Chapter-I

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INTRODUCTION

I.1. General Introduction

The present study was designed to reveal the anthropometric and physical fitness variables of a particular ethnic group of people called “Rajbangsi”. The ethnic community has their own culture and traditions of living. This community has their own traditional games, social culture and life style which may influence on physical fitness and anthropometric variables of the students of this community.

Rajbangsi is the largest scheduled caste community in West Bengal. According to the latest 2011 census estimate their population is about 3801677 in the state of whom majority (about 80%) are found to live in the northern parts of the state community known as “North Bengal”. Rajbangsi also found in Purnea (Bihar), Goalpara, Kamrup and Nowgaon districts of Assam, and West Garo Hill district of Meghalaya.

Rajbangsi occupy an important place in the southern districts of North Bengal which include Malda and two (north and south) Dinajpur districts. Geographically, they have greater concentration in the region between river Kulik and river Tangan, an area stretching over the south and parts of North Dinajpur district. They also have a sizable population in the Malda district despite their greater representation in the local population. Their origin and social history is still obscure and their ethnic identity appears somewhat confusing and controversial.

Antecedents of the Rajbangsi: Historical and Ethnological View

A Hindu social group of people called Rajbangsi living in the extreme northern region of West Bengal has been very little studied. It is an ancient tribe originally from the ancient Koch Kingdom. The Rajbangsi is also referred to as Koch/Rajbansi/ Rajvanshi etc. The word Rajbangsi means literally “Royal Community”. They have a rich culture, heritage and their own language.

The history of the origin of the Rajbangsi is a mystery. It is said that they belong to the great Bodo family that entered India in the 10th century B.C., from the east and settled on the banks of the Brahmaputra and gradually spread over Assam and the whole of North and East Bengal. They appear as a mixed lineage. On the
West their affinities are with the Dravidians stock and on the east with the Mongolians.

The ethnic origin and development of the Koches is rather shrouded with varied opinions of the historians and scholars of home and abroad, as to their pure Mongoloid origin or blended with the Dravidian stock. From all available historical and traditional records, social customs, observance of religious rites and rituals, linguistic peculiarities and particularizes, it can undoubtly be accepted that Koches are one of the most ancient people of India who predominantly inhabiting in present day at North East India and some other parts of Asia. No historical data can be fixed for their origin, because of their antiquity and as such exact period of the Koches, who were late popularly known as Rajbangsi also in some parts, had not yet clearly been established. There seems, however to be no doubt that the true Koches were a Mongoloid race very closely allied to the Meches, Ravas, Palias, Garos etc. and they could be found in Cooch Behar, Jalpaiguri, Assam, Bangladesh and some other parts of Asia. According to some modern western anthropologists, the Koches/Rajbangsi’s, the Meshes, the Ravas, the Palias are all one and the some people having sprung from the common stock. The persons known as Rajbangsi are either pure Koches who though dark, have a distinct Mongoloid Physiognomy or else a mixed bred in which the Mongoloid element usually preponderates.

**Features, habits and customs**

According to Sanyal (2002) personally observed that the Zamindars of Baikunthopur, their children and most of their nearest kin (Raj-gain) have fair skin tinged yellow. Many other Rajbangsis have danker skin and some are black. They have one thing common, that is the nose is flat at least the tip of the nose is broad, high cheek bones and thick lips, the eyes are generally small and slightly oblique.

**Language**

The Rajbangsi’s speak Bengali but it is a local dialect sometimes widely away from standard Bengali.

**Dress**

The adult women of the villages were one piece of cloth called phota tied round the chest just above the breast which hangs up to the knees. The phota the women wear are all hand woven and mostly dyed in red and blue. Now the phota is
being replaced by mill-made cloth. The women do not usually use any other cloth to cover the body.

The males in the villages were only a loin cloth while engaged in cultivation work but while going out of the village they wear full cloth and a shirt to cover the body and in the winter wear a chuddar. Now-a-days the dress of Rajbangsi people was changed due to modernization, urbanization and industrialization.

**Food**

The Rajbangsi’s are rice eating people. They usually take three big meals a day, one in the morning usually puffed (Muri) or flattened rice (Tsura) or previous night’s cooked rice ‘Khokora bhat’ or ‘Pontha bhat’, after coming back from the early morning ploughing work and before going out with the plough for the second time, one at noon usually freshly cooked rice and curry and one at night the same food as in the noon. They eat cooked vegetables, pulses, fish and goat’s meat. They take milk and milk products of which curd is the main item. Apart from the traditional food habits, in present situation the food habits also have been changed due to life style, education and urbanization.

**Marriage**

In matters of marriage the Rajbangsi’s are in a state of transition. The more backward and illiterate section of the Rajbangsi caste still maintain practices in consistent with the orthodox Hindu customs. Some forms of companionate marriage where divorce can be affected without ado are still to be found amongst them. This Gao-goch, Pani-chita, Pani-sorpan, Ghor-sodhari, Dangua, Pachuca (coming after), Songona (living with) are the forms of union that are still to be found in the villages. Some other forms of regular marriage are Tokrot biha, Kouna biha, Gondhorok biha, Motha-dan etc. Apart from the traditional forms of marriage they have also engaged in modern marriage style due to urbanization, modernization of the society.

**Sports**

The Rajbangsi’s of North Bengal enjoy many sports. They also enjoy indoor games and outdoor games. The indoor games are Tsok or Tsal khela, Solo paita Games-putting sixteen etc and the outdoor games are Dorkhela or Dhaikhela, Bhuri-bhusa khela, Dhop khela, Pakki khela etc. the Rajbangsi’s recite interesting poems in sports. It is difficult to make out any sense of the poems but they give the children a
lot of enjoyment. Both male and female children take part in the game. For example, **Bhat Bhat sak sak khela:** A few children cook some earth and make a food. (This is a play food and not to be eaten.). The cooking is called Basudia. The following song is sung: Gudu gudu mana pat dzol anit hoil bhat. They were involved not only traditional sports but now-a-days they were involved in modern games & sports like Athletics, Football, Kabaddi, Kho-kho, Volleyball, Cricket etc. They were participated at State level and National level game in track & field events, Kabaddi and Kho-Kho etc. (Sanyal, 2002).

The physical features or anthropometrical parameters of Rajbangsi Community are more concerns in sporting performance. Considering the anthropometric characteristics and their influence on sports performance, the scholar gave more emphasis to find out the anthropometric features and influence of weight training on those parameters.

**Anthropometry**

Greek word anthropos means “man” and metron means “measure” therefore anthropometry means measurement of man. Anthropometry is the study of the measurement of human body in terms of the dimensions of bone, muscle and adipose (fat) tissue. It provides scientific methods and observations on the living man and the skeleton. It represents the typical and traditional tool of human biology, physical anthropology and auxology. Recently it has taken a strong boned relationship with physical education and sports sciences.

The origin of anthropometry is very ancient. In 1935, The American Association of physical Anthropologists formed an Advisory Committee on Anthropometric Interests. The committee reviewed certain definitions nomenclature of some controversial measurements and suggested guide-lines.

The Anthropometry Journal of Physical Anthropology set aside a section of the Journal for publishing articles concerning anthropometric techniques.

In 1960, at the VI International Congress of Anthropological and Ethnological Sciences held at Paris, it was decided to form a Conditioning Committee for Standardization of Anthropometric Measurements.

Later Intervention Working Group on Kinanthropometry endorsed the recommendations of Ross et. Al (1978) for measuring dimensions of human organs or
body parts. Further the International Society for the Advancement of Kinanthropometry was established. Many landmarks and techniques of body measurements have been described using recommendation of this group.

Establishment of ISAK (International Society for the Advancement of Kinanthropometry) in 1986 is a large step forward in the field of anthropometric measurements. The organization providing training and literature for following some standard techniques throughout the world, which was lacking earlier.

Since 1960, Olympic athletes have been studied using anthropometry as a tool. The use of anthropometry on the Indian athletes has also been very extensive. The use of this science in sports has grown so extensively that now it constitutes a new science called Sports Kinanthropometry or sports anthropometry. [Sodhi, 1991]

**Application of Anthropometry in Sports and Physical Education**

Sports Anthropometry can be applied in the following areas of Sports and physical education. Some of these are physique, body composition, growth and development, morphological optimization, proportionality, body shape and performance, evaluation of human body size, body image, physical fitness and identification of talents.

Artists were the first to study anthropometry for their ends. Indian arts show the idealization of human proposition from which time until the present each succeeding of civilization has left some indication of what it considers perfect proportion of the human figure (Mathews, 1973).

Anthropometry means the measurement of man, whether living or dead and consists primarily in the measurements of the diuretics of the Body. (Montagu, 1960). Anthropometry of man provided scientific methods and observation on living man. The science of anthropometry has developed primarily in the play field of physical anthropologists.

According to Corbin human body is designed for physical activity. He has to be physically fit for climbing, running, jumping and knowing for procuring needs and to escape constant threats of life. Anthropologist indicates that the need to be active is associated with the “fight or flight” response. In search of food primitive people sometimes had to fight with other predators or to feel for safety. In either case the response was often vigorous activity. Even our more recent ancestors were required to
be vigorous activity as relatively major part of their normal daily routine (Corbin and Lindisay, 1994).

Anthropometry is not merely an ensemble of techniques and measurements, but it is a powerful method for description and analysis of body size, shape, from and proportions. It has been extensively used to quantify and analyze human growth and as such it has become an important specialization not only in anthropology and human biology, but also of sports science, nutrition, medical sciences, aero space, engineering, operational designing, psychology and numerous others sciences (Nath, 1993).

The human organism genetically processes on innate biological need for the regular stress of exercise. The effect of such activity stress is to improve the functional response of the vigorous physiological systems, with the most dramatic changes taking place in the neuromuscular, skeletal, cardiovascular and pulmonary systems and also in the oxygen transport mechanism. These improvements in physiological functions are the result of biological adaptation to regular exercise stress. So a regular program of balance physical exercise many improve the quality of life (George and Elwood -1975).

Human body composed of a skeletal frame work and a number of systems on which the functions are dependent. After birth the body composition changes with some changes in internal system too. Growth enhance with age followed by a stagnant on part and decline also. From childhood onwards the skeletal and muscular growth are predominant the land is influenced by several factors such as genetic and environmental factors including food, exercise social and geographical conditions. [Maity, D. (2009)]

Many studies have been conducted to find out the racial or ethnic differences in body composition, anthropometric measurements etc.

Kagawa.et.al (2009) to analyze ethnic differences in body composition and anthropometric characteristics in Australian Caucasian and Indigenous children and revealed trunk circumferences and proportion of overweight and obesity than their Caucasian counter parts.

Stature and body weight of the different community residing at different region of a country may differ significantly. The boys and girls in Eastern china were
found taller and heavier than their counter parts in Western China in 7-18 years age groups (Zhang and Wang, 2011).

Training influences human performance. The basis of performance are the structure of the individual, specific ethnicity, characteristics of muscles, geographical condition, food habits and health and wellness. In this study we were focus one particular ethnic group i.e. Rajbangsi group. There are various types of training method in the field of sports. Researcher have chosen weight training among the various training method.

**Weight Training**

Weight training is specific in that gains in strength and muscular endurance will improve skill performance to the greatest extent when the training program we consists of exercises that include the muscle groups and that simulate the movement patters used during the skill.

Weight training is a common type of strength training for developing the strength and size of skeletal muscles. If use the weight force of gravity (in the form of weighted bars, dumbbells or weight stacks) to oppose the force generated by muscle through concentric or eccentric contracting. Weight training was variety of specialized equipment to target specific muscle groups and types of movement.

Sports where strength training is central are bodybuilding, weightlifting, power lifting and strongman, Highland games, shot put, discus throw and javelin throw. Many other sports use strength training as part of their training regimen, notably, mixed material arts, American football, wrestling, rugby football, track and field, rowing, lacrosse, basketball and hockey. Strength training for other sports and physical activity is becoming increasingly popular.

**History**

The genealogy of lifting can be traced back to the beginning of recorded history where humanity’s fascination with physical abilities can be found among numerous ancient writings. Progressive resistance training dates back at last to Ancient Greece, when legend wrestler Milo of croton trained by carrying a newborn calf on his back every day until it was fully grown. Another Greeks, the physician Galen, described strength training exercises using halters (an early from off from of dumb bell) in the 2nd century. Ancient Greeks Sculptures also depict lifting feats. The
weights were generally stones, but later gave way to dumbbells. The dumbbell was joined by the barbell in the later half of the 19th century. Early barbells had hollow globes that could be filled with sand or lead shot, but by the plate-loading barbell commonly used today. Another early device was the Indian club, which came from ancient Persia where it was called the “meels”. It subsequently became popular during the 19th century and has recently made a comeback in the form of the club ball. In 1960s saw the gradual introduction of exercise machines into the still-rare strength training gyms of the time. Weight training become increasingly popular in the 1970s, following the release of the bodybuilding movie Pumping Iron and the subsequently popularity of Arnold Schwarzenegger. Since the date 1990s increasing number of women has taken up weight training, influenced by programmers like Body for life, currently nearly one in five U.S. women engage in weight training on a regular basis.

**Basic Principles**

The basic principles of weight training are essentially identical to strength training and involve a manipulation of the number of repetitions (reps), sets, tempo, exercise types and weight moved to cause desired increases in strength, endurance and size. The specific combination of reps, sets exercises and weight depends on the aims of the individual performing the exercise, sets with fewer reps can be performed with hearers weights.

In addition to the basic principles of strength training, a further consideration added by weight training is the equipment used. Types of equipment include barbells, dumbbells, pulleys and stacks in the form of weight machines and the body own weight in case of chin-ups and push use. Different types of weight will give different types of resistance and often the same absolute weight can have different relative weight depending on the type of equipment used.

Weight training also requires the use of ‘good from’, performing the movements with the appropriate muscle group and not transforming the weight to different body parts in order to move greater weight. Failure to use good from during a training set can result in injury or failure to meet training goals, since the desired muscle group is not challenged sufficiently; the threshold of overload is never reached and muscle dose not gain in strength. (en Wikipedia. Org/wiki/Weight-training)
Council on Sports Medicine and Fitness (2008) stated the guidelines for strength training of children and adolescents. When children and adolescents undertake strength training programmed, they should begin initially no load or with low resistance exercises until proper technique perfected. When 8 to 15 repetitions can be performed, it is reasonable to add weight in 10% increments. Incremental loads can be added using either body weight or others form of resistance. Increasing the repetitions of the lighter resistance may be performed to improve endurance, strength of the muscles in preparation for repetition- motion sports. Exercise should include all muscle groups, including the muscles of the core and should be performed through the full range of motion at each joint. For achievement of gains in strength, workouts need to be at least 20-30 minutes long, take 2 to 3 times per week at least 8 weeks and continue to add weight and repetitions as strength improves. Strength training > 4 times per week seems to have no additional benefit and may increase the risk for an overuse injury. Proper technique and strict supervision are mandatory for safety reason and to reduce the risk for injury. Proper 10 to 15 minutes warm- up and cooling-down periods with appropriate stretching techniques also is recommended. Guidelines have been proposed by the American Academy of Pediatrics (AAP), the American Orthopedic Society for Sports Medicine (AOSSM) and the National Strength Conditioning Association (NSCA).

The optimum time to begin strength training is 11-13 years of age for girls and 13-15 years of age for boys, although the use of high resistance should be avoided until well into adolescence; even then it needs to be monitored very carefully. (www.educate@chekinstitute.com)

Many other studies have also been conducted to find out the results of weight training:

A. Little or no improvement in speed of contraction, most show that strengthening exercises do indeed increase both speed and power of contraction.

B. Speed of contraction is improved by strength training provides evidence that the term “muscle bound” has no scientific merit. In addition, research generally demonstrates that specific sports skills, such as speed in running, swimming, throwing, speed and force of offensive football charge and jumping all can be improved significantly through weight training programmers.
C. From strength development and motor or sports improvement, Clarke reached the following conclusions:

i. Both isometric and isotonic forms of strength training can produce improvements in many motor and sports performances. Although the evidence is at times conflicting, it is generally accepted that progressive weight training programmed are superior.

ii. Some studies did not provide adequate overload in applying both isometric and isotonic strength training. In general, exercises confined to single static contractions of short duration or isotonic efforts limited to a single boul- were not effective in developing either strength or motor skills. Strenuous resistance exercises of either from are needed for best results.

iii. Fear of muscle-bound effects from weight training may be laid to rest. The majority of studies show that speed of movement may be enhanced rather than retarded as a consequence of strength development.

iv. Exercise programmers designed to strengthen muscles primarily involved in a particular sport can be used as supplements to regular practice in effectively improving the athlete’s skill and motor fitness.

D. Both men and women increase in muscular strength following a weight training programme. The female athletes were nationally prominent track and field and throwing females are much stronger than non athlete’s females but their strength gains are still very substantial, particularly after 6 months of training.

E. For the average college-age male and female, body composition changes following a weight training programme are as follows:

i. Little or no changes in total body weight.

ii. Significant losses of relative and absolute body fat.

iii. A significant gain in lean body weight. Similar change in body composition have been observed in female athletes following a season of training and competition.

F. Gains in strength are usually accomplished by increases as muscular size (girth) while this is true for both male and female, it is much less pronounced in the female (Fox & Mathews, 1981).
Recent researches have suggested the benefits of strength training for children. In the light of all the latest researches, national health organizations recommended that children should participate in physical activity to stress their musculoskeletal system. The British Association of Exercise and Sports Sciences supports strength training as a regular component of any physical activity programme (Stratton et. al., 2004).

In the USA, Surgeon General physical Activity and Health Report aims to increase the number of children and older who participate in activities that improve musculoskeletal fitness (Faigenbaum & Kamg, 2006).

The Canadian Society for Exercise physiology (Faigenbaum et. al. 2008) states that a resistance training programme can lead to numerous functional benefits including increased muscular strength, endurance, power, balance, and coordination as well as general health benefit.

Some authorities indicate that children strength gain are temporarily and have not lasting muscular effect. Faigenbaum et. al. (1996) has studied elaborately the effect of training and detraining on children and has shown long lasting effects of resistance training.

Because strength gain has a neuromuscular component, some authorities have concluded that strength training improvements in children due to motor learning rather than muscle development. However, Westcott et. al. (1995) have shown that both boys and girls have significantly improved more muscle mass following resistance training.

Physical fitness has direct influence in sports performance. Physical fitness is the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure-time pursuits and respond to emergencies. There are different types of components of physical fitness from which researcher was taken only muscular strength, muscular endurance and speed in this study.

**Strength**

Strength is frequently recognized by physical educators as the most important factor in the performance of physical skills. Strength is a conditional ability. It depends largely on the energy liberation processes in the muscles. Strength is the most important motor ability in sports as it is a direct product of muscle contraction.
Strength is the ability to overcome resistance or to act against resistance. In sports movement, strength always appears in some combination with the duration and speed of movement i.e. in combination with endurance and speed abilities. In each sports movement strength appears in a different form (Singh, 1991).

Prior to 1950 it was commonly believed by both coaches and athletes that weight training did not produce the type of strength necessary for superior sports performance and furthermore, that such training hindered speed of movement. However, starting in 1950 a, number of researchers reported that isometric weight training increased strength and improved speed of movement.

Hettinger and Miller, in 1953, found that mass interest was created in short static contraction (isometric) training. Since that date numerous studies have indicated that strength can be significantly increased by isometric exercises.

Michael (1954) found that isometric training increased both speed of movement and reaction time significantly. Crowder (1970) found that isometric and isotonic strength training were equally effective in improving reaction time when the exercises were performed in the same way in which the reaction time measures were taken.

Concerning strength and academic achievement, Clarke (1948) found that high strength groups had a consistent tendency to have higher means on standard achievement tests and grade point averages, while two studies revealed that persons who had greater strength as measured by grip strength had significantly better grades in physical education courses.

Johnson (1966) found that motivated isometric training group significantly increased their strength, whereas a non-motivated isometric training group made little or no gain when tested under conditions of no consciously induced motivation (Johnson & Nelson, 1982).

**Muscular Endurance**

Muscular endurance may be either dynamic or static in nature and concerns the ability of a muscle to repeal identical movement or pressures, or to maintain a certain degree of tension over a period of time. The ability of the human body to maintain a certain level of energy production forms the physiological basis of endurance. Due to its high importance for health, training and competition and also
due to its physiological determinants, which can be relatively easily studied, it is an ability which has been studied in great detail and depth by the physiologists. Endurance is directly or indirectly of high importance in all sports.

The concurrent effects of strength and endurance reflect in various activities where strength is prerequisite for performing in continuous work. Abdominal strength endurance reflects the ability of a abdominal muscles to perform curl against the resistance of the upper body part with repeated contractions over time without rest. In various sports, in daily living as well as various jobs abdominal strength endurance is required for performing the task in a skillful way and with confidence.

Research in various exercise programs reveals the following findings concerning muscular endurance.

Weight training programs will improve performance on muscular endurance exercises. Moreover, muscular endurance performance is influenced by the strength of the individual.

Isotonic exercises are more effective than isometric exercises in the development of muscular endurance, Furthermore; a faster rate of repeated contractions produces the greater endurance.

Meadows found both methods significantly increased dipping and chinning endurance, he found the isotonic method superior in the chinning test.

Various types of motivational techniques employed during testing periods will significantly increase muscular endurance performance.

Excess weight is a handicap to students in performing relative endurance exercises such as push-ups, pull-ups, and squat jumps. Moreover, there is a high relationship between relative strength and relative endurance (Johnson & Nelson, 1982).

**Speed**

Speed is a conditional ability. It has a complex nature as it depends to a considerable extent on the central nervous system. Due to this fact the exact nature of speed abilities is different to discover and understand. Become of the high role of coordinative processes in a speed performance the improvement of speed has to be done with specific means and methods. Speed ability primarily signifies the ability to
execute motor movement with high speed. This movement may be cyclic or acyclic in nature. Theiss and Schnabel (1987) give the following definition of speed: “It is the performance prerequisite to do motor action under give conditions (movement task, external factors, individual prerequisite) in minimum of time.”

In spite of the complex and specific nature and low train ability speed ability is high importance in all sports except endurance sports. Speed performances appear in different form in various sports. Various types of research done in psychology, physiology and physical education on speed of movement, much research are still needed (Singh, 1991).

Zorbas and Karpovich (1951), Wilkin (1952), Masiey, Endres (1953) and Chui (1950) all found that weight training improved speed of movement.

Meadows (1959) and Johnson (1964) found that both isotonic and isometric exercises improved speed of movement.

Dintiman (1964) reported that a combination of flexibility and weight training programmes, given as supplements to spring training, improved speed significantly more than the spring training programme alone (Jhonson & Nelson, 1982).

Considering key anthropometric features of the Rajbangsi community and the effect of weight training on specific fitness components, the investigator felt a need to conduct weight training on this ethnic group so that a comparative movement may be observed between General and Rajbangsi school boys.

I.2. Statement of the problem

The present investigation was an attempt to analyze the Effect of Weight Training on selected Anthropometric and Physical Fitness variables on male Rajbangsi student.

Sub Problem

To find out the relationship between thigh girth, calf girth and performance in 50m. dash among Rajbangsi boys.
I.3. Definition and Explanation of the terms

Rajbangsi

The word Rajbangsi means literally “Royal Community”. They have rich culture, heritage and their own language. Rajbangsi have fair skin tinged yellow. Many other Rajbangsis have darker skin and some are black. The nose is flat at least the tip of the nose in broad, high cheek bones and thick lips, the eyes are generally small and slightly oblique (en. wikipedia.org/wiki/ Koch- Rajbangsi – people and Sanyal, 2002).

Weight Training

Weight training is a common type of strength training for developing the strength and size of skeletal muscles. It uses the weight force of gravity (in the form of weighted bars, dumbbell or weight stacks) to oppose the force generated by muscle through concentric or eccentric contraction. Weight training was a variety of specialized equipment to target specific muscle groups and types of movement. (en. wikipedia.org/ wiki/weight training)

Muscular Strength

Muscular strength is defined as the maximum amount of force that a muscle can extent against some form of resistance in a single effort (https// www. google. co. in/ web hp)

Muscular Endurance

Muscular endurance is the ability of a muscle or muscle group of muscles to repeatedly exert force against resistance. Performing multiple repetitions of an exercise is a form of muscular endurance, as is running or swimming. (www. live strong. com/ article/ 3992246-what-is- the-definition-of muscular- endurance)

Speed

Speed is the ability to move quickly across the ground or move limbs rapidly to grab or throw (www. topend sports. com/ fitness / speed. http)

Anthropometry

Anthropometry is the science which deals with the measurement of the size, Weight and proportion of the human body. (Dorland Medical Dictionary)
I.4. Delimitation of the Study

The present study was delimited to the following conditions:

i. The subjects of the study were selected from three schools from two subdivisions of Uttar Dinajpur district of West Bengal State.

ii. The number of subjects for each group was 25 only.

iii. Anthropometric variables like head circumference, chest circumference, upper arm girth, thigh girth, calf girth and sitting height were considered as criterion measures for the study.

iv. Physical fitness was assessed by measuring muscular strength (Grip), muscular strength endurance and speed only.

v. Only boys of 14-16 years of age were taken as subjects for the present study.

I.5. Limitations of the study

The present study was conducted under the following limitation:

i. The climate conditions at the time of collecting data in different sessions were not similar.

ii. The socio-economic status of the subjects was not similar.

iii. Ground conditions of different testing fields were not exactly similar.

iv. Instruments used were also a limiting factor with regard to their precision.

v. Financial condition and time were also limiting factors of this study.

vi. Motivation, attitude and interests of the subjects were also limiting factors for present study.

I.6. Hypothesis

Following hypothesis was formulated to conduct the present study:

$H_1$: It was hypothesized that there would be no significant difference in selected anthropometric parameters like head circumference, chest circumference, upper arm girth, thigh girth, calf girth and sitting height among Rajbangsi boys after 16 week weight training programme.
H₂ : It was hypothesized that there would be no significant different in selected anthropometric parameters like head circumference, chest circumference, upper arm girth, thigh girth, calf girth and sitting height among general boys after 16 weeks weight training programme.

H₃ : It was hypothesized that there would be no significant difference in selected anthropometric variables like head circumference, chest circumference, upper arm girth, thigh girth, calf girth and sitting height among Rajbangsi boys and general boys after 16 week weight training programme.

H₄: It was further hypothesized that there would be significant difference in selected physical fitness variables such as muscular strength, muscular strength endurance and speed among Rajbangsi boys after 16 week weight training programme.

H₅: It was hypothesized that there would be significant difference in selected physical fitness variable such as muscular strength, muscular strength endurance and speed among general boys after 16 week weight training programme.

H₆ : It was hypothesized that there would be no significant difference in selected physical fitness variable such as muscular strength, muscular strength endurance and speed among Rajbangsi boys and general boys after 16 week weight training programme.

H₇ : It was also hypothesized that there would be no relationship between thigh girth, calf girth and performance in speed among both the group of subject after 16 week weight training programme.

I.7. Purpose of the study

The study was conducted with following purposes:

i. To compare the selected anthropometric parameters like head circumference, chest circumference upper arm, girth, thigh girth, calf girth and sitting height among Rajbangsi boys and general boys before experiment.

ii. To compare the selected anthropometric parameters like head circumference, chest circumference upper arm, girth, thigh girth, calf
girth and sitting height among Rajbangsi boys and general boys after 16 weeks weight training programme.

iii. To compare the selected anthropometric parameters like head circumference, chest circumference upper arm, girth, thigh girth, calf girth and sitting height among Rajbangsi boys and general boys before and after the study.

iv. To observe the increment in selected anthropometric parameters like head circumference, chest circumference upper arm, girth, thigh girth, calf girth and sitting height among Rajbangsi boys after 16 weeks weight training programme.

v. To observe the increment in selected anthropometric parameters like head circumference, chest circumference, upper arm girth, thigh girth, calf girth and sitting height among general boys after 16 weeks weight training programme.

vi. To compare the selected physical fitness variable such as muscular strength, muscular strength endurance and speed among Rajbangsi boys and general boys before 16 weeks weight training programme.

vii. To compare the selected physical fitness variable such as muscular strength, muscular strength endurance and speed among Rajbangsi boys and general boys after 16 weeks weight training programmed.

viii. To observe the improvement in selected physical fitness variable such as muscular strength, muscular strength endurance and speed among Rajbangsi boys after 16 weeks weight training programme.

ix. To observe the improvement in selected physical fitness variable such as muscular strength, muscular strength endurance and speed among general boys after 16 weeks weight training programme.

x. To compare the selected physical fitness variable such as muscular strength, muscular strength endurance and speed among Rajbangsi boys and general boys before and after the study.

xi. To observe the relationship between thigh girth, calf girth and performance in speed among Rajbangsi experimental group of subjects.

xii. To observe the relationship between thigh girth, calf girth and performance in speed among general experimental group of subjects.
I.8. Significance of the study

The result of the study would be significant for education, Physical education and sports in the following areas:

i. Weight training among boys is relatively new and in our country it is limited. Therefore the findings of the present study ever with its limitation can throw new light in the area of weight training.

ii. The findings of the present study may enlighten physical education professionals, coaches and the parents of young boys and girls to use weight training for objective development of muscular strength & endurance.

iii. The professional leaders of physical education may use the data for updating the curricula related strength training.

iv. At present time participation in competitive sports by young boys of girls are expanding day by day. All concern in competitive sports may be interested to explore the findings of research work for their endeavor.

v. Different anthropometric measurements of boys of 14 to 16 years age of Rajbangsi community would be available through this study.

vi. Findings of the present study would also be useful for planning the curriculum of physical education as well as its evaluation in secondary school.

vii. Sports talent might be spotted on the basis of the results of this present study.

viii. The results of this study would provide some useful information for further research and study about this community.