	78
9	Jayavardhan	81
10	Annol	78
Average		88.6

Table 1 show that the volleyball players have an average of 88.6 level of lung capacity

Table 2: Vital Capacity of High School Handball Players

SI No	Name	Vital Capacity
1	Shreyas	57
2	Prathik .P	69
3	Rahul	74
4	Beeresh	75
5	Vinod.S	77
6	Subhash	82
7	Sunil	87
8	Veeresh	87
9	Manjunath	91
10	Ramesh	95
Average		79.4

Table II shows that the handball players have an average of 79.4 level of lung capacity.

Table 3: Comparison of Vital Capacity of Handball Players and Volleyball Players with Statistical Analysis

Group	Mean	SD	T-Value	Table Value
Volleyball Players	88.6	14.70	0.135	1.734
Handball Players	79.4	11.37		

Table 1 and table 2 shows that ,the mean values of vital capacity of lungs of high school Volleyball players and handball players is 88.6 and 79.4 respectively, Since the obtained t- ratio of 0.135 is lesser then the table value of 1.734 at 0.05 level of significance, we may accept the null hypothesis Ho. This it may be concluded that there is a no significant difference between the vital capacity of lungs of both volleyball and handball players in high school level Graph 1. Comparison of vital capacity of hand ball players and volleyball players

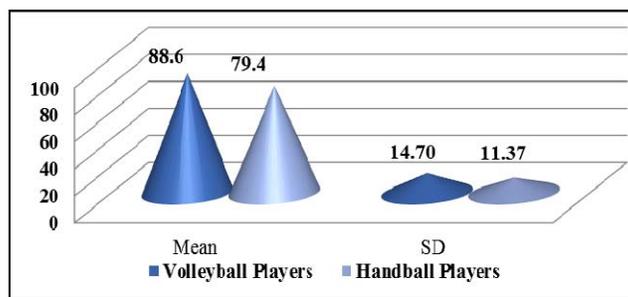


Fig 1

The graph shows that the difference in mean is very less between volleyball players and handball players. This indicates that there is no major difference between lung capacity of high school volleyball players and handball players. With this we can understand that the physiological fitness of volleyball players and the handball players in high school level has no significant difference. Both players are engaged in different kinds of physical activities under the right direction of physical education teachers. The ability of the heart and lungs with the adequate amount of oxygen and nutrients to meet the demands for the long period of time during training, coaching or day to day physical activity.

Discussion on Hypothesis

H₀ - Hypothesized that, there is no significant difference between vital capacity of volleyball and Hand ball players.

H₁. Hypothesized that, there is a significant difference between vital capacity of volleyball and Hand ball players.

The results of the study revealed that there is a no significant difference between vital capacity of volleyball and Hand ball player's. Hence H₁ is rejected and null hypothesis is accepted.

Summary, Conclusion, And Recommendation

Vital capacity means the amount of air which the lungs can store and also capacity to involve in a physical activity for a longer period with the help of oxygen. Lung is a pair of respiratory organ in a human body where in exchange of oxygen and carbon dioxide takes place and the amount of air which the lungs can store the capacity of an individual to involve in a physical activity for a longer period of time with the help of the oxygen. Lung capacity still continues to be one of the important long volumes frequently appraised in respiratory physiology. The study was taken to assess and compare the lung capacity of high school volleyball and handball players. A spirometer was used to measure the lung capacity using the standard method.

The data collected was statistically analyzed and the significant was established by 't' test method. The level of confidence chosen was 0.05 levels to test the null hypothesis and it was found that no significant difference in lung capacity existed between high school volleyball and handball players of Mangalore taluk. Hence hypothesis 1 was rejected and null hypothesis was accepted. The study revealed that in the age of 14-16 years the volleyball and handball players of Mangalore taluk did not show much difference in their vital capacities. This may have been a result of discontinuous training of these sports persons during the year. However, it may be possible that lung capacity would improve a lot with planned physical activity over a prolonged time. The taluk level high school handball and volleyball players are given proper training during the tournament period. However, this training is discontinuous, due to various factors such as importance to academics, changing weather conditions, etc. This may be one of the reasons for less significant difference between the lung capacity of high school volleyball and handball players.

Conclusion

With the limitation of the present study and on the basis of findings, the following conclusions may be made.

The regular and systematic physical activities and proper training would increase the lung capacity of an individual, and this would vary from one sport to the other, as each sports demands different type of exercises and physical activities.

This reveals lung capacity has a direct bearing on activity status.

Recommendation

In the light of findings and conclusion drawn the following recommendation are made.

1. While designing the training programme for players the lung capacity of the players must be considered.
2. The selection of players for various sports can be done on the basis of their lung capacities.
3. Suitable training programmes may be chalked out for the improvement of lung capacity of the players.
4. Similar study can be taken up for different age groups.
5. Similar study can be conducted by taking national sports man also.

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