SUMMARY

INTRODUCTION

The world of games and sports has crossed many milestones, as a result of different achievements in general and their application in the filed of sports in particular. Scientific investigation into performance of sportsman has been playing an increasingly importance role to attain excellence of performance in different sports. Now the sports-man have been able to give out standing performance because of involvement of new scientifically substantiated training methods and means of execution of sports exercise such as sports techniques and tactics, improvement of sports grass, and equipment, as well as other components and condition of the system of sports training.

Physiological and Anthropometric measurement and motor fitness variable play a vital role in almost all games and sports. Sportsmen concentrate on the development of speld, strength, agility flexibility, endurance etc. as a part of preparation in their respective sports General motor abilities assist a sportsman in learning specific skills from a solid base over which he can develop excellence in the particular game he is involved

Performance in certain events and activities has already reached miracle increase in speed performance by .01 seconds seems to be different and challenging task. In the present era development of science and technologies has revolutionized the field of sports. Every day the new records are being established in different sports activities. International level competitions sports presence bringing honour of for their countries the field of physical education and sports as also affected from such developments of science and technologies over the last century, and sports has captured an important place in the world. This is so because the application to the field of sports and physical education
has enabled modern youth to develop physical capabilities beyond anything earlier imagined.

The sports scientists and coaches are demanding full time involvement and round the year dedicated practice of sports to reach the pinnacle of their performance. The international community of sports lovers is also curiously looking for better and superb performance of sportsman and women in their respective fields.

Aspirations and expectations of the people pertaining to the performance of sportsman all over the world are going higher and higher. The high level of performance by sportsmen and要求 a highly scientific approach and it should be done right from the level of identifying talents.

**ANTHROPOMETRY**

One of the fundamentals of this approach is the study of human measurements or anthropometry. Anthropometry is a branch of ergonomics that deals specifically with the measurement of people, particularly with measurements of body size, shape, strength and working capacity (Pheasant, S.T., 1998). This measurement data is used to describe or paint a picture of the user population for a particular measure of the body. By applying anthropometry, we attempt to design the working environment around the person, rather than placing constraints on them because they have to adapt to what is provided. If anthropometric factors are taken into consideration when products are designed, the outcome is likely to be increased acceptability, improved ease and efficiency of use, and therefore greater operational safety and cost effectiveness. When considering the design and use of equipment, the term ‘average person’ is often referred to and used. However, very few people would actually fit such a pattern. The body is made up anthropometrically of several functional parts, such as sitting height, forward grip reach, waist height and head circumference. Height is often used as a design criterion, but a ‘tall’
A person can either have a long or short body and long or short legs. Thus, although many people will fit average garments (using clothing as an example), and garments can be sized to increase the probability of a reasonable fit, the efficiency of the garment or ensemble may be compromised, especially when free movement is further influenced by, for example, wearing breathing apparatus and a harness. When products are designed around the ‘average person’, many of the population are excluded from using them, since they fall well outside of this average.

Changes in body dimensions reflect the overall health and welfare of individuals and populations. Anthropometry is used to assess and predict performance, health and survival of individuals and reflect the economic and social well being of populations. Anthropometry is a widely used, inexpensive and non-invasive measure of the general nutritional status of an individual or a population group. Recent studies have demonstrated the applications of anthropometry to include the prediction of who will benefit from interventions, identifying social and economic inequity and evaluating responses to interventions.

Anthropometry can be used for various purposes, depending on the anthropometric indicators selected. For example, weight-for-height (wasting) is useful for screening children at risk and for measuring short-term changes in nutritional status. However, weight-for-height is not appropriate for evaluating changes in a population over longer time periods. A clear understanding of the different uses and interpretations of each anthropometric indicator will help to determine the most appropriate indicator(s) for program evaluation. For more detailed explanations of age and sex specific appropriate anthropometric uses. Key terms are defined in the glossary.

The four building factors or measures used to undertake anthropometric assessment are:

1. Age
2. Sex

3. Length

4. Weight

Each of these variables provides one piece of information about a person. When they are used together they can provide important information about a person’s nutritional status. The actual measurement of age, weight and height of children requires specific equipment and techniques which are described later. When two of these variables are used together they are called an index. Three indices are commonly used in assessing the nutritional status of children:

- Weight-for-age;
- Length-for-age or Height-for-age;
- Weight-for-length or Weight-for-height.

There are many other anthropometric measures including mid-upper-arm-circumference (MUAC), sitting height to standing height ratio (Cormic Index), and many skinfold measures. This guide will concentrate on the measurements and interpretation of weight and height in children. Anthropometric measurements were central concerns of the first phase of the scientific era of measurement began in 1860.

Current interest in anthropometric measurements on these areas, growth measurements body types and body composition, prediction of growth pattern and prediction of success in motor activities as well as assessments obesity.

PHYSIOLOGY

Physiology is defined by dictionaries as ‘the science of the normal functions and phenomena of living things’.

Historically, the subsequent meaning of ‘physiology’ is well illustrated by the way in which the word is used in the two following quotations. The first is from 1704 (J. Harris, Lexicon Technica): ‘Physiology, is by some also
accounted a Part of Physick’ (i.e. Medicine), ‘that teaches the Constitution of the Body so far as it is sound, or in its Natural State; and Endeavour’s to find Reasons for its Functions and Operations, by the Help of Anatomy and Natural Philosophy’. The second (a definition of Charles Darwin's colleague T. H. Huxley), 150 years later, is virtually identical to current usage: ‘whereas that part of biological science which deals with form and structure is called Morphology; that which concerns itself with function is Physiology’.

Physiology has a complex, deep relationship with the approach of reductive science. This is in part because ‘function’, particularly ‘interesting’ or unexpected function, emerges from interactions that can be found only in relatively complex systems; hence physiologists are unlikely (unless they are working on essentially trivial problems) to find that molecular structures in isolation give more than partial insight into the problem under attack. ‘Explanations’ of physiological questions seem more likely to arise from combining such reductionist approaches with, on the one hand, thermodynamics and, on the other, control systems theory. Life depends on ‘non-equilibrium’ properties — i.e. on complex interactions that require the constant expenditure of energy to maintain them. And networks of information and control (the nervous system, hormones etc.) are central to the development, function, and probably the evolution of complex biological systems.

Seen in this way, the information encoded in the genes provides a very challenging experimental opportunity for physiologists. To have read the sequence of DNA is only a small step on the route to understanding how and to what extent our genes build and control our bodies, and cause disease. Genes do just one thing: they translate their information into proteins. To understand how the products of genes work individually and together to create the magnificent complexity of a whole organism is part of the exciting challenge that faces the revitalized science of physiology in the twenty-first century. Indeed, the prospects for physiology are wider still: it will ultimately need to
link such understanding ‘upwards’ to such disciplines as experimental psychology, ecology and human biology.

**Physiological Parameters**

Physiological parameters may be defined as those parameters which are directly linked with various physiological systems and may be voluntary or involuntary, such as pulse rate, blood pressure vital capacity etc.

Physiological parameters have very serious implications on the health and well being of individuals. It is defined as the degree of task under specific ambit conditions. Most authors define physical fitness as a capacity of carrying out every day activities i.e. work and play without excessive fatigue and with enough energy in reserve for emergencies.

**KABADDI**

Kabaddi is aptly known as the “Games of The mass” due to its popularity, simple, easy to comprehend rules, and public appeal. The game calls for no supplicated equipment what so ever, which it very popular sport in the developing countries. Though it is basically an out door sport played on clay court, of late the game is being played on synthetic surface indoors with great success. The duration of the game if 45 minutes for men & junior boys with a 5 minutes break in between for the teams to change sides in the case of women/girls & sub-junior boys, the duration of 35 minutes with a 5 minute break in between Kabaddi is a combative team game, played with absolutely no equipment, in a rectangular court, either outdoors with seven players on the ground in each side. Each side take ultimate chances at offence and defense.

Kabaddi is perhaps the only combative sports in which attack is an individual attempt while defence is a group effort. The attack in Kabaddi is known as “raid.” The ants touched by the raider before the returns to how court. These players can resume play only when their side scores points against
the opposite side during their raiding turn or if the remaining players succeed in catching the opponent’s raider.

The game calls for agility, good lung capacity, muscular co-ordination presence of mind and quick responses. For a single players to take on seven opponents is no mean task, requires dare as well as ability to concentrate anticipate the opponents moves.

The Asian Amateur Kabaddi federation was formed in the year 1978, during the silver jubilee celebrations of National Kabaddi Championship in India organized at Bhilai, Madhya Pradesh. The first Asian Championship in Kabaddi was organized in Calcutta, in the year 1980. A goodwill tour was organized in the year 1981 in which, the Indian men & women teams visited Thailand, Japan and Malaysia to play exhibition Kabaddi matches. Federation cup Kabaddi matches also commenced in the year 198.

Kabaddi was included as a demonstration game in the IX Asian Game hosted by India in the year 1982. In the year 1984, an open international tournaments was organized at Bombay (Now renamed Mumbai), in India. During the Tri centenary celebrations of the city of Calcutta, an inter-national invitation Kabaddi tournaments was organized in the city.

Kabaddi in now a very popular game and is a regular sport in Asian Games, Asian Indoor Games and Asian Beach Games apart from SAF Game. Kabaddi will be a demonstration sport during commonwealth games 2010 at New Delhi.

KHO-KHO

Kho-Kho, an ancient game of undivided India, Probably was derived from the different strategy and tactics of “Kurukshetra” was in Mahabharata. The chariot fifth during the war and zigzag pathways followed by the retreating soldiers indicates the formation of chain play a defense skill in the game of Kho-Kho. On the 13 the day of war, the chief of Kaurav Army, Guru Dronacharaya drew a typical strategic formation chakrabyuha keeping
Jayadratha in main entrance with 7 soldiers to draw in and kill the enemy. Bir Abhimannyu, the son of Arruna, Entered into the trap but could not get his away out and in the process got killed. He fought gallantly alone against 7 soldiers adopted by Abhumannyu resembles the idea of Ring play a defense tactis in Kho-Kho game.

In the year 1936, during the event of Berlin Olympic one Kho-Kho team from Pune exhibited the salient feature of the game of Kho-Kho in Berlin. Kho-Kho, based on natural principals of physical development, fosters a healthy combative spirit of team understanding. Asian championship ’96 was held in ‘tera flex’ court at Kshudiram Anushilan Kendra, Kolkata.

Asian Kho-Kho federation (AKKF) came into being after the demonstration game during 3rd SAF Games held in Kolkata in 1987. Kho-Kho made its entry into international sports area in a first Asian Kho-Kho Championship 96 held at Kolkata in 1996 under the Auspices of AKKF & KKFI and organized by the west Bengal Kho-Kho Association (WBKKA), India and Bangladesh were the winners and runner up respectively. The participants are Bangladesh, Pakistan, Sri-Lanka’s Nepal and host India. In 2nd Asian Kho-Kho Championship in Dhaka 2000 India, Sri Lanka, Pakistan, Thailand, Japan and host Bangladesh participated.

The game of Kho-Kho is based on natural principals of physical developments. It is vigorous and fosters a health combative spirit among youth. It is not merely running with speed but its CHASE a natural instinct to overtake, to pursue to catch a kill. No doubt speed is the heart and to stand to a relentless pursuit of a minutes at a stretch (turn) this heart demand stoutness stamina. In turn a physically fit youth enjoys it and the spectators who watch enjoy a trilling sport to their satisfaction. The game is played in two innings. A team consists of 15 players. However 12 players are nominated for a match and only a take to the actual game initially. Every team has to chase and defend for
a minutes each twice in a match that thus consists of a 2 innings. Chasing or defending once in an inning is termed a “Turn” of the particular act.

There is a rest of minutes in between two innings and 5 minutes in between two turns for a change over. Controlled sprinting Dodging, dividing are few skills exhibited during the game which won by a team that scores more points (one point is awarded for away defender, who is out). The game can be played on any surface that suits open field sports. As on today it is played on grounds prepared from or earth or even on turf. Needless to say that synthetic ground and playing indoor is no card.

Through are nature of two game Kabaddi “Kho-Kho” seems to be similar yet there is some difference in skills and nature a activities of the two games. The size of court definitely denominates the difference in playing situation in the two games. As a matter fact, different qualities such as strength, speed, endurance, agility, co-ordinate balance, turning abilities. The best performance of sports person in kabaddi and Kho-Kho or any other games greatly depend upon various factors such as physical fitness, skill perfection, tactical understanding, psychological, anthropometry, sports medicine, social and physique (as physiology, morphology, Body composition factors) in which physique and physical fitness components are the physical educators and trainers are mere interested in physiology and anthropometry as it pertains to the selection of some problems in the field, for example has deviation in height seriously influence performance. In tests in separate area? Should body build besides being reviewed to clarify standard sports training’s. the human body, size and from varies in a variety of ways and depend upon sex, age race and geography one of the main concerns of the physical anthropology and human physiology is to acquire and convey he knowledge on the true way and reasons of individual variability and differentiation.
Anthropometry and physiology play an important role in deciding the particular build of the body with various measurements of the segments of the body; it has also its importance in the field of kabaddi and Kho-Kho game. Some what or altogether the body height length of various level and measurements of the varies body segments, basal pulse rate blood pressure Haemoglobin, vital capacity and body composition have definite effects on the performance of these game players. The investigator in the present study will make efforts to test. This hunch to compare the difference between the various physiology and Anthropometric measurements of Kabaddi and Kho-Kho players.

Anthropometric and physiological characteristics in every field is an important, determining and influential factor in the performance of athletes. Achieving the optimum athletic performance and best position in sport requires athletes who possess special anthropometric and physiological characteristics, as well as using scientific exercise programs and having access to sport sciences experts and to enough facilities. On the other hand, a lack of a deeper understanding of the education of elite athletes, in addition to not paying attention to their personal differences, may lead them to choose sports which are not compatible with their physical characteristics and abilities. Theoretically speaking, being aware of the anthropometric and physiological characteristics of an elite athlete will pave the way for his success. Of course, there are several factors which influence the achievement of the best athletic performance, including, without doubt, physical and physiological abilities. Although every athlete, for his optimum performance, needs to be in possession, to a certain degree, of features such as explosive power, agility, speed and other physical and physiological abilities. All sport events requires each of these features, which demands special physical characteristics for success.
STATEMENT OF THE PROBLEM

The present problem is stated as a “Comparative study of selected physiological and Anthropometrical variables of Kabaddi and Kho-Kho players of Haryana.”

OBJECTIVES OF THE STUDY

1. To compare the linear measurements such as height, weight, sitting height, Total leg length, thigh length, trunk length, total arm length, upper arm length, fore arm length, hand length, foot length and foot width of Kabaddi and Kho-Kho players.

2. To compare the body circumfrances of the shoulder chest, abdomen, hip, thigh and calf of Kabaddi and Kho-Kho players

3. To compare the bone diameters such as biacromial, bitrochanteric, femur bi condylor and ankle of Kabaddi and Kho-Kho players of Haryana.

4. To compare the skin fold measurements such as biceps, triceps, subscapular, suprailliac, thigh and calf of Kabaddi and Kho-Kho players of Haryana.

5. To compare the body composition variables i.e. body density, fat weight, lean body mass (LBM) and fat % of Kabaddi and Kho-Kho players.

6. To compare the physiological variables i.e. basal pulse rate, vital capacity, Haemoglobin and blood pressure of Kabaddi and Kho-Kho players of Haryana.

HYPOTHESES

Keeping in view the objectives of the present study the following hypothesis have been constituted :
1. There would be significant differences in linear measurements between Kabaddi and Kho-Kho players of Haryana.
2. There would be significant differences in Body circumferences between Kabaddi and Kho-Kho players of Haryana.
3. There would be significant differences in bone diameters i.e. biacromial, bitrochantric, femur bicondylor and ankle between Kabaddi and Kho-Kho players of Haryana.
4. There would be significant differences in skin fold measurements like biceps, triceps, subscapular, suprailliac, thigh and calf between Kabaddi and Kho-Kho players of Haryana.
5. There would be significant difference in body composition i.e. body density, fat %, fat weight, and lean body mass between Kabaddi and Kho-Kho players of Haryana.
6. There would be significant differences in Physiological variables i.e. Blood Pressure, Haemoglobin, vital capacity, and basal pulse rates of Kabaddi and Kho-Kho players of Haryana.

DELIMITATION OF THE STUDY

1. The present study was delimited to selected Kabaddi and Kho-Kho players of Haryana, who will be participating in Senior State Championship and Haryana Olympic Games of Kabaddi and Kho-Kho.
2. Only 120 male players of Kabaddi and 120 male players of Kho-Kho were taken as the subject.
3. Subject age ranging between 18-27 years.
4. Subtracts were measured tested for different anthropometric variables by using venire calliper, anthropometric rod, skin fold calliper and measuring tape.
5. The subtracts were also measured for vital capacity by digital peak flow meter, pulse rate and blood pressures measured by digital apparatus. Haemoglobin test were done by the lab technician in pathological lab.

6. For assessing Body composition, Durnin and Rehman’s equation was used to find out the body density and fat percentage was calculated by using Siri Equation (1956)

**LIMITATIONS**

1. Daily restive of the Kabaddi and Kho-Kho players might have and an effect on the study is taken as the limitation for the study.
2. Food habits of the Kabaddi and Kho-Kho players might have and an effect on the study is taken as the limitations for the study.
3. Social background of Kabaddi and Kho-Kho players is also taken as the limitations for the study.

**DEFINITION OF THE TERM USED**

The various terms used in the study are defined as follow:

**Kabaddi**

Kabaddi game is played in a marked rectangular are which is divided into two equal courts. A player of one team enters with the cant into court of the opponent team consisting of seven players and tries to affects them.

**Kho-Kho**

Kho-Kho is also played in a rectangular marked area with two poles fixed at the two longitudinal sides of the rectangle. The marking on the rectangle and sitting arrangement of 8 players on the central line is done with the fixed standards. In Kho-Kho, one player chases the three defensive player of the opponent team around, the rectangle, the poles and around the sitting players.
Age

Asimov and other (1966) defined age as the period, usually expressed in number of user that has elapsed since the birth of a living person.

Weight

Onions (1948) expressed that the body weight is the measurement of physical or material frame of the whole material organism (men/women) as determined by means of weighing.

Anthropometry

Anthropometry is a branch of ergonomics that deals specifically with the measurement of people, particularly with measurements of body size, shape, strength and working capacity (Pheasant, S.T., 1998).

Linear Measurements

It is the vertical distance from the horizontal ground. The stature was measured with an anthropometric rod. The measurement was taken with the subject standing straight against an upright wall touching it with needs, buttock and back. The head was oriented in the Frankfort plane (the upper border e.g. the tragus of the ear or the tragion and the lower border of the eye socked where on a horizontal line) and the needs were together, and the hands were hanging downward. The subject was stretched upward by a gentle traction on the mastoid region, taking care that the heel were kept on the ground. The anthropometer was held vertically in front of the subject in mid-segital plane and the horizontal movable bear was brought down touch the point the stature was recorded to the nearest of a millimeter

Body Composition

The four skin fold measurement were used to estimate the density, percent fat, lean body mass and fat weight as the main constituents of body composition.
**Body Density**

This indicates the weight in grams per cubic centimeter of body tissues. Body density is estimated from the sum of four skinfold measurements (Biceps, Triceps, Subscupular and Suprailiac). In the present study body density was estimated using Durning and Reliman’s equation (1967).

**Fat Percentage**

Percent fat is the amount of fat in 100 kg. of body weight.

**Fat Weight**

This is the weight of the overall body fat, which is deposited in the subcutaneous area of the body. About fifty percent of the depot fat is stored in specialized cells under the skin, the thickness of which depends upon the amount of fat in the body.

**Lean body mass**

This is the amount of muscle in the body. Lean body mass is considered to be divisible into biological constant proportions. These would include water (70-72%), minerals (7%) and organic substances including an undermined but probably constant percentage (2-3%) of essential liquids in bone-marrow, the central nervous system and other organs. In other words, the lean body mass includes the weight of the essential fat (Bakhnke and Wilmores, 1974).

**Physiology**

The scientific study of an organism's vital functions, including growth and development, the absorption and processing of nutrients, the synthesis and distribution of proteins and other organic molecules, and the functioning of different tissues, organs, and other anatomic structures. Physiology studies the normal mechanical, physical, and biochemical processes of animals and plants.

**Physiological Parameters**

Physiological variables may be define as those variables which are directly linked with various physiological systems and which may be voluntary
or involuntary such as pulse rate, vital capacity, Haemoglobin and blood pressure etc (Toor, 1996).

**Pulse rate**

Pulse rate is actually the frequency of pressure waves (waves per minute) propagate along the peripheral arteries such as the carotid or radial arteries (Astrond and Rodahl, 1970).

**Haemoglobin**

A mature blood cell that contains haemoglobin to carry oxygen to the bodily tissues; a biconcave disc that has no nucleus.

**Vital Capacity**

Vital capacity is the maximum amount of air that a person can expel from the lungs after first filling the lungs to their maximum extent; it is equivalent to the inspiratory reserve volume plus the tidal volume plus the expiratory reserve volume.

**Peak Expiratory Flow Rate**

Rate of flow of air per minute of the peak expiratory condition is known as peak flow rate (Wooton and Freeman, 1982).

**FEV1**

It represent the volume of air exhaled in the first second.

**Blood pressure**

The blood pressure is the pressure of the blood within the arteries. It is produced by the contraction of the heart muscle. It's measurement is recorded by two numbers. The first (systolic pressure) is measured after the heart contracts and is highest. The second (diastolic pressure) is measured before the heart contracts and lowest. A blood pressure cuff is used to measure the pressure.
Systolic Blood Pressure

Systolic blood pressure explained that when the left ventricle contracts and pushes the blood into the aorta and which as a result of push produces pressure and that pressure is known and the systolic blood pressure. Ross and Wilson (1981)

Diastolic blood pressure

Diastolic blood pressure explained that when complete cardiac diastolic occur and heart is resting following the ejection of blood the pressure is regulate within blood pressure. Ross and Wilson (1981)

SIGNIFICANCE OF THE STUDY

1. The finding of the study has the significance of self assessment of physiological and Anthropometrical variables of Kabaddi and Kho-Kho players.
2. The study seeks to bring out the significance differences through comparison of selected physiological and Anthropometrical variables between Kabaddi and Kho-Kho players.
3. The study has the significance of making a training schedule for the players, coaches, trainers and physical education teachers of Kabaddi and Kho-Kho players for developing different structure pertaining of this game.
4. The study, contrary to above, has the significant to select the players for Kabaddi and Kho-Kho games on the basis of the evaluation of physiological and Anthropometrical measurement as possessed by one individual.
5. The present study has also the significance of proposing guideline and index for future researchers in the field of Kabaddi and Kho-Kho game related to physiology and Anthropometrics measurements.

**DESIGN**

In the present study an attempt has been made to compare the anthropometric and physiological variables between two games of Kabaddi and Kho-Kho. The concept framework within which the study conducted has been undertaken through the following steps.

**Sample**

In the present study 120 male kabaddi players and 120 male Kho-Kho players of Haryana who participated in Haryana Olympic Games and Haryana State Kho-Kho and Kabaddi Championships.

**TOOLS USED:**

1. Linear measurements were taken with the help of anthropometer.
2. A flexible steel tape was used to measure the circumstances.
3. The skinfold caliper was used to measure the skinfolds.
4. Diameter was taken with the help of vernier caliper and anthropometer compass.
5. The weight of the subject was measured with the help of portable actuated weighting machine.
6. Vital capacity of the subjects was measured by Digital spirometer.
7. Basal Pulse Rate and Blood pressures were measured by Digital Appratus.
8. Haemoglobin of the subjects was tested by the lab. Technician in Pathological Laboratory.

**SELECTION OF VARIABLES:-**

- Age
- Weight
- Height
- Leg Length
- Thigh length
- Lower leg length
- Foot length
- Foot width
- Sitting height
- Trunk length
- Total arm length
- Upper arm length
- Fore-arm length
- Hand length

**BODY CIRCUMFERENCES**
- Shoulder
- Chest
- Abdomen
- Hip
- Thigh
- Calf

**BONE DIAMETERS**
- Bioacromial diameter
- Bitrochantric diameter
- Femur Bycondylar diameter
- Ankle diameter

**SKIN FOLDS**
- Biceps skin-folds
- Triceps skin folds
Sub-scapular skin-fold
Suprailiac skin-fold
Thigh skin-fold
Calf skin-fold

**BODY COMPOSITIONS**
- Body Density
- Fat %
- Fat Weight
- Lean Body Mass

**PHYSIOLOGICAL PARAMETERS**
- Diastolic Blood Pressure
- Systolic Blood Pressure
- Basal Pulse Rate
- Haemoglobin

**VITAL CAPACITY**
- FEV1
- PEF

**PROCEDURE FOR COLLECTION OF DATA**

The investigator met the subjects, whom were to be tested, in their respective training centers camps and during the senior state championships and Haryana Olympic Games and explained and guided to them the purpose of the present investigation. He demonstrated them the various tests items, which the subjects had to took, so that the subjects form a mental prepare of various tests they was going to attempt. The subjects were asked to clarify their doubts by asking questions and quires. The research scholar also took the help of other research scholars, classmates, coaches and other professional friends to record the data of different test items in a require manner.
COLLECTION OF DATA

The data were collected during the (Haryana Olympic Games) held at Faridabad and Senior Kho-Kho State Championship held at Bhambhewa (Jind) and Kabaddi State Championship held at Rajakheri (Panipat). For the collection of data, keeping in view the difficulty of administering the test and collection of data individually, the test and collection of data individually, the investigator sought the help of few experts for this purpose. These experts were made conversant with the purpose of the study, detailed regarding the test to be used, and the procedural to be followed for the recording of the score. The data were collected with the help of standardized equipments.

STATISTICAL DESIGN

For the present study, the mean value, standard deviation, ‘t’-test was applied to analyze the data, different steps in ‘t’ – test was used in SPSS software and the final conclusion was drawn and it was also be compared with the significant value at both 0.05 and 0.01 level of confidence.

FINDINGS

1. It was found that there is a significant difference in weight of Kho-Kho and Kabaddi players. The weight of Kabaddi players is much higher in comparison to weight of Kho-Kho players.
2. It was found that there is a significant difference in height of Kho-Kho and Kabaddi players. The height of Kabaddi players is much higher in comparison to height of Kho-Kho players.
3. It was found that there is no significant difference in total leg length of Kho-Kho and Kabaddi players.
4. It was found that there is no significant difference in thigh length of Kho-Kho and Kabaddi players.
5. It was found that there is a significant difference in lower leg length of Kho-Kho and Kabaddi players. The lower leg length of Kabaddi players is much higher in comparison to Kho-Kho players.

6. It was found that there is a significant difference in foot length of Kho-Kho and Kabaddi players. The foot length of Kabaddi players is much higher in comparison to Kho-Kho players.

7. It was found that there is a significant difference in foot width of Kho-Kho and Kabaddi players. The foot width of Kabaddi players is much higher in comparison to Kho-Kho players.

8. It was found that there is a significant difference in total arm length of Kho-Kho and Kabaddi players. The total arm length of Kabaddi players is much higher in comparison to Kho-Kho players.

9. It was found that there is no significant difference in upper arm length of Kho-Kho and Kabaddi players.

10. It was found that there is a significant difference in forearm length of Kho-Kho and Kabaddi players. Forearm lengths of Kabaddi players are higher in comparison to Kho-Kho players.

11. It was found that there is no significant difference in hand length of Kho-Kho and Kabaddi players.

12. It was found that there is no significant difference in trunk length of Kho-Kho and Kabaddi players.

13. It was found that there is a significant difference in sitting height of Kho-Kho and Kabaddi players. Sitting height of Kabaddi players are higher in comparison to Kho-Kho players.

14. It was found that there is a significant difference in shoulder of Kho-Kho and Kabaddi players. The shoulder of Kabaddi players is much higher in comparison to Kho-Kho players.
15. It was found that there is a significant difference in chest of Kho-Kho and Kabaddi players. The chest of Kabaddi players are much in comparison to kho-kho players.

16. It was found that there is no significant difference in abdomen of Kho-Kho and Kabaddi players. Abdomen of Kabaddi players is more than in comparison to Kho-Kho players.

17. It was found that there is a significant difference in hip of Kho-Kho and Kabaddi players. Hips of Kabaddi players are more in comparison to kho-kho players.

18. It was found that there is a significant difference in thigh of Kho-Kho and Kabaddi players. Thigh of Kabaddi players are more in comparison to Kho-Kho players.

19. It was found that there is a significant difference in calf of Kho-Kho and Kabaddi players. Calf of Kabaddi players are more in comparison to Kho-Kho players.

20. It was found that there is a significant difference in biacromial of Kho-Kho and Kabaddi players. The biacromial diameter of Kabaddi players is much higher in comparison to Kho-Kho players.

21. It was found that there is no significant difference in bitrocentric diameters of Kho-Kho and Kabaddi players.

22. It was found that there is no significant difference in femur bicondylar of Kho-Kho and Kabaddi players.

23. It was found that there is a significant difference in ankle diameter of Kho-Kho and Kabaddi players. Ankle diameter of Kabaddi players are much in comparison to kho-kho players.

24. It was found that there is a significant difference in biceps of Kho-Kho and Kabaddi players. The biceps of Kabaddi players is much higher in comparison to Kho-Kho players.
25. It was found that there is no significant difference in triceps of Kho-Kho and Kabaddi players.
26. It was found that there is no significant difference in subscapular of Kho-Kho and Kabaddi players.
27. It was found that there is a significant difference in suprailiac of Kho-Kho and Kabaddi players. Kabaddi players having much suprailiac than kho-kho players.
28. It was found that there is no significant difference in thigh skin-folds of Kho-Kho and Kabaddi players.
29. It was found that there is no significant difference in calf skin-folds of Kho-Kho and Kabaddi players.
30. It was found that there is a significant difference in body density of Kho-Kho and Kabaddi players. The body density of Kho-kho players is much higher in comparison to Kabaddi players.
31. It was found that there is a significant difference in Fat% of Kho-Kho and Kabaddi players. The Fat % of Kho-kho players is less than Kabaddi players.
32. It was found that there is a significant difference in fat weight of Kho-Kho and Kabaddi players. The fat weight of Kho-kho players is less than Kabaddi players.
33. It was found that there is a significant difference in fat lean body mass of Kho-Kho and Kabaddi players. The lean body mass of Kho-kho players is less than Kabaddi players.
34. It was found that o there is a significant difference in diastolic blood pressure of Kho-Kho and Kabaddi players. The diastolic blood pressure of Kho-kho players is less than Kabaddi players.
35. It was found that there is no significant difference in systolic blood pressure of Kho-Kho and Kabaddi players.
36. It was found that there is a significant difference in basal pulse rate of Kho-Kho and Kabaddi players. The basal pulse rate of Kho-kho players is less than Kabaddi players.

37. It was found that there is a significant difference in Haemoglobin of Kho-Kho and Kabaddi players. The Haemoglobin of Kho-kho players is less than Kabaddi players.

38. It was found that so there is no significant difference in FEV1 of Kho-Kho and Kabaddi players.

39. It was found that there is no significant difference in PEF of Kho-Kho and Kabaddi players.

CONCLUSION

It was concluded that there is a significant difference in linear measurements such as – weight, height, lower leg length, foot length, foot width, total arm length, forearm length, sitting height in comparison to Kho-Kho players. Kabaddi players are found more in weight, weight, height, lower leg length, foot length, foot width, total arm length, forearm length, sitting height in comparison to Kho-Kho players. But no significant difference was found in total leg length, thigh length, upper arm length, hand length, trunk length.

Regarding body circumferences, there is a significant difference in shoulder, chest, hip, thigh, calf between Kabaddi and Kho-Kho players. Kabaddi players are found more in shoulder, chest circumferences, hip, thigh, calf, but there is no significant difference was found in abdomen.

Regarding bone diameter, there is a significant difference in biacromial and ankle diameters. Kabaddi players are found more in biacromial and ankel diameters in comparison to Kho-Kho players. But no significant difference was found in bitrocentric diameters and femur bicondylar between Kabaddi and Kho-Kho players.
Regarding skin-fold, there is a significant difference in biceps, and suprailiac. Kabaddi players are found more in biceps and suprailiac in comparison to Kho-Kho players. But no significant difference was found in triceps, subscapular, thigh and calf between Kabaddi and Kho-Kho players.

Regarding body composition, there is a significant difference in, Fat percent, fat weight and lean body mass. Kabaddi players are found more in Fat percent, fat weight and lean body mass in comparison to Kho-Kho players. There is a significant difference in body density between Kabaddi and Kho-Kho players. Kho-Kho players are more in body density in comparison to Kabaddi players.

In case of physiological parameters, there is a significant difference in diastolic blood pressure, haemoglobin and basal pulse rate. Kabaddi layers are found more in diastolic blood pressure, haemoglobin in comparison to Kho-Kho players. But no significant difference was found in systolic blood pressure, FEV1 and PEF between Kabaddi and Kho-Kho players.

**TESTING OF HYPOTHESIS:**

From the results, it is clear that Kabaddi players possess more weight, height, lower leg length, foot length, foot width, total arm length, forearm length sitting height than those of Kho-Kho players. No significant difference was found total leg length, thigh length, upper arm length, hand length and trunk length. Hence the hypothesis (No. 1) partially accepted and partially rejected.

In case of Body circumferences Kabaddi players possess more in shoulder, chest, hip, thigh and calf than those of Kho-Kho players. But no significant difference was found in abdomen. Hence the hypothesis (No. 2) partially accepted and partially rejected.

Further the bone diameters, Kabaddi players possess more in biacromial and ankle than Kho-Kho players. But no significant difference was found in
bitrochentric diameters and femur bicondylar between Kabaddi and Kho-Kho players. Hence the null hypotheses (No. 3) partially accepted and partially rejected.

Furthermore the skin-fold variables, Kabaddi players possess more in biceps and suprailiac than Kho-Kho players. But no significant difference was found in triceps, subscapular, thigh and calf between Kabaddi and Kho-Kho players. Hence the null hypotheses (No. 4) partially accepted and partially rejected.

Regarding body composition, Kabaddi players possess more in fat percentage, fat weight and lean body mass than Kho-Kho players. But there was found a significant difference in body density, Kho-Kho players possess more body density in comparison to Kabaddi players. Hence the null hypotheses (No. 5) partially accepted and partially rejected.

In case of the physiological parameters, Kabaddi players possess more in diastolic blood pressure, haemoglobin and basal pulse rate than Kho-Kho players. But no significant difference was found in systolic blood pressure, FEV1 and PEF between Kabaddi and Kho-Kho players. Hence the null hypotheses (No. 6) partially accepted and partially rejected.

EDUCATIONAL IMPLICATIONS

1. The finding of the study has the significance of self assessment of physiological and Anthropometrical variables of Kabaddi and Kho-Kho players.
2. The study seeks to bring out the significance differences through comparison of selected physiological and Anthropometrical variables between Kabaddi and Kho-Kho players.
3. The study has the significance of making a training schedule for the players, coaches, trainers and physical education teachers of Kabaddi
and Kho-Kho players for developing different structure pertaining of this game.

4. The study, contrary to above, has the significant to select the players for Kabaddi and Kho-Kho games on the basis of the evaluation of physiological and Anthropometrical measurement as possessed by one individual.

5. The present study has also the significance of proposing guideline and index for future researchers in the field of Kabaddi and Kho-Kho game related to physiology and Anthropometrics measurements.

SUGGESTIONS AND RECOMMENDATIONS:

On the basis of the results of the study, the following suggestions and recommendations are made:

1. The similar study may be undertaken by selecting subjects belonging to different levels and age groups of participations in different games and sports.

2. The findings of study can be used by the coaches and physical trainers as an aid in screening and selecting talented identification.

3. Study of similar nature can be conducted on female players.

4. For such type of research, more facilities, training and practice with instruments are essential for better results.

5. It is suggested that similar study may be conducted by using psychological variables and motor fitness measures of players.

6. Such type of studies should be conducted on other athletics events and games/sports. So that specific anthropometric characteristics of an individual may be found out according to the games and sports.

7. Appreciable incentives to research personals in physical education and sports should be provided for standard research work.
8. More facilities for research in physical education and sports should be provided for smooth conduct and better results.

9. The preset study will be of immense use for further research in the field.

10. Such types of studies will help the Physical Education Teacher trainer and coaches to find out the best talent among the participants according to their selected anthropometric variables.

11. The more findings of such studies should be made available to all coaches and physical education teachers so that they may come to know and try to implement the findings for better performance.