

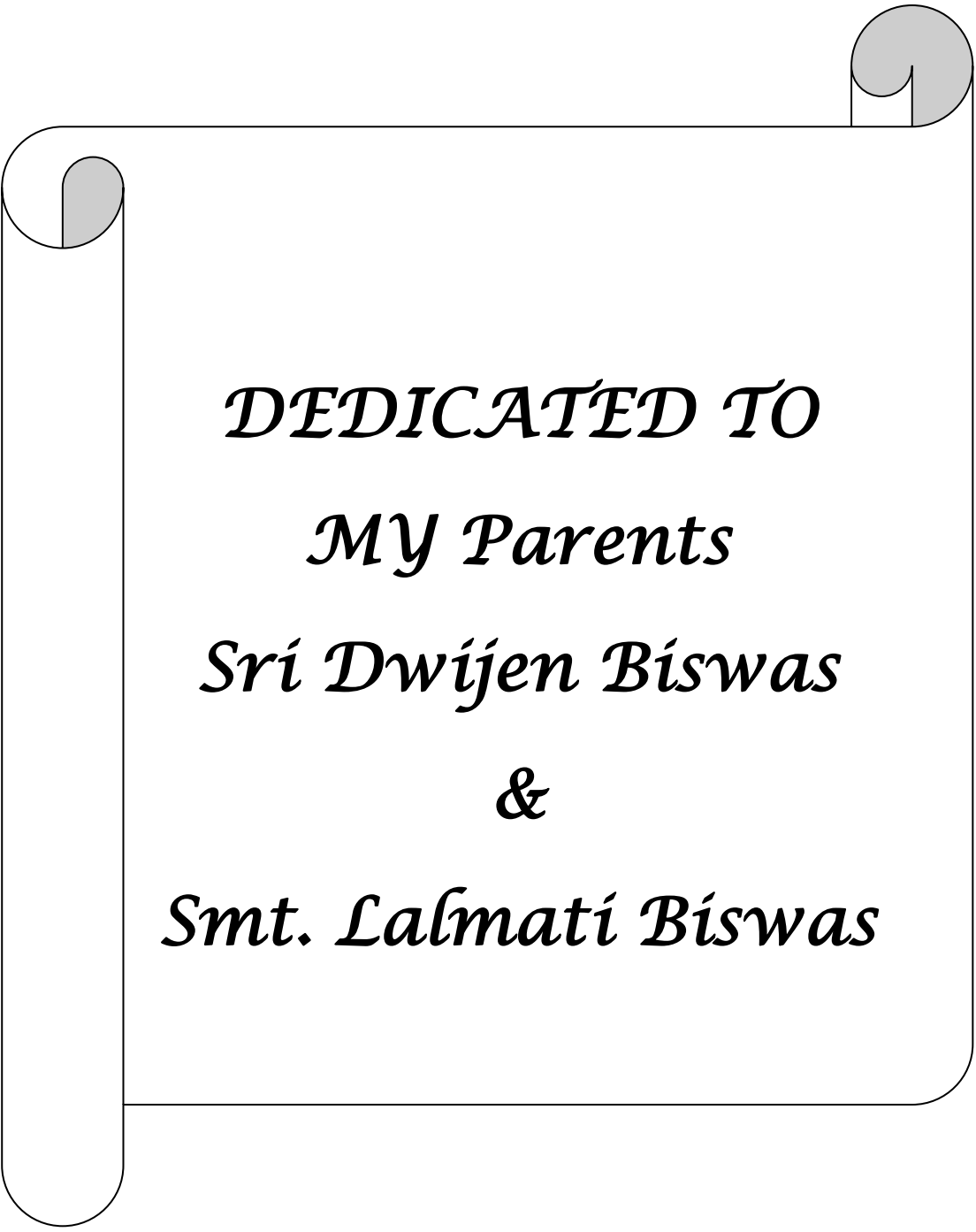
**A COMPARATIVE STUDY BETWEEN TRIBAL AND NON
TRIBAL ADOLESCENTS IN RESPECT TO MOTOR
FITNESS HEALTH STATUS ANTHROPOMETRIC
AND PSYCHOSOCIAL PARAMETERS**

**A THESIS
SUBMITTED TO THE JADAVPUR UNIVERSITY FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY
IN PHYSICAL EDUCATION
FACULTY OF ARTS**

By
MRITYUNJAY BISWAS

**DEPARTMENT OF PHYSICAL EDUCATION
JADAVPUR UNIVERSITY
WEST BENGAL
INDIA**

2021

A decorative border resembling a scroll, with a vertical strip on the left and a horizontal strip at the top, both featuring rounded ends and a light gray shaded area.

DEDICATED TO
My Parents
Sri Dwíjen Biswas
&
Smt. Lalmatí Biswas

CERTIFICATE

Certified that the Thesis entitled “**A COMPARATIVE STUDY BETWEEN TRIBAL AND NON-TRIBAL ADOLESCENTS IN RESPECT TO MOTOR FITNESS HEALTH STATUS ANTHROPOMETRIC AND PSYCHOSOCIAL PARAMETERS**” submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the Supervision of **Prof. Sudip Sundar Das**, Department of Physical Education, Jadavpur University, Kolkata and that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere / elsewhere.

Countersigned by the Supervisor

Signature of the Candidate

Dated:

Dated:

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Place:

MRITYUNJAY BISWAS

Date:

Research Scholar

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LIST OF ABBREVIATION

sec	: Second/Seconds
m	: Meter/Meters
cm	: Centimeter/Centimeters
n	: Number
kg	: Kilogram
mm	: Millimeter/Millimeters
OHS	: Optimum Health Scale
BMI	: Body Mass Index
BF %	: Body fat percent
SD	: Standard Deviation
WHO	: World Health Organization
fig	: Figure
SC	: Scheduled Caste
ST	: Scheduled Tribe

CHAPTER- I

INTRODUCTION

- 1.1 General Introduction
- 1.2 Statement of The Problem
- 1.3 Purpose of The Study
- 1.4 Significance of The Study
- 1.5 Delimitation of The Study
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CHAPTER - I

INTRODUCTION

In this chapter, general introduction, statement of the problem, definition of terms, delimitation, limitation, purpose and significance of the study have been described for introducing the subject of investigation of this study.

1.1 General Introduction:

Indian society is a traditional one which is highly stratified and suffers from wide socio- economic disparities and cultural diversities. According to the report of the Education Commission (1964-1966) “The Indian society is hierarchical, stratified and deficient in vertical mobility.” This society of ours has many social divisions, which have been persisting through the centuries. These divisions consist of poor and rich people on the one hand, touchable and non-touchable on the other. Nevertheless, our society is also divided into tribals and non- tribals. The tribals in India have suffered from environmental deficiencies for ages. They have confined themselves to their own bounds, cutting themselves off from civilized societies. The tribal population in India numerically constitutes a small segment of the total population of the country but is a significant part of the population. Most of the Scheduled tribe people lives in rural areas and their population comprise 10.4 % of the total rural population of the country (Census of India, 2001). They usually staying in rural areas, in a small locality, absolutely illiterate poor, hardly clad in clothes, usually dark and frail, fully living within their own community.

In India various tribal communities are in different stages of development, but they are still backward in comparison to those who are so called civilized people. Therefore, it is possible that there may be a greater difference in physical fitness, body composition, anthropometric measurement and psychological etc. between tribal and non-tribals (Rowney, 1974). These tribals are aborigines of our country. They have been number of studied from number of angles. The active life with lot of physical activity to earn their daily bread and butter is contributory to their physical development. The genetically potentiality in performing vigorous physical activity can be useful to excel in certain sports and games.

It is a matter of common knowledge that tribal lands are brought up in the lap of open natural space and outdoor setting of vigorous life. Most of the tribals people

are laborious. The main occupations of tribals are handicraft, wood work and selling fruits which are found in forest. Some of them are farmers also (Majumdar, 1961). Because of this conducive environment, their physical capabilities in running, jumping, throwing and such other natural activities are tremendously developed.

History reveals that there are a lot of differences between tribes and non-tribes in every aspect of their life such as customs, rituals, eating habits, culture and style of living which result in difference in physical potential of tribes and non-tribes (Negi, 1976; Ahluwalia, 1999).

The people have adopted themselves to a particular kind of environment. The daily routine is very strenuous. The environmental factors such as climate, topography, natural resources and social set-up play a vital role in determining the physical fitness and psychological make-up of the society. The tribal people are considered to be more physically fit as far as fitness is concerned, and they are spiritually healthy. Maity (1983), compared physical fitness between tribals and nontribals and indicated that the tribals were superior in peak respiratory flow rate, speed and endurance than the non-tribal.

The word “tribal” or Adivasi brings to our mind a picture of half-naked men and women, with arrows and spears in their hands, feathers in their heads, and speaking an unintelligible language. Even when majority of the communities in the world kept changing their life-styles very quickly to keep pace with the “progress” of the world, there were communities still living in line with their traditional values, customs and beliefs, where they could continue to live in peace with Nature and their unpolluted environment. The mainstream world, so called civilized people branded these communities variously as natives, uncivilized people, Aborigines, Adivasis, Tribals, Indigenous and uncontacted people etc. In India, we mostly refer them as Adivasis/Girijans. Tribal communities are facing number of problems they are educationally backward, deals with many social & religious issues and faces poverty, exploitation, forced displacement, various health problems and many more. Like other societies, tribal society is also not static, rather is quite dynamic. The transformation among tribal society is very slow. That is why they have been backward and poor in comparison to other communities. Since they have been materially backward and economically poor, attempts have been made by the Government to develop them. Today, the governments of all over the world are paying special attention towards the

development of the tribal. Number of inclusive policies and programmes are being run by the governments to connect tribals with mainstream of the world.

The term, “tribe” originated around the time of the Greek city-states and the early formation of the Roman Empire. The Latin term, “tribus” has since been transformed to mean, “A group of persons forming a community and claiming descent from a common ancestor”. The Imperial Gazetteer of India, 1911, defines a tribe as a “collection of families bearing a common name, speaking a common dialect, occupying or professing to occupy a common territory and is not usually endogamous though originally it might have been so”. Another definition of a tribe by Majumdar (1961) is that “a tribe is a collection of families or common groups bearing a common name, the members of which occupy the same territory, speak the same language and observe certain taboos, regarding marriage, profession, or occupation and have developed a well assured system of reciprocity and mutuality of obligation”.

Tribals can be seen throughout the earth. In each part they are called by the person by different names, viz. Gipsy, Aborigines, Adivasis and other synonymous names. The tribals have their own identity; cultural traits even than every tribal group have their own identity. In this way each tribal group can be distinguished their own existence or identity. The isolation problem has deprived them by the developed part of the nations. The isolation problem is not in India, but it can be seen throughout the world. The highest concentration of tribals can be seen in Africa and second stands in India. In India on 1/5 part (19 percent) of the country and having more than 500 different groups. They speak over 150 languages and about 225 subsidiary languages.

Tribal people in India are called adivasi. Adivasi is an umbrella term for a heterogeneous set of ethnic and tribal groups considered the aboriginal population of India. Although terms such as *atavika*, *vanavasi* ("forest dwellers"), or *giriyan* ("hill people") are also used for the tribes of India, *adivasi* carries the specific meaning of being the original and autochthonous inhabitants of a given region and was specifically coined for that purpose in the 1930s. Over time, unlike the terms "aborigines" or "tribes", the word "adivasi" has developed a connotation of past autonomy which was disrupted during the British colonial period in India and has not been restored. They generally live outside the mainstream of Indian Hindu and Muslim society. Most ordinary Indians know little about them.

In the 1950s a policy of protection was adopted towards all the tribal peoples in India. Prime Minister Jawaharlal Nehru once wrote: "There is no point in trying to make them a second-rate copy of ourselves...they are people who sing and dance and try to enjoy life; not people who sit in stock exchanges, shout at each other, and think themselves civilized."

The educational status of the tribes is very poor. According to the 1981 census, the literacy rate of scheduled tribes was quite low and according to the 1971 census, the literacy percentage for tribal's is not very encouraging. Despite government efforts to promote education among the Scheduled Tribes (STs), their literacy rates as compared to the national average have remained low, a Parliamentary Committee has said this week. The literacy rate as per Census 2011 is 73% but for STs is 59% only. "The overall literacy gap amongst the various groups and STs has come down from 19.77% in 1961 to 14.03% in 2011, a scrutiny of state-wise literacy data reveals that in most of the north eastern states like Meghalaya, Mizoram and Nagaland, STs are at par with the general population. "While in Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu and West Bengal, which have sizeable ST population in remote areas, the literacy gap is as high as 18 to 26 per cent," the committee has noted.

The major tribal groups who have been scheduled in India include Gonds, Santals, Khasis, Nagas, Garos, Mundas, Oraons, Kharias, Hos, Angamis, Bhils, Kols, Chenchu, Kondadoras, Kondakapus, Totos, Paharias, Bhutias etc. Each and every tribal people have their own distinct social system, culture, tradition, customs, values, language and lifestyle etc. and they maintain symbiotic relationships with the nature. In present day context, almost all the tribal peoples are facing various kinds of problems to sustain their livelihood and hence they try to engage themselves in informal activities for their survival.

So far as the state of West Bengal there are forty (40) schedule tribes (As per the Constitution Scheduled Tribes Order, 1950) were listed as scheduled tribes in West Bengal: Asur, Baiga, Badia, Bediya, Bhumji, Bhutia, Sherpa, Toto, Dukpa, Kagatay, Tibetan, Yolmo, Birhor, Birjia, Chakma, Chero, Chik Baraik, Garo, Gond, Gorait, Hajang, Ho, Karmali, Kharwar, Khond, Kisan, Kora, Korwa, Lepcha, Lodha, Kheria, Kharia, Lohara, Lohra, Magh, Mahali, Mahli, Mal Pahariya, Mech, Mru.,

Munda, Nagesia, Oraon, Parhaiya, Rabha, Santal, Sauria Paharia, Savar, Limbu (Subba), and Tamang.

In West Bengal Scheduled Tribes constituting 5.5 per cent of the total population (Census of India, 2001). It is important to note that more than half of the total Scheduled Tribes population of West Bengal are belong to districts of West Medinipur, Jalpaiguri, Purulia and Bardhaman; besides the remaining districts of Bankura, Maida, Uttar Dinajpur and Dakshin Dinajpur have notable scheduled tribe population.

It is true that physical activity has been part of the fundamental pattern of living for every creature that has ever lived on earth. For this reason, the condition of a person's body must have always been of great concern. In primitive society there appears to have been very little organized, purposive instruction in physical education, although early people considered that a certain type of fitness was necessary for survival. The usual activities of labour, searching of food, dancing, hunting skills of archery, spear and rock throwing games were essential to the development of superior bodies with physical efficiency as a basic survival, need muscle including the heart had to be strong vision had to be keen, body had to move fast and lift heavy loads (Ziegler, 1977). Hence the fitness levels of the tribal people are more with greater work efficiency.

When considering the physical fitness, attention must be given to body size and changes in the body's composition that are influenced by the physical activity. Relative amount of muscle, bone, fat and the functional capabilities of cardio vascular and respiratory systems have a pronounced influence on physical fitness. Physical fitness is the ability to carry out daily tasks with vigour and alertness, without undue fatigue, and with ample energy to enjoy leisure time pursuits and to meet unforeseen circumstances (Clarke, 1967).

Fitness is that state which characterizes the degree to which the person is able to function and it is an individual matter. It implies the ability of each person to live most effectively with his potential ability to function which depends upon the physical, mental, emotional, social and spiritual components of fitness, all of which are related to each other and are mutually interdependent (American Association of Health and Physical Education and Recreation, 1967).

Today, life is the toughest of all competitions. It is to be handled with a degree of success and enjoyment. It requires strength, endurance, energy and the protection from stress and strain that only a physically fit body will provide. People in civilized communities are lacking in strength and endurance because of artificial life encouraged by modern civilization in which life is made as soft and easy as far as possible with physical effort diminished to a minimum. The average man spends more time in attending his automobiles than attending his own machine-his body (Featherstone, 1965).

Physically fit individual is mentally alert, emotionally balanced and socially well adjusted. He faces the day-to-day problems of life with confidence. He adopts a positive and optimistic attitude towards life. Physical well-being is the basis of all forms of excellence. Physical fitness is not to be confused with health. Both are connected but not interdependent — it is necessary to be fit, but not necessary to be fit to be healthy. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. W.H.O. (1976) declares physical fitness as an important facet of health.

Motor fitness is an important component of physical fitness; it may be defined as a readiness of the body for performance with special regard to big muscle activities without undue fatigue (Barrow, 1983). It is concerned with the capacity to move the body efficiently with force over a reasonable length of time. The various component of motor fitness are speed, strength, endurance, agility, flexibility, balance and coordination and reaction time.

Motor ability extensively includes a combination of abilities that contribute to motor skill or motor performance. Continued practice brings about changes in the combination of these abilities. Motor abilities become more important in task performance than non-motor abilities and task specific factors emerge with practice (Fleishman, 1964; Singer, 1980).

Human motor performance is a composite of many variables. One of which is the structure of the body. Motor performance can be assessed by conducting motor fitness components. The specific measurement of limb length, circumferences, breadth and body build indexes can reveal the relationship between the anthropometry of the athlete and his motor fitness.

The measurement of structure and proportion of the body is called anthropometry. It consists of making external measurements of the body. The results can be used to upraised body build, health and nutritional status and posture (Meyers, 1974). Anthropometric measurements are still widely used to assess the body composition in many fields and epidemiological investigations (Debnath, Mondal, & Sen, 2018).

Measurement of body size include such descriptive information as height, weight and surface area, while measures of body proportion describe the relationship between height, weight and among length, width and circumferences of various body segments. It has been found that top athletes in some sports tend to have those proportions that biomechanically aid the particular performance required (Ziegler, 1977). Thus, sports anthropometry has developed as a special branch not only as a parameter of selective diagnostic procedure but also as a performance prediction tool. A healthy individual is not only physically healthy, but is also mentally healthy. The modern concept of health extends beyond the proper functioning of the body. It includes a sound, efficient mind and controlled emotions. 'Health is a state of being hale, sound or whole, in body mind or soul.' It means that both body and mind are working efficiently and harmoniously. Man is an integrated mechanism, a psychosomatic unit (body-mind unit), whose behavior is determined by both physical and mental factors.

Health is an asset most valued resource in an individual's life. It is a state where there is a balance in body and its function, mental, social and spiritual wellbeing, many habits pattern of thinking, emotional experience and attitude influence the overall quality of life which in turn affect the health. "Health is state of physical, mental, social and spiritual wellbeing. The status of physical health based on the immune system of the individual.

Health knowledge and attitude constitute an important dimension contributing to health. The prevention of disease is the best method of health care and perfect health, should be our aim for achieving this we have to deal with all aspects of body, mind environment, behavior and consciousness. Human health is an important factor for personality development. Healthy person remains generally successful in his life. Unhealthy person become problem of his family and his society. Consequently, the fate of the nation depends upon the health of its citizens. Health has been defined in

various ways. It has been defined as a “state of complete physical, mental and social well-being, not more the absence of diseases or infirmity.” In general, two types of health have been discussed by the authors, the physical and mental health.

Physical health means all the organs in the body are carrying out their duties properly. This implies physical fitness of the body brought about by enough and proper food, the right amount of exercises, attention to the rules of health, It is not enough to avoid disease, one should not be satisfied with the absence of diseases every effort should be made to make sure that the body is completely physically fit.

In common usage mental health often means both psychological wellbeing and lack of mental illness. In psychology the term mental health always stands with another term popularly known as mental hygiene. Mental health covers an elusive and diffuse field and the term itself encompasses a multiplicity of meanings. Mental health is a scientific concept, and it is unlikely that present or future thinking and study and in any of the behavioral and medical sciences are going to realize its status.

Mental Health means maximum development of physical, intellectual and emotional states of the individual. So that he can contribute maximum to the welfare of the society and can also realize his ideas and aims in life. The integration strong to mental health can be strongly supported by positive feelings. Feelings to insecurity, inadequacy, inferiority, hostility and hatred, jealousy and every sign of emotional disruption and can act to disrupt mental stability and can lead to mental ill health. Contrary to such feelings are those of acceptance, love, belongingness, security and personal worth. Each one of which contribute to mental stability and serves as a signpost of mental health.

Many of the criteria of mental health and adjustment are oriented to peace of mind of tranquility, where there is emotional harmony, positive feeling, control of thought and conduct and integration of motives. Attitudes are very similar to feeling in their relation to mental health. Healthy self-concept is a sign of mental health. A person must maintain a healthy orientation to objective reality. So, one must learn to think of himself in a healthy manner. Feeling of personal inadequacy, helplessness, inferiority or insecurity or worthlessness will undermine an adequate self-concept. This condition will serve to disrupt the relation between self and reality so that it becomes more difficult to meet other criteria of mental health. This idea can be

compared with criterion of self – acceptance. Relation between such factors as pride and neurosis make the development of a healthy self-concept one of the most important factors in the achievement of mental health.

The ability to carry out much health behavior is affected by personal health, while illness may provide additional motivation for behavior change. People with diabetes and other metabolic disorder may have particular dietary requirements the effectiveness of medication taken by people with HIV can be affected by alcohol and diet. Diagnosis with a condition like coronary heart disease or non-insulin dependent diabetes may provide the stimulus for weight reduction thought dietary change and physical exercise.

The life style of tribal students is more natural than the non-tribals one. They study mostly in ashram schools and work independently in daily routine. They walk and run in everywhere and not dependent on vehicles which is quite opposite too nontribal one. The nature also they have is pure and food also healthy without fatty and chemicals. All these make physically strong and so the Muscular strength, Body Composition, Muscular endurance, Cardio Vascular Endurance and flexibility are quite good when compared to the non-tribal students. But the mental motivation they get is quite low and so if provided and guided well they can compete well with the non-tribal students in all aspects.

Psychosocial parameters are one of the vital areas, the psychological traits depend upon the race, geographical and climate conditions of human being. Therefore, it is receiving spot light attention all the time. The study of psychosocial parameters is a continuous process in bringing out a champion athlete. Their skills very considerably according to their psychological traits. Unlike physical differences, psychological differences are not so apparent and consequently are not readily accepted especially when the lack of needed characteristics prevents success. Understanding of the necessary characteristics required for a success in a particular sport must receive major consideration both in matching athlete, with them best sport and in training an athlete for success in his chosen sports. Some psychological traits have long been associated with success in certain sports.

The twenty-first century with rapid changes in environmental structure has been called a stressful, anxious and pressured century. The psychosocial parameters

differ from individual to individuals. There are many factors which causes individual differences; that are genetic factor, social and cultural factor, daily routine, daily exercise, educational factors etc. Especially they suffer from the various psychological problems like academic anxiety, stress and adjustment, etc. As per the recent report, the various psychological problems are increasing every year.

Anxiety is one of the most common psychological disorders in school-aged children and adolescents worldwide. Anxiety is a physiological and psychological state characterized by cognitive, somatic, emotional and behavioral components. It is a common phenomenon of everyday life. Its play a crucial role in human life because all of us are the victim of anxiety in different ways (Goodstein & Layon, 1975).

Generally, anxiety can be either a trait anxiety or a state anxiety. A trait anxiety is a stable characteristic or trait of the person. A state anxiety is one which is aroused by some temporary condition of the environment such as examination, accident, punishment, etc. Academic anxiety is a kind of state anxiety which relates to the impending danger from the environment of the academic institutions including teacher, certain subjects like Mathematics, English, etc. Academic anxiety constitutes particular unpleasant psychological and physiological reactions of an organism to extrinsic or an intrinsic threat which amounts to disintegration or extinction of the organism (Dutt, 1998).

Academic anxiety afflicts students during school-related situations. If academic anxiety isn't properly addressed, it can have many serious and lasting consequences, such as causing a student to procrastinate, perform poorly on school work, fail in classes and withdraw from socializing with peers or pursuing activities that interest him.

Anxiety disorders are the most common disorders occur during adolescence. Anxiety is of many types and one among them is academic anxiety. Academic anxiety is a kind of anxiety related to the impending danger from the learning institution, learning environment, from ineffective study habits, from a certain subject, from the specific subject teacher or from the examination. It is a mutual feeling of agitation, uneasiness, distress, stress or tension in a reaction to a certain school situation which is related to the academics and perceived negatively. Students can feel anxiety related to every academic task as well as with the examination also. It may tend towards lack

of concentration, procrastination, low academic achievement, lower level of intrinsic motivation, poor study habits, low achievement motivation, delayed academic assessments etc. Academic anxiety can become more detrimental over time. A moderate level of academic anxiety is considered as a normal but high level can hamper the academic performance of an individual (Huberty, 2009; Shakir & Sharma, 2018). Academic anxiety can either enhance or inhibit academic performance and it depends on how an individual student perceives the academic situation (Mahato & Jangir, 2012; Matto & Nabi, 2012).

Stress is a common phenomenon of everyday life. Stress is an internal state which can be caused by physical demands on the body or by environmental and social situations which are evaluated as potentially harmful, uncontrollable or exceeding our resources for coping life events and pressures of everyday life. The physical, environmental, and social causes of the stress are called stressors (Morgan, King, Weisg, & Schopler, 1993).

In the present era, stress has become more attention-catching for a student. Students undergo stress at assignments, mid-term exams, etc. which is driving many students to frustration. Academic stress has increased more with the increasing awareness of education (Puri & Dubey, 2011).

Adolescents today are living in an increasing stress-ridden atmosphere. Stress among adolescents' boys and girls are very common and natural. Be it about self, career, academic, or any other issue, the youth undergo feelings of anxiety at some phase of lives. Stress is also partially created by parental pressure too when they expect the adolescents to perform and stand out among their groups. When they can't rise up to their expectations or are in a process of meeting it, adolescents suffer from frustration, physical stress, aggression, undesirable complexes, anxiety and depression (Alam, 2010).

Stress is considered to be a key factor affecting mental health, and high level of stress is associated with depression and suicidal attempts (Nolen-Hoeksema, 2004). One recent study found that adolescents who engaged in suicide ideation were more likely to have experienced negative life events in the past years than adolescents who did not engage in suicide ideation (Liu & Tein, 2005).

The problem of stress and adjustment is widely seen as a social crisis as well as a problem of individual behavior. When an individual does not succeed in his work regularly then he comes under the area of stress and maladjustment. The concept of emotional intelligence can be used effectively in solving these problems and helps the individual to adjust in the society.

Adjustment refers to individuals achieving an overall harmonious balance between the demands of various aspects of environment, such as home, health, social, emotional and school on the one hand and cognition on the other. Adjustment as the maintenance of a harmonious relationship between man and his environment. An individual needs to change or modify himself in some way or the other to fit into or accommodate himself with his environment (Crow & Crow, 1956).

Adjustment in the case of an individual should consist of personal as well as environmental components. These two aspects of adjustment can be further subdivided into smaller aspects of personal and environmental factors. Adjustment, although seeming to be a universal characteristic or quality may have different aspects and dimensions. However, there are numerous efforts at measuring adjustment through inventories and other techniques. These aspects have been identified and various tests have been constructed to assess their dimensions. Bell (1958) has taken five areas or dimensions in his adjustment inventory namely, home, health, social, emotional and occupational. Arkoff (1968) in his book: Adjustment and Mental Health has enumerated the family, school or college, vocation and marriage as the important areas of adjustment. According to him adjustment is the person's interaction with his or her environment.

During adolescent stage is vital for all community students (tribal & non-tribal) because, adolescence is the developmental period of transitional stage of physical and mental development that occurs between childhood to adulthood (age of majority). This transition involves biological, social and psychological changes. The World Health Organization identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. Adolescence is the period of transition between childhood and adulthood. It includes some big changes—to the body, and to the way a young person relates to the world. The process of adolescence is a period of preparation for adulthood during which time several key developmental experiences occur. Besides physical and sexual

maturation, these experiences include movement toward social and economic independence, and development of identity, the acquisition of skills needed to carry out adult relationships and roles, and the capacity for abstract reasoning.

Generally, the adolescent period has definite age range. Early adolescents (approximately 10 to 13 years) During this stage, children often start to grow more quickly and body changes, including hair growth under the arms and near the genitals, breast development in females and enlargement of the testicles in males. Middle Adolescence (Ages 14 to 17 years) must contend with puberty, changing gender roles and developing more autonomous relationships with parents and more mature relationships with peers. Later adolescents (approximately 18 to 21 years) face the need to integrate their sexuality into their relationships, prepare for adult work roles arrive at a set of values to guide their behavior and through each of these achieve a sense of their own identity.

Adolescents with supportive parents exhibit higher rates of self-reliance, identity formation, school performance, and positive career-planning aspirations, as well as lower rates of depression and delinquency (Simpson, 2001). Youth who share trusting relationships with their parents—characterized by mutual and sustained bonds and open communication—have higher achievement and better physical health and are more likely to disclose information to their parents that will keep them out of trouble (Pong, Hao, & Gardner, 2005).

There are lot of differences in tribal and non-tribal students in every aspect of their life i.e., customs, rituals, eating habit, cultural style of living etc. Therefore, it is possible that there may be greater differences in body composition, fitness, health status and psychosocial parameters between tribal and non-tribal students. The tribal students are generally differed from others students i.e., non-tribal, such as physical appearance, body structure, socioeconomic status, physical work & playing ability etc. Most of the works of our country which have been completed so far, have been conducted with the secondary school children as subjects. Thus, there is a genuine need for information about adolescents particularly 13 to 15 years school children of our country. This idea has motivated the researcher to take-up the present project. The purpose was to study the find out the comparison of the motor fitness, health status anthropometric, and psychosocial parameters between Tribal & Non-Tribal adolescent students.

1.2 Statement of The Problem:

With this background concept, the present study an attempt has been made to observe the motor fitness, health status, anthropometric and psycho-social parameters of tribal and non-tribal adolescent students, so the present study was stated as **“A Comparative Study Between Tribal and Non-Tribal Adolescents in Respect to Motor Fitness Health Status Anthropometric and Psychosocial Parameters”**.

1.3 Purpose of The Study:

The purpose of the study is presented below according to the dimensions of the study.

1. On Motor Fitness

- i. To compare the motor fitness components of tribal and non-tribal boys adolescents.
- ii. To compare the motor fitness components of tribal and non-tribal girls adolescents.

2. On Health Status

- i. To compare the health status of tribal and non-tribal boys adolescents.
- ii. To compare the health status of tribal and non-tribal girls adolescents.

3. On Anthropometric Measurements

- i. To compare anthropometric variables of tribal and non-tribal boys adolescents.
- ii. To compare anthropometric variables of tribal and non-tribal girls adolescents.

4. On Psychosocial parameters:

- i. To compare psychosocial parameters of tribal and non-tribal boys adolescents.
- ii. To compare psychosocial parameters of tribal and non-tribal girls adolescents.

1.4 Significance of The Study:

The results of the study would be significant for physical education and sports in the following ways:

1. The present study would help to know about the motor fitness, health status, anthropometric and psychosocial parameters of tribal and non-tribal adolescents of West Bengal.
2. The presents study would help to improve the motor fitness and health status of tribal and non-tribal adolescents of West Bengal.
3. The result of the study would be possible to develop and prepare the program of Physical Education Teacher and coaches for secondary school students.
4. The result of the study will provide an opportunity for physical education teachers and coaches, to spot out the latent talents of the students and to select potential students for different sports and games.
5. The results will provide some information that will lead to further study and research.

1.5 Delimitation of The Study:

The present study was delimited to the following conditions:

1. The subjects were selected only from 10 districts of West Bengal.
2. The subjects were delimited only 1600 adolescents of both tribal and non-tribal have been selected for this study.
3. The age range of the subjects was delimited between 13 to 15 years only.
4. Motor fitness was measured only by, speed, agility, explosive strength, balance, coordination, and reaction time.
5. The health status was measured only by optimum health scale (OHS).
6. The anthropometric measurement was height, weight, triceps skinfold, suprailiac skinfold, abdominal skinfold, thigh skin fold and body composition in the form of body fat%, fat mass, and lean body mass.
7. The Psychosocial parameters were measured only by academic anxiety, stress, adjustment.

1.5 Limitations of The Study:

The study was conducted under the following limiting conditions:

1. The climatic condition at different centers for data collection at five different administrative divisions of West Bengal was not similar.
2. Ground conditions at different testing centers were not exactly similar.
3. For obtaining data motivation, interest and attitude of the subjects were also limiting factors.
4. The socio-economic status of different groups of subjects was not similar.
5. Financial conditions and time were also limiting factors.

1.6 Definition and Explanation of Terms:

In order to understand the nature and scope of present investigation, the following terms should be specifically understood as follows.

Tribal: A tribe is defined by Dr. River as a " a social group of a simple kind, the members of which speak common dialect, have single government and act together for each common purpose as warfare". A tribe is a group of distinct people, dependent on their land for their livelihood, who are largely self-sufficient, and not integrated into the national society. It is perhaps the term most readily understood and used by the general public. In the present study the tribal was expressed by those are belong to schedule tribe community, all schedule tribe community was the tribal students.

Non- Tribal: For the purpose of the present study the term non-tribal group and lives among the more advanced people in the urban areas receives all types of amenities for proper development and a standard living. In the present study the non-tribal was expressed by those are belong to other than schedule tribe community.

Adolescence: Adolescence refers to the period of human growth that occurs between childhood and adulthood. Adolescence begins at around age 10 years and ends around age 19 years. Adolescence can be broken into three stages: early adolescence, middle adolescence, and late adolescence. Each stage has its own characteristics. In the present study 13 to 15 years middle age adolescence was selected.

Motor fitness: Motor fitness is considered as a part of physical fitness which is responsible for doing any movement activity. There are different components of motor fitness which are used to measure it objectively. These components are strength, speed,

endurance and agility. These are considered as the conditional components of motor fitness. The present idea about motor fitness also includes some co-coordinative components such as, orientation ability, balance, adaptation, reaction ability, coupling, rhythm and differentiation ability. Motor fitness is one major aspect of physical fitness and consists of the elements of strength, endurance, speed, power, agility, flexibility, coordination, balance and body control. In the present study speed, agility, explosive strength, balance, coordination, and reaction time, were considered as the motor fitness variables.

Speed: Speed is the ability to cover a short distance in as short a period of time as possible. Speed is also considered as the rate of change of position. In the present study, speed was measured by the performance of 50-yard dash.

Agility: Agility is the ability to change the direction of the body rapidly and accurately as it moves from one point to another as fast as possible. It is the ability to make quick and accurate shifts in body position during movement. It was measured by 4 x 10 m shuttle run in the present study.

Explosive strength: Explosive strength is the power. It is the ability to release maximum force in the fastest possible time. It is considered as the explosive strength of a particular muscle group. In the present study leg explosive strength was measured by standing broad jump.

Balance: It refers to the body's ability to maintain a state of equilibrium while remaining stationary or moving. For examples, gymnastics activities and all movements required to essential maintaining balance. In the present study stork stand test was measured for balance.

Coordination: It is the ability of the body to perform smoothly and successfully more than one motor task at the same time. It required mainly hand-eye, foot-eye skills. For example: catching a ball, kicking a ball, walking upstairs, tracking, etc. In the present alternative hand wall toss test was measured by coordination.

Reaction time: Reaction time means the amount of elapsed time from the signal or stimulus to the first movement of the body for reaction. Reaction time is the interval of time between the presentation of the stimulus and the initiation of the response. It was measured by Nelson hand reaction test.

Health Status: Health status is a balance among all the health aspects (Physiological and psychological) function properly without any disturbance in the absence of disease. In the present study optimum health scale was used to measure health status on the different dimension as physical health, mental health, social health, emotional health, and spiritual health.

Anthropometry: Anthropometry is making external measuring of the human body. This measurement may be either objective, by using instruments such as calipers or subjective using a list of characteristics. In the present study four important skinfold measurement were considered.

Body Composition: Body composition refers to the relative amount of muscle, fat, bone and others vital parts of the body. In the present study body composition was measured in the form of body fat%, fat mass, and lean body mass.

Psychosocial Parameters: Psychosocial parameters refer to psychological and social aspect of one's behavior. In the present study the psycho-social parameters were measured by academic anxiety, stress, and Adjustment.

Academic Anxiety: Academic anxiety is a kind of state anxiety which relates to the impending danger from the environments of the academic institutions including teacher, certain subjects like Mathematics, English etc.

Stress: Stress is an internal state which can be caused by physical demands on the body or by environmental and social situations which are evaluated as potentially harmful, uncontrollable or exceeding our resources for coping life events and pressures of everyday life.

Adjustment: Adjustment as the maintenance of a harmonious relationship between man and his environment. An individual needs to change or modify himself in some way or the other to fit into or accommodate himself with his environment.

CHAPTER- II

REVIEW OF RELATED LITERATURE

2.1 Literatures Related to Motor Fitness

2.2 Literatures Related to Health Status

2.3 Literatures Related to Anthropometric Measurements

2.4 Literatures Related to Psychosocial Parameters

2.5 Summary of the Literature

CHAPTER - II

REVIEW OF RELATED LITERATURE

The review of related literature helps the researcher to know the previous knowledge about his or her studies. The review of related literature will help to avoid the risk of duplication, to provide theories and ideas for further investigation, to expand the sphere of knowledge and to make available explanations for verification in the concerned area – attempt was made to locate literature related to the present investigation and also help the researcher to find unsearched new things which is very much beneficial to researcher and related society. For the purpose of better understanding the literature has been presented in four separate sections as follows:

2.1 Literatures Related to Motor Fitness

In this section, the literature related to motor fitness of children has been presented.

Devi (2000) compared the physical fitness and psychological traits of tribal and non-tribal high school students of high-altitude areas were carried out on 1200 students age range was 14 to 17 years, were taken randomly from six districts of Himachal Pradesh. They were tested Fleishman's Physical Fitness Test Battery to measure the physical fitness and for psychological traits, personality and adjustment inventory was used. They were found that the tribal students were superior in explosive strength, agility, dynamic flexibility and better in speed and endurance than the non-tribal students. Altitude also affects both the group of tribal and non-tribal, the tribal of lower altitude were superior in their height and endurance to the tribal of higher altitude and the tribal of higher altitude were better in dynamic flexibility than the tribal of lower altitude. In the case of psychological traits, the non-tribal students were found more intelligent, emotionally stable, undemonstrative, conscientious, controlled and relaxed than the tribal students. Also, the non-tribal (boys and girls) were better adjusted in all the three areas of Adjustment; Emotional, Social and Educational than the tribal (boys and girls).

Dhanabal (2011) conducted a study on selected Anthropometric, Physical, Physiological variables and socio-economic status of urban, rural and tribal area school student of Trichy District in Tamil Nadu. To achieve this purpose 451 school

student from an urban area (237 boys and 214 girls), 448 school students from rural area (231 boys and 217 girls) and 456 students from the tribal area (234 boys and 222 girls) were selected at random from various Government and Non- Government high and higher secondary schools in Trichy District in Tamil Nadu. Their age ranged from 13 to 16 years as per their school records. It was concluded from the result of the study that tribal area school students were better than other two area school students in physical and physiological variables, and urban area school students was better than other two area school students in case of BMI, body fat percent and socioeconomic status.

Saha & Haldar (2012) compared the Health-related physical fitness variables and psychomotor ability between rural and urban school-going children and concluded that there were significant differences between Rural and Urban school-going children in all the Health-related Physical fitness components as well as in Reaction ability under psychomotor ability and rural school-going children were found better than urban school going-children.

Saha (2014) studied on health-related physical fitness, socioeconomic status and psychomotor ability of tribal school-going children of West Bengal and their age ranging from 14 to 16 years from four different districts of West Bengal namely North 24 Parganas, South 24 Parganas, Cooch Behar, and Burdwan. Result reveals that there was positive relationship between health-related physical fitness with reaction time, socioeconomic status and psychomotor ability of tribal school going children of West Bengal.

Singh, (2014) conducted a study to compared physique and motor fitness among tribal and non-tribal football players. The author, to assess physique, Heath & Carter Method was used, body Mass Index (BMI) was calculated by Siri Formulae and for Motor fitness JCR test prepared by Cooper was used. The result found that no significant difference was on body mass index but the Tribal male football players having more arm strength, speed and agility as compared to non-tribal male football players.

Sarkar & Paul (2015) compared the status of health-related physical fitness of school-going boys between tribal and non-tribal students. Study was carried on 60 randomly selected subjects from Hooghly district, in the age group of 12-14 yrs. The

researcher concluded that the non-tribal students are better abdominal strength endurance, agility and higher body fat % than the tribal students. Another also concluded that upper body strength endurance of the tribal students are better than the non-tribal students.

Sharma, Varoda, Venugopal, & Gupta (2018) observed a cross-sectional study of the anthropometric variables and physical fitness variables which were carried out on 782 boys and girls, aged 12+ to 17+ years from Tribal residential and non-residential school of Bastar dist of Chhattisgarh. The study was aimed to compare stature, body weight, 50m run, 10x4m shuttle run and vertical jump to measure motor fitness components. Height and weight measurements showed an increasing trend with age in both groups of boys and girls, but it is not uniform in all the ages. However, the comparison revealed that there was no difference in height and weight measurements in residential and non-residential boys and girls of all the age group but the motor fitness variables shown better scores for boys and girls of residential school.

Beigh & Rajpal (2018) compared the selected motor fitness components of Tribal and Non-Tribal Intercollegiate Male Soccer Players in Jammu and Kashmir State and their age ranged were 18-28 years. The author concluded that there is a significant difference in selected motor fitness components between the speeds of intercollegiate football players, but found insignificance in Agility.

Hansda & Bandopadhyay (2019) compare the Agility, Power, Speed, Strength and Coordination between tribal and general school going subjects and their age ranged from 13 years to 16 years from the Bankura, Jhargram and Paschim Medinipur districts of West Bengal State. The result found that no significant difference was observed in Power and Coordination between tribal boys and general boys but the tribal boys were significantly better in speed, agility and strength than general boys.

Sylejmani, et al. (2019) conducted a study on physical fitness components of rural and urban children and adolescents from the region of Strumica (Macedonia). The author concluded that children and adolescents from the rural environment show better results in cardiorespiratory fitness, muscle fitness of the upper and lower extremities and have better coordination, speed and agility from their urban peers.

2.2 Literatures Related to Health Status

In this section the literatures related to health status of children have been presented.

Basu (1993) discussed the health status of the tribal women in relation to sex ratio, age at marriage, fertility, mortality, life expectancy, nutritional status, maternal and child health care practices, sexually transmitted diseases, genetic disorders, etc. the health status of tribal women is found to be lower than that of the Indian women in general on most of these aspects.

Dhargupta, Goswami, Sen, & Mazumder (2009) conducted a study of comprising the socio-economic variables like, age, sex, education, family education status etc having importance in maintaining the health status, on 320 Toto, Santal, Sabar and Lodha respondents of Jalpaiguri and Purulia District of West Bengal using a pre-tested structured interview schedule for data collection. It was found that Education, occupation, income, house types were highly significant in relation to health status among the Santals. Family education status, land type, land holding, family size, family type and personal cosmopolite were highly significant to health status amongst the Lodhas.

Divakar, et al. (2013) assessed the nutritional and health status among the tribal and non-tribal forest areas of Mysore. Data were collected through pre-tested structured interview which was used house to house visits by individual and family scheduling. They concluded that the tribals were is low socio-economic status, poor nutritional status, increased prevalence of morbid conditions compared to non-tribal population.

Taviyad (2014) compared various components of the mental health of tribal and non-tribal students on 120 high school students of Panchmahal district of Gujrat. Result revealed that tribal student significantly differ on mental health factor such as emotional stability, over all adjustment, autonomy, and security insecurity than the non-tribal students.

Khan & Lone (2017) had conducted a study about the status of mental health of tribal and non-tribal students on 600 students were randomly selected from two different districts of Kashmir division, with 300 students from tribal community and

an equal number from the non-tribal community. Mental Health Battery of Singh and Gupta was used as a tool for collecting the data. The results revealed that mental health status of Non-Tribal students was found better than tribal students.

Singh & Negi (2019) suggested that tribals health status is very miserable and need a systematic policy intervention at the states and the national level to revive and cure the health condition of the most vulnerable population.

Roshni, Khan, & Hasan (2020) assessed the mental health status of the tribal students in Bangladesh especially in Rajshahi University. Mental health of 180 (tribal student) respondents was measured by administering General Health Questionnaire (Goldberg, 1972) another 180 general (non-tribal) students was also measured as a control group for the comparison. The result revealed that the mental health of the tribal students was significantly ($P < 0.01$) poor than general (non-tribal) students. The findings also indicated that mental health among the different tribal groups did not differed significantly ($P > 0.01$).

2.3 Literatures Related to Anthropometric Measurements

In this section the literatures related to anthropometric variables of children have been presented.

Karkare (2011) observed the anthropometric variables of tribal and non tribal players of Chhattisgarh state and found that tribal players had significantly more skinfold thickness of triceps, biceps, sub scapular and calf compared to non tribal players but Non tribal players showed significantly more diameters of humerus and femur as compared to tribal players.

Sinha & Nag (2013) studied on anthropometric characteristics of 150 pre-pubertal tribal and non-tribal boys from Agartala Municipality area of West Tripura and observed that non-tribal boys had significantly higher height, weight, skinfold measurements and body fat % as compared to tribal boys. On the other hand, the tribal boy also showed significantly greater circumferences, bone widths, mesomorphic component as compared to non-tribal boys.

Das, Biswas, Pal, & Biswas (2014) conducted a cross sectional study to assess the anthropometric status between tribal and non-tribal school children aged 6 to 10 years. Total 63 were selected from tribal community and 65 from non-tribal

area. The study revealed that 9.2% non-tribal and 7.9% tribal children were severely stunted, 12.3% non-tribal and 1.6% tribal were moderately wasted and 9.2% non-tribal and 1.6% tribal children were moderately underweight. In relation to sex among tribal children 12.9% tribal boys and 3.1% tribal girls were severely stunted, only 3.2% tribal boys were both moderately wasted and underweight. In case of non-tribal children 17.9% boys and 2.7% girls were severely stunted, 17.9% boys and 8.1% girls were moderately wasted and 17.9% boys and 2.7% girls were moderately underweight. According to the age group of 6 to 7 years it was found that, only 4.2% non-tribal children were severely stunted and 29.2% were moderately stunted whereas 12% tribal children were moderately stunted. In both case of moderately wasting and underweight non-tribal were 8.5% more than tribal children and among 8 to 10 years age group it was 12.2% and 7.3% more respectively and in case of severely stunted tribal children were 1% more than non-tribal.

Manna, Pan, & Chowdhury (2015) compared the body composition between tribal and non-tribal children of 10 to 16 years, which was selected from West Midnapore district of West Bengal. The author has been seen that tribal children have significantly better body composition than non-tribal children.

Tara & Singh (2017) found out the difference in selected anthropometric characteristics between tribal (n=150) and non-tribal (n=150) senior secondary school players of Himachal Pradesh. Each player was tested for various anthropometric measurements necessary for estimation of body weight, height, chest circumference, upper arm circumference, forearm circumference, thigh circumference and calf circumference of tribal and non-tribal players. It was found that non-tribal senior secondary school players possessed significantly higher values of upper arm circumference, forearm circumference and calf circumference and depicted somewhat higher mean value for height. The tribal senior secondary school players possessed significantly higher chest circumference and depicted somewhat higher mean value for height.

Singh, Singh, & Singh (2017) compared the anthropometric characteristics and body composition components of the rural and urban children from various districts of Punjab and their age ranged 12 to 18 years. The results revealed that the rural children had significantly greater in length measurements, circumference and

diameter measurements than the urban children. The results also revealed that the rural children possessed significantly higher lean body mass than the urban children.

Saha & Sil (2018) observed a cross-sectional study of physical growth, percentage of fat mass, and the nutritional status of tribal (n=700) and non-tribal (n=703) school-going children, aged 6 to 18 years from different districts of Tripura. The result revealed that 16.14 percent non-tribal and 15.64 percent tribal children were stunted. The overall prevalence of thinness was 11.29 percent for non-tribal and 3.70 percent for tribal, while 0.71 percent non-tribal and 1.85 percent tribal girls were overweight. The tribal girls have significantly greater percentage of fat mass than the non-tribal girls in the order of 2.13 percent and 2.08 percent respectively.

Singh & Tara (2019) find out the difference in selected skinfolds between tribal (n=150) and non-tribal (n=150) male players were selected randomly from the six district of Himachal Pradesh and their age ranged was 14 to 19 years. The author was tested in various skin-fold measurements of biceps skin-fold, triceps skin-fold, forearm skin-fold and sub-scapular skin-fold of tribal and nontribal players. The result found that the non- tribal players possessed significantly greater triceps skin-fold and forearm skinfold than tribal senior secondary school players.

2.4 Literatures Related to Psychosocial Parameters

In this section the literatures related to psychosocial parameters of children have been presented.

Akhtar (2012) studied the level of adjustment and anxiety among tribal and non-tribal students, and their age ranged was 12 to 18years. The level of adjustment testing tool developed by Bell (1934) and Sinha Anxiety Scale was administered to find out the level of anxiety. Result reveled that, there was significant difference between tribal and non-tribal students on adjustment and anxiety. Tribal students possessed more anxiety and adjustment related problems. The results also showed significant of difference on the dimension of home, health, social and emotional adjustment.

Das & Deb (2013) compared the social adjustment among 120 subjects classified as 60 tribal (30 male & 30 female each)) and 60 non-tribals (30 male & 30 female each) students of Agartala City of Tripura state. Their age ranges from 18

years to 21 years. After interpretation of data, they found that, there is a significant difference of social adjustment pattern among Tribal and Nontribal students.

Vig & Chawla (2013) assessed the academic anxiety among rural and urban adolescent girls of Ludhiana district and the results revealed that majority of rural and urban girls had moderate level of academic anxiety, but the mean score indicated that rural girls significantly higher levels of academic anxiety than the urban girls.

Dey, Rahman, Bairagi, & Roy (2014) investigated the relationship between stress and anger of rural and urban adolescents of chittagong district in Bangladesh. Bengali version of life stress scale (Fahim,2001) and bengali version adolescents anger rating scale (Islam et al., 2006) was used to measure stress and anger. The results revealed that both the stress and anger of urban adolescents was more than the rural adolescents, and results also showed that adolescents stress was positively correlated ($r = .8, p < .01$) with their anger.

Dhanjal & Sharma 2014) conducted a study on status of academic anxiety, stress & body build among 337 kaware tribal boys and girls (135 & 202 respectively) of Surguja district of Chhattisgarh. The academic anxiety and state of stress were assessed by administering recommended psychological manuals and Pignet index (Pignet, 1901) was calculated to assess the body build. It was found that girls were found academically more anxious than boys. Both boys and girls showed non-satisfactory body build and girls exhibited high degree of stress.

Siddiqui & Rehman (2014) studied the levels of academic anxiety with respect to school type, gender, socio-economic status of secondary school students. The study revealed that low socio economic status school students and female students suffer more from academic anxiety.

Thakur & Kumar (2015) studied on academic Anxiety among Adolescents in relation to Socio-Emotional School Climate. The author used Academic Anxiety Scale (A.A.S.) by Pal, Misra and Pandey (1985) and Socio-Emotional School Climate Inventory (S.E.S.C.I.) by Sinha and Bhargava (1998) to collect the data. Total 200 students were drawn from urban and rural secondary schools of Ludhiana District. The result of the study showed that there is a negative relationship between academic anxiety and socio-emotional school climate among adolescents of Ludhiana

district, and also shows that academic anxiety did not differ significantly with respect to gender but shows a significant difference with respect to demographic location.

Banga & Sharma (2016) conducted a study on academic anxiety of secondary school students in relation to gender, locale and social category and find out the academic anxiety of secondary school boy's students significantly higher than girls secondary school students. On the other hand no significant difference was observed in the academic anxiety among rural and urban secondary school students, and also no significant difference was observed in academic anxiety of secondary school students belonging to general castes, other backward castes and scheduled castes/ scheduled tribes.

Alam (2018) conducted a study on effect of adjustment on the senior secondary school students from government and private schools located in the rural and urban areas of Aligarh district. The Adjustment Inventory for School Students constructed and standardized by Sinha and Singh (1971) was used. The results revealed that there is significant difference in adjustment of senior secondary school students across gender (male and female), locale (rural and urban), academic stream (science and social sciences) and types of school (government and private).

Bajaj & Kaur (2020) assessed the stress and educational adjustment among urban and rural school going children. They concluded that urban school going children are more stressful than their rural counterpart and rural school going children have higher level of educational adjustment than their urban counterparts.

2.5 Summary of the Literature

The review of literature helped the researcher to spot the relevant topics and variables. The latest literature also helped the researcher to support the findings with regard to the problem. Further the literature collected related to the study helps the research scholar in understanding the similar areas.

The reviews were presented under the four sections such as motor fitness (n=10), health status (n=7) anthropometric (n=10), and Psychosocial parameters (n=10) in chronological order.

In the above review of related literature researcher found that so many researchers conducted in the field of physical fitness, anthropometry, and

psychological variables between tribal and non-tribal boys' students only. Hence, the comparative study on motor fitness health status anthropometric and psychosocial parameters of both boys and girls of tribal and non-tribal adolescents, at the different administrative division of West Bengal, were very few. Despite this researcher had tried to find the related literature as much as possible. In this gap of knowledge, the researcher has motivated and present study was planned.

CHAPTER-III

METHODOLOGY

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CHAPTER-III

METHODOLOGY

The methodology is an important part of any research work for the success or failure of the work. The researcher had to proceed step by step with the help of the scientific and systematic process of research. It is determined based on the objective of the study. The various aspects of the method and materials presented in this chapter are related to the study.

This chapter describes the selection of subjects, criterion measure, tools and techniques, administration of the test, and statistical techniques used for analysis and interpretation of the data.

3.1. The Subjects:

The purpose of the study was to analyze the selected motor fitness, health status, anthropometric and psychosocial parameters of tribal and non-tribal adolescents. The basic principle which was followed for the selection of subjects should be the true representatives of the whole of West Bengal. For this purpose, West Bengal state is sub-divided into five divisions based on administrative conditions.

3.1.1 The Administrative Divisions for Selection of The Subjects:

The different administrative divisions where from the subjects were selected have been indicated in Fig. 1.

In West Bengal, 23 districts are divided under five administrative divisions, namely the Jalpaiguri division, Malda division, Burdwan division, Presidency division, and Medinipur division. The researcher has selected two districts in every division. The total number of 10 (ten) districts were selected from five administrative divisions. In the Jalpaiguri division, Alipurduar & Jalpaiguri districts were selected for the present study. In the Malda division, Dakshin Dinajpur & Murshidabad districts were selected for the study. In the Burdwan division, Birbhum & Hoogly districts were selected for the study. In the Presidency division, Nadia & North 24 Parganas districts were selected for the study. In the Medinipur division, Purulia and Purba-Medinipur districts were selected for the study.

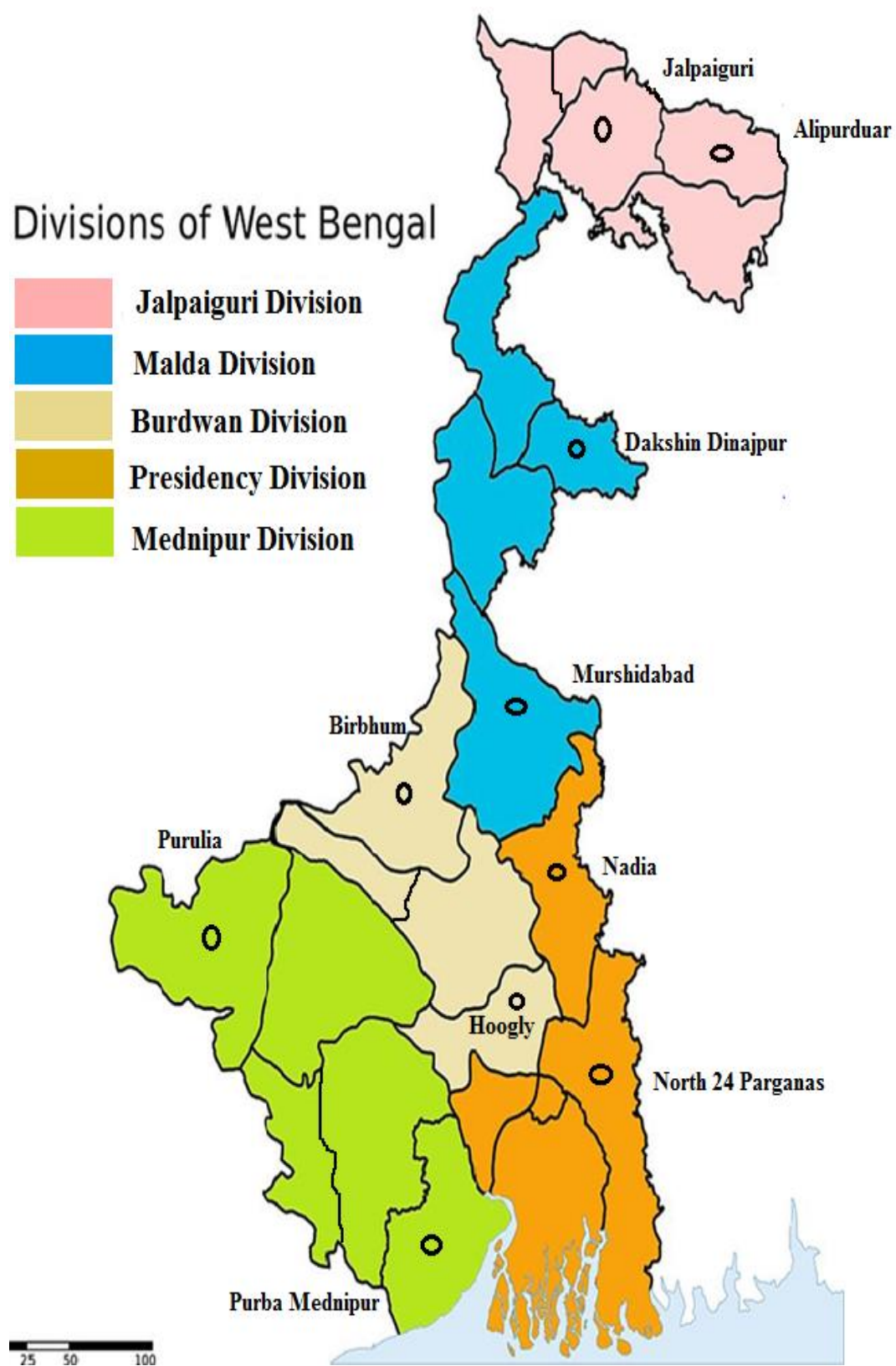


Figure- 1: Map of administrative divisions of West Bengal where data were collected

3.1.2 Distribution of Subjects:

All together one thousand six hundred (1600) school students from five different administrative divisions, namely Jalpaiguri division, Malda division, Burdwan division, Presidency division, and Medinipur division were selected as subjects for the present study.

The study was conducted one thousand six hundred individuals ($n = 1600$) out of which eight hundred were boys group students and they sub-divided into four hundred tribal boys ($n = 400$) and four hundred non-tribal boys ($n = 400$), selected from the school of different districts of West Bengal. Another eight hundred were girls group students. They were also divided into four hundred tribal girls ($n = 400$) and four hundred non-tribal girls ($n = 400$) and they were selected from the school of different districts of West Bengal. Their age ranged from 13 to 15 years. The distribution of the subjects has been presented in Fig. 2.

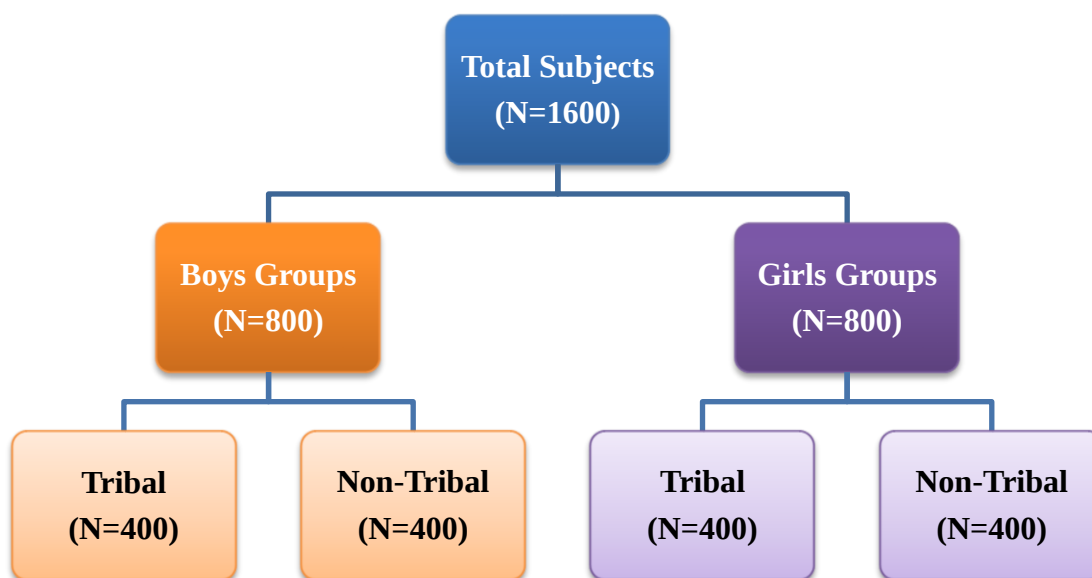


Figure-2: Distribution of the Subjects of the Present Study

3.2 Design of the Study:

In the present study, the quota-random sampling method was adopted. At first, the whole of West Bengal was divided into five divisions, namely Jalpaiguri division, Malda division, Burdwan division, Presidency division, and Medinipur division. The researcher has selected every division of West Bengal. From each division, two districts were selected and, in every district, two schools were selected. The total number of ten (10) districts were selected from five administrative divisions.

From these two districts of each division, 320 students were selected. Out of the 160 students were selected from one district and another 160 students were selected from other district. Among 160 students there were 80 boys students and 80 girls students. Further 80 boys were equally divided into 40 tribal boys and another 40 were non-tribal boys students. Similarly, 80 girls were equally divided into 40 tribal girls and another 40 were non-tribal girls students. The same procedure for the selection of subjects was followed for other districts and other divisions. So, finally, 1600 subjects were selected from 20 high schools of five different administrative divisions of West Bengal. The design of the study has been presented in Fig. 3.

In the selection process of the subjects, the researcher contacted and consulted with the Physical Education Teacher, Provost of the hostel, Teacher-in charge, and Head of School. The researcher convinced them with a recommendation letter for the research work.



Figure- 3: Showing the Sampling Design of the Study

3.3. Criterion Measures:

The main task of the research was to compare the motor fitness, health status, anthropometric and psychosocial parameters of tribal and non-tribal adolescents. The age, height, weight, and BMI were measured for personal data of both the groups of the subjects. The motor fitness was assessed by measuring selected motor fitness

components. These were speed, agility, explosive strength, balance, co-ordination, reaction-time, and overall motor fitness. For measuring health status, optimum health scale (OHS) was selected for the present study. For measuring anthropometric measurements, triceps skinfold, suprailiac skinfold, abdominal skinfold, thigh skin fold and body composition (body fat %, fat mass & lean body mass) were selected for the present study. On the other hand, psychosocial parameters were included academic anxiety, stress (pressure, physical stress, anxiety, frustration and overall stress), and adjustment (emotional adjustment, social adjustment, educational adjustment and overall adjustment) were conducted all the subjects of the present study. All the parameters were the criteria for measurement for the present study. At a glance the criterion measures were presented below.

1. Personal Data:

- I. Age (Years)
- II. Height (cm)
- III. Weight (kg)
- IV. BMI (kg/m^2)

2. Motor Fitness:

- I. Speed
- II. Agility
- III. Explosive Strength
- IV. Balance
- V. Co-ordination
- VI. Reaction time
- VII. Overall Motor Fitness

3. Health Status:

- I. Optimum Health Scale (OHS)

4. Anthropometric Measurement

A. Skinfold Measurement

- i. Triceps Skinfold
- ii. Suprailiac Skinfold
- iii. Abdominal Skinfold
- iv. Thigh Skinfold

B. Body Composition

- i. Body Fat %
- ii. Fat Mass
- iii. Lean Body Mass

5. Psychosocial Parameters:

A. Academic Anxiety

B. Stress

- i. Pressure
- ii. Physical Stress
- iii. Anxiety
- iv. Frustration
- v. Overall Stress

C. Adjustment

- i. Emotional Adjustment
- ii. Social Adjustment
- iii. Educational Adjustment
- iv. Overall Adjustment

3.4. Tools and Techniques Used:

Following tools and techniques were used for the present study.

Parameter	Variables	Method/ Technique used	Unit
Personal Data	Age	As per school records	Years
	Height	Anthropometric Rod	cm
	Weight	Standard Weighing Machine	kg
	BMI	Weight (kg)/ Height (m ²)	Kg/m ²
Motor Fitness	Speed	50 Yard Dash (AAHPER, 1976)	sec
	Agility	Shuttle Run (AAHPER, 1976)	sec
	Explosive Strength	Standing Broad Jump (AAHPER, 1976)	m
	Balance	Stork Stand Test (Johnson & Nelson, 1982)	sec
	Coordination	Alternate Hand Wall Toss Test (Wood, 2008)	n
	Reaction time	Nelson Hand Reaction Test (1982)	sec

Health Status	Optimum Health	Optimum Health Scale (Kumar & Bala, 2016)	
Anthropometric Measurement	Skinfolds	Skinfold Caliper	mm
	Body Composition		
	Body Fat %	Jackson & Pollock, (1978)	
	Fat Mass	Total body weight (kg) x Body fat% /100	kg
	Lean Body Mass	(Body Mass – Fat Mass)	kg
Psychosocial Parameters	Academic Anxiety	Academic Anxiety Scale (Singh & Gupta, 2013)	
	Stress	Stress Scale (Lakshmi & Narin, 2014)	
	Adjustment	Adjustment Scale (Sinha & Singh, 2013)	

3.5 Reliability of Data:

Reliability of data depends upon various factors, such as instrument's reliability, tester's reliability.

3.5.1. Instruments Reliability

The instruments used for this study were standard ones and of high quality. All the instruments were manufactured by reputed concern and received from Department of Physical Education, Jadavpur University and widely used for similar measuring purposes. The reliability of the instrument was ensured by their manufacturers. For measuring psycho-social parameters like academic anxiety, stress, and adjustment were used all as standardized questionnaires. The questionnaires were selected after discussion with the experts in the field of physical education and sports.

3.5.2. Testers Reliability

Physical Education professional (Physical Education Teachers and Research Scholars) had assisted researcher to collect the data for this study. They were also given a short orientation well before the data were collected. The researcher arranged practice session of the procedure of conducting test, measurements and collection of the data for test –retest to check the reliability of the testers. Tester's competency and reliability were ensured by high degree of reliability coefficient found by Test Re-Test method.

3.6. Administration of the Test:

Before administration the test the investigator explained the nature and purpose of the study to the subjects as well as to the testers. They were properly oriented through demonstration and they were motivated to give their best effort in performing all the items prescribe for them. Two consecutive days and about five hours per day were spent in a school for conducting all the tests. On the first day the researcher collected the motor fitness component and anthropometric measurement. On the second day, the health status and psychosocial parameters (questionnaire) were conducted and collected the data.

In every school total number of the subject are equally divided in two groups, i.e., the first group was performing motor fitness components; the second group was performing the anthropocentric measurement. After completion all the tests in a station, the groups were interchanged the station for other group of tests. Next day or at second day all the subjects were completed the questionnaires for measuring psychosocial parameters.

All data on motor fitness, health status, anthropometric and psychosocial parameters were collected within the school session. The age, height, weight, and BMI were measured for personal data of both the groups of the subjects. The motor fitness variables were included 50-yard dash for measuring speed, shuttle run for measuring agility, standing board jump for measuring explosive strength, stork stand test for measuring balance, alternate hand wall toss test for measuring co-ordination, nelson hand reaction test for measuring reaction time and calculated overall motor fitness for measuring overall motor fitness status of the subjects. For measuring health status, optimum health scale (OHS) was selected for the present study. For anthropometric measurements: triceps skinfold, suprailiac skinfold, abdominal skinfold, thigh skin fold and body composition (body fat %, fat mass & lean body mass) were selected for the present study. On the other hand, psychosocial parameters were included academic anxiety, stress (pressure, physical stress, anxiety, frustration and overall stress), and adjustment (emotional adjustment, social adjustment, educational adjustment and overall adjustment) were conducted for all the subjects of the present study.

Thus, all the tests were completed within 15 months in the month of October 2018 to December 2019. The procedure and administration of the tests have been discussed below.

3.6.1 Measurement of Personal Data

The demographic characteristics of the subjects i.e., Age, Height, Weight, and BMI were taken into consideration and the description are given below:

3.6.1.1 Age

Age of the subject was recorded in completed years and it was noted according to their date of birth. In this study, chronological age ranged of the subject was 13 to 15 years based on their school records.

3.6.1.2 Height

It is measured with the help of Anthropometric rod. The subject was asked to stand erect bare footed on a horizontal surface and stretch as much as possible taking care of heels which must be in touch with the surface. The horizontal arm of vertical anthropometric rod was brought down till it touched the highest point on the head especially at the mid sagittal plane. The Height was recorded in centimeter (cm).

3.6.1.3 Weight

The weight of the subjects was taken from standard weighing machine. Subject in shorts and briefs, bare feet equally balanced and placed on the top of the scale and were asked to stand erect, looking straight. The body weight was recorded in kilogram.

3.6.1.4 BMI (Body Mass Index)

To measure the Body Mass in relation to height.

Equipment's Used: Anthropometric rod, was used to measure height and standard weighing machine used to measure weight.

Procedure: BMI is a derived measurement from height and weight of an individual. BMI was obtained from the following formula:

BMI = Weight (in Kg) / Height² (in meter).

Scoring: The following table is used to determine the BMI rating of the individual. These classification systems were framed by World Health Organization (WHO). The rating scale is the same for male and female. One can also use the reverse lookup BMI table for determining the ideal weight based on height.

Classification BMI (kg/m²)

Under Weight	< 18.5
Normal Weight	18.5 – 24.9
Over Weight	25 – 29.9
Obesity	30 greater

3.6.2 Measurement of Motor Fitness Parameters:**3.6.2.1 Speed (50 Yard Dash) (AAPHER Youth Fitness Test, 1976)**

Purpose: The purpose of the test was to measure speed.

Equipment required: Measuring tape or marked track, stopwatch, cone markers, flat and clear surface of at least 70 meters.

Procedure: The test involves running a single maximum sprint over 50-yard dash, with the time recorded. A thorough warm up should be given, including some practice starts and accelerations. Start from a stationary standing position (hands cannot touch the ground), with one foot in front of the other. The front foot must be behind the starting line. Once the subject is ready and motionless, the starter gives the instructions "set" then "go." The tester should provide hints for maximizing speed (such as keeping low, driving hard with the arms and legs) and the participant should be encouraged to not slow down before crossing the finish line.

Scoring: The elapsed time from the starting signal until the runner crosses the finish line is measured to the nearest tenth of a second.

3.6.2.2 Agility (4x10meter Shuttle Run) (AAPHER Youth Fitness Test, 1976).

Purpose: To measures change of direction of the body.

Equipment required: Two wooden blocks for each runner (each block should measure 10 x 5 x 5 cm), marker cones or marking tape, measurement tape, stopwatch, flat non-slip surface, with two lines 10 meters apart.

Procedure: Mark two lines 10 meters apart using marking tape or cones. The two blocks are placed on the line opposite the line they are going to start at. On the signal "ready", the participant places their front foot behind the starting line. On the signal, "go!" the participant sprints to the opposite line, picks up a block of wood, runs back and places it on or beyond the starting line. Then turning without a rest, they run back

to retrieve the second block and carry it back across the finish line. Two trials are performed.

Scoring: two trials are allowed to each subject with some rest in between the time of the better of the two trials was recorded to nearest 10th of a second as the score of the test item.

3.6.2.3 Explosive Strength (Standing Broad Jump) (AAPHER Youth Fitness Test, 1976)

Purpose: to measure the explosive power of the legs

Equipment required: Measuring tape to measure distance jumped, non-slip floor for takeoff, and soft-landing area preferred. Commercial Long Jump Landing Mats are also available.

Procedure: The athlete stands behind a line marked on the ground with feet slightly apart. A two-foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts are allowed.

Scoring: The measurement is taken from take-off line to the nearest point of contact on the landing (back of the heels). Record the longest distance jumped, the best of three attempts.

3.6.2.4 Balance (Stork Stand Test) (Johnson & Nelson, 1982)

Purpose: To assess the ability to balance on the ball of the foot.

Equipment required: flat, non-slip surface, stopwatch, paper and pencil.

Procedure: Remove the shoes and place the hands on the hips, then position the non-supporting foot against the inside knee of the supporting leg. The subject is given one minute to practice the balance. The subject raises the heel to balance on the ball of the foot. The stopwatch is started as the heel is raised from the floor. The stopwatch is stopped if any of the follow occurs: the hand(s) come off the hips, the supporting foot swivels or moves (hops) in any direction, the non-supporting foot loses contact with the knee and the heel of the supporting foot touches the floor.

Scoring: The total time in seconds is recorded. The score is the best of three attempts.

3.6.2.5 Co-Ordination (Alternate Hand Wall Toss Test) (Topend Sports, 2008)

Purpose: to measure hand-eye coordination

Equipment required: tennis ball, smooth and solid wall, marking tape, stopwatch.

Procedure: A mark is placed a certain distance from the wall (e.g., 3 feet). The person stands behind the line and facing the wall. The ball is thrown from one hand in an underarm action against the wall, and attempted to be caught with the opposite hand. The ball is then thrown back against the wall and caught with the initial hand. The test can continue for a nominated number of attempts or for a set time period (e.g., 30 seconds). By adding the constraint of a set time period, you also add the factor of working under pressure.

Scoring: The number of successful catches in a 30 second period.

3.6.2.6 Reaction Time (Nelson Hand Reaction Test, 1982)

Purpose: to measure reaction time, hand-eye quickness and attentiveness.

Equipment required: 1-meter-long ruler or Yardstick, calculator.

Procedure: The tester was asked a subject to sit in the chair with his/ her fore-arm and hand resting on the table (or desk top) in such a way that the tips of thumb and index finger held on a ready to pinch position, about 3 or 4 inches beyond the edge of the table. The tester assured that the upper edge of the thumb and index finger are in a horizontal position. Now the tester holds the stick of the timer from its top edge in such a way that the lower edge of the stick timer hangs between the subject's thumb and index finger so that the marked base line (not the edge) of the stick timer was in a same horizontal position in which is the upper surface of the subject's thumb and forefingers. The tester has to assured that the subject does not touch the hanging stick timer. The subject was instructed to catch the stick by pinching together his/her thumb and index finger as soon as the stick timers were released by the tester. The subject is also to be instructed strictly neither to look at the tester's hand nor to move his/her hand up or down-while attempting to catch the falling stick timer. Before leaving the stick, the tester gives a preparatory command of "Ready". Each subject was given 20 trials.

Scoring: Out of the 20 trials, results of five fastest and five slowest trials, were discarded and the average of the middle 10 trials gives the score of this test.

Following formula were used to calculate the reaction time of subjects:

Reaction Time = $\sqrt{2d / g}$, where, d = the distance the ruler fell in centimeters, g = acceleration of gravity (9.8 m/s^2).

3.6.2.7 Overall Motor Fitness:

The motor fitness variables comprised of speed (sec), agility (sec), explosive strength (m), balance (sec), co-ordination (n), and reaction-time (sec). All the motor fitness components raw scores were converted by standard score, which was prepared by calculating Z score and T-score. The formula used for this was-

$$\text{Z score} = \frac{x - M}{\sigma},$$

where, **x** = observed value, **M** = mean of the sample, **σ** = standard deviation

$$\text{T score} = 10 \text{ Z} + 50$$

3.6.3 Measurement of Health Status:

In this study, Health Status of the subjects were measured through optimum health scale (OHS). Appropriate questionnaires were used to measure and predict the health status of the subjects of the study. The subjects were asked to co-operate wholeheartedly. There was no right or wrong statement for any individual. What a subject felt could opt in that option and their observation to be kept confidential and also to be used for research purpose only.

3.6.3.1 Optimum Health Scale (OHS) (Kumar & Bala, 2016)

Health is the most important aspect in today's lifestyle. Optimum health is a balance among all the health aspects. Optimum health scale is the state of an individual in which all the aspects of health (Psychological and Physiological) function properly without any disturbance in the absence of disease. Vasseghi (2011) says that the optimum health is freedom from bonds, limitations and restrictions across all the dimensions of physical, mental, emotional and spiritual.

This scale will provide the facility to assess the health status of the grown-up school students for both boys and girls. The Optimum Health Scale (OHS), prepared by Kumamar & Bala, (2016), was used as highly recommended tool for the assessment of the Optimum Health Status of both boys and girls.

Purpose: To measure the health status of the subjects.

Test Application: Satisfactory for both boys and girls of different age groups.

Reliability: Cronbach's Alpha Method: 0.80.

Tools used: In this study Bengali Version of optimum health scale (OHS) of Singh & Gupta (2016) was used for data collection.

Validity:

Content validity of this Optimum Health scale was determined based on the opinion of the subject experts from Physical Education, Physiotherapy and Education fields. The Optimum Health Scale has been given to 26 experts to find out its content validity and 15 experts has been agreed that the items in this scale provided have adequate coverage of the concept of Optimum Health along with some modifications.

Description of the scale:

This scale contains five dimensions which was comprised of 45 different type of questions where subjects are to put his or her agreements or disagreements in respects of some statements. In this scale are sub divided under five dimensions namely: physical health, mental health, social health, emotional health and spiritual health has been considered in this scale.

1. **Physical Health:** Physical Health is a state of health in which all the function of the body work properly, psychologically as well as physiologically. It deals with general health status of an individual.
2. **Mental Health:** it is about clear decision making along with alert, active or sharp mind regarding any task of daily routine by an individual.
3. **Social Health:** It deals with social network of an individual. The healthy relationship with his family as well as with his friends and community.
4. **Emotional Health:** Emotions of an individual occurring on different circumstances and situations. It deals with the healthy emotions and healthy responses according to the situations and circumstances by an individual.
5. **Spiritual Health:** it deals with positive approach towards life and environment by an individual.

The subjects were clearly instructed and request to co-operate as best as possible from their end. It was administered to a group as well as an individual according to availability of the subjects. There was no time limit fixed for completing the scale.

However, they were instructed that an individual takes 30 to 45 minutes in completing the scale for 45 items and no items was right or wrong, its only to know the health status of an individual. So, each item had to be responded in one of the five alternatives. No items were to be left out. They were assured that their answers will be kept confidential and the results to be used for research purpose only.

Score:

The score of the subjects on each item is followed by five alternatives which were added to obtain a total score. The possible minimum and maximum range score is 45 to 225.

Interpretation of score:

The higher value was the better score. Thus, high score on the test indicates good health and low score on the test indicates poor health.

3.6.4 Anthropometric Measurements:

Anthropometry is the science of measuring the human body and its parts.

3.6.4.1 Skinfold Measurements:

Skinfold measurements is a common method for determining body fat percentage. Its suitable for all ages. Skinfold measurements were done at anatomical sites around the body. The researcher pinched the skin at the appropriate site to raise a double layer of skin and the underlying adipose tissue, but not the muscle. The calipers were then applied to one centimeter below and at right angles to the pinch, and a reading in millimeters (mm) taken two seconds later. Obtained value of skinfold thickness (millimeter) was the score.

3.6.4.1.1 Triceps Skinfold:

Purpose: To measure the skinfold thickness of triceps.

Equipment: Skinfold caliper

Procedure: The subject was asked to assume a relaxed standing position with the arms hanging by the sides. The skin of the mid line of the posterior surface of the arm was held between the thumb and index finger of the left hand and pulled out and measurement was taken with the help of skinfold caliper.

Scoring: The skinfold thickness was recorded in millimeter.

3.6.4.1.2 Suprailiac Skinfold:

Purpose: To measure the skinfold thickness of iliac creast region.

Equipment: Skinfold caliper

Procedure: The subject was asked to assume a relaxed standing position with the right arm folded across the chest. The skin superior to the iliocristale site was held between the thumb and index finger of the left hand and pulled out and measurement was taken with the help of skinfold caliper.

Scoring: The skinfold thickness was recorded in millimeter.

3.6.4.1.3 Abdominal Skinfold:

Purpose: To measure the skinfold thickness of abdomen.

Equipment: Skinfold caliper

Procedure: The subject was asked to assume a relaxed standing position with the arms hanging by the sides. The skin of the about 5 cm. horizontally apart from the omphalion of subject's right side was held between the thumb and index finger of the left hand and pulled out and measurement was taken with the help of skinfold caliper.

Scoring: The skinfold thickness was recorded in millimeter.

3.6.4.1.4 Mid-Thigh Skinfold:

Purpose: To measure the skinfold thickness on the middle of the thigh.

Equipment: Skinfold caliper

Procedure: The subject was asked to assume a relaxed standing position with the arms hanging by the sides. The knee of the right leg was at a right angle. The researcher facing the right side of the subject on the lateral side of the thigh. The skinfold was raised at the marked site and measurement was taken while the knee bent of the subject.

Scoring: The skinfold thickness was recorded in millimeter.

3.6.4.2 Body Composition:

There are several traditional and new method to assess body composition. The skinfold method of Jackson & Pollock (1978) was followed in the study for assessment of body composition. Four skinfold sites i.e., triceps, suprailiac, abdominal and thigh

were measured. Sum of skinfolds of a subject was computed by adding the four skinfolds.

3.6.4.2.1 Body Fat Percentage (%): (Jackson & Pollock 4 Caliper Method 1978)

In this study, skinfold method (Jackson & Pollock, 1978) was used to measure body fat percentage (fat %).

Purpose: To measure the level of body fatness or individual's body fat percentage.

Equipment: Skinfold caliper

Procedure: The Jackson-Pollock 4 method gives an estimate of body fat percentage and lean body mass based on weight, age, and the thickness of four different skinfold measurements, i.e., i) Tricep, ii) suprailiac, iii) Abdominal and iv) Thigh were measured. Skinfold measurement of those four sites has been described earlier in this chapter.

Jackson-Pollock 4 Body Fat Formula for Males:

Body Density = $(0.29288 \times \text{sum of skinfolds}) - (0.0005 \times \text{square of the sum of skinfolds}) + (0.15845 \times \text{age}) - 5.76377$

Body Fat Percentage (%) = $(495 / \text{Body Density}) - 450$

Jackson-Pollock 4 Body Fat Formula for Females:

Body Density = $(0.29669 \times \text{sum of skinfolds}) - (0.00043 \times \text{square of the sum of skinfolds}) + (0.02963 \times \text{age}) + 1.4072$

Body Fat Percentage (%) = $(495 / \text{Body Density}) - 450$

Scoring: Obtaining body fat percentage value was the score.

3.6.4.2.2 Fat Mass:

In this study fat mass was measured in the following formula:

$$\text{Fat Mass:} = \frac{\text{Total body weight (kg)} \times \text{Body fat\%}}{100}$$

Scoring: The calculation value was recorded to the nearest 0.01 kg.

3.6.4.2.3 Lean Body Mass:

In this study, lean body mass of a subject was obtained by deducting the fat mass from the body weight.

Lean Body Mass = (Body weight – Fat mass).

Scoring: The calculation value was recorded to the nearest 0.01 kg.

3.6.5 Psychosocial Parameters:

In this study, psychosocial parameters of the subjects were measured through academic anxiety, stress and adjustment. Appropriate questionnaires were used to measure and predict the psychosocial parameters of the subjects of the study. The subjects were asked to co-operate whole-heartedly. There was no right or wrong statement for any individual. What a subject felt could opt in that option and their observation to be kept confidential and also to be used for research purpose only.

3.6.5.1 Academic Anxiety Scale (Singh & Gupta, 2013):

Today, anxiety is a common phenomenon of everyday life. It plays a crucial role in human life because all of us are the victim of anxiety in different ways. Generally, anxiety can be either a trait anxiety or a state anxiety. A trait anxiety is a stable characteristic or trait of the person. A state anxiety is one which is aroused by some temporary condition of the environment such as examination, accident, punishment, etc. academic anxiety is a kind of state anxiety which relates to the impending danger from the environments of the academic institutions including teacher, certain subjects like Mathematics, English etc.

The Academic Anxiety Scale for children, prepared by Singh & Gupta, (2013), was used as highly recommended instrument for the assessment of Academic Anxiety of the adolescents.

Purpose: To measure the Academic Anxiety of the subjects.

Test Application: Satisfactory for both boys and girls between 13 to 16 years only.

Reliability: Test- retest Reliability: 0.60, Split-half Reliability: 0.65.

Tools used: In this study Bengali Version of academic anxiety scale of Singh & Gupta (2013) was used for data collection.

Description:

The academic anxiety scale was comprised of 20 different type of questions where subjects are to put his or her agreements or disagreements in respects of some statements. The subjects were clearly instructed and request to co-operate as best as possible from their end. It was administered to a group as well as an individual according to availability of the subjects. There was no time limit fixed for completing the scale. However, they were instructed that an individual takes 10 to 15 minutes in completing the scale. No items were to be left out. They were assured that their answers will be kept confidential and the results to be used for research purpose only.

Score:

The score of the subjects on each item were added to obtain a total score.

Interpretation of score:

Thus, high score on the test indicates high academic anxiety and low score on the test indicates low academic anxiety.

3.6.5.2 Stress Scale (Lakshmi & Narain, 2014)

Stress is an internal state which can be caused by physical demands on the body or by environmental and social situations which are evaluated as potentially harmful, uncontrollable or exceeding our resources for coping life events and pressures of everyday life. Adolescents today are living in an increasingly stress-ridden atmosphere. Stress among adolescent boys and girls are very common and natural. Stress is partly created by parental pressure too when they expect the adolescents to perform and stand out among their groups. When they can't rise up to their expectations or are in a process of meeting it, adolescents suffer from frustration, physical stress, aggression, undesirable complexes, anxiety and depression.

The stress scale consists of 40 items which measure the following four dimensions:

- 1) **Pressure:** It involves expectations or demands that one behave in a certain way. Adolescents feel several types of pressure such as to do well in academic, to gain the approval of parents, peers, appearance, personal identity, etc.

- 2) **Physical Stress:** Over the long time, stress can lead to diminished health or illness and is reflected in frequent headaches, fatigue, monotony, muscular tension, elevated heart rate, etc.
- 3) **Anxiety:** An unpleasant emotional state accompanied by physiological arousal along with the cognitive elements of apprehension, guilt and a sense of impending disaster. Responses to stress include adaptation, psychological coping such as stress management, anxiety and depression.
- 4) **Frustration:** It occurs in any situation, in which the pursuit of some goal is thwarted.

The Stress Scale, prepared by Lakshmi & Narain, (2014), was used as highly recommended instrument for the assessment of Stress of the adolescents.

Purpose: To measure the level of Stress of the subjects.

Test Application: Satisfactory for both boys and girls in the age range of 12 to 24 years.

Reliability: Test re-test Reliability: 0.82.

Tools used: In this study Bengali Version of stress scale of Lakshmi & Narain (2014) was used.

Description:

The stress scale was comprised of 40 different type of questions where subjects are to put his or her agreements or disagreements in respects of some statements. The subjects were clearly instructed and request to co-operate as best as possible from their end. The scale can be administered either by self or by the investigator. It may be used in group as well as individual condition. There is no fixed time limit as such. However, it generally takes about 10 to 15 minutes in its completion. No items were to be left out. They were assured that their answers will be kept confidential and the results to be used for research purpose only.

Scoring:

In stress scale, each item of the test is scored as either +1 or 0. The sum total of the score for 40 items was the raw score.

Interpretation of score:

High the score, greater is the level of stress.

3.6.5.3 Adjustment Ability (Sinha & Singh, 2013)

The Adjustment Inventory has been designed for use with school students of India. The inventory seeks to segregate well-adjusted secondary school students from poorly adjusted students in the three areas of adjustment: Emotional, Social and Educational. This inventory consisted of 60 items, 20 items in each area of adjustment.

The Adjustment Inventory for school students, prepared by Sinha & Singh, (2013), was used as highly recommended instrument for the assessment of Adjustment Ability of the students.

Purpose: To measure the Adjustment Ability of the subjects.

Test Application: Satisfactory for both boys and girls of different age groups

Reliability: Test re-test Reliability: 0.93, Split-half Reliability: 0.94.

Tools used: In this study Bengali Version of Adjustment Inventory for school students of Sinha & Singh (2013) was used.

Description:

The stress scale was comprised of 60 different types of questions where subjects are to put his or her agreements or disagreements in respects of some statements. The subjects were clearly instructed and request to co-operate as best as possible from their end. The scale can be administered either by self or by the investigator. It may be used in group as well as individual condition. There is no fixed time limit as such. However, it generally takes about 30 to 45 minutes in its completion the scale for 60 items and no items was right or wrong, its only to know the adjustment ability of an individual. So, each item had to be responded in three-point alternatives. No items were to be left out. They were assured that their answers will be kept confidential and the results to be used for research purpose only

Score:

The score of the subjects on each item is followed by three-point alternatives response, which were added to obtain a total score.

Interpretation of score:

High Score indicates Unsatisfactory Adjustment. The lower score better is the level of Adjustment.

3.7 Procedure for analysis of data:

The data were analyzed by appropriate statistical method. Statistics used for this study for presentation of data in different forms and their interpretation were according to the following:

- 1) Mean and Standard Deviation (SD) – as descriptive statistics.
- 2) The significant difference between the group's 't' test was used. The level of significant difference between the groups was set as 0.05 level of confidence.
- 3) All the motor fitness components raw scores were converted by standard score, which was prepared by calculating Z score and T-score. The formula used for this was-

$$\mathbf{Z\ score} = \frac{x-M}{\sigma},$$

Where, x = observed value, M = mean of the sample, σ = standard deviation,

$$\mathbf{T\ score} = 10 Z + 50$$

For all the statistical calculation, Statistical Procedure for Social Science (SPSS) Version –23 was used.

CHAPTER-IV

RESULTS AND DISCUSSIONS

4.1 Personal Data

4.2 Motor Fitness

4.3 Health Status

4.4 Anthropometric Measurements

4.5 Psychosocial Parameters

4.6 Concluding Remarks on Findings

CHAPTER- IV

RESULT AND DISCUSSION

In this chapter, all the collected data have been presented. Results obtained from statistical analysis of data and interpretation of results based on experience and existing knowledge of the field have also been presented in this chapter. All these aspects have been described according to the dimension of the study.

4.1 Personal Data:

Mean and standard deviation (Mean $\pm$ SD) as descriptive statistics of personal data of two boys groups and two girls groups were age, height, weight, and BMI have been presented in Table- 1.

Table 1: Mean and SD of personal data of two boys groups and two girls groups.

Groups Variables	Boys Groups		Girls Groups	
	Tribal (Mean $\pm$SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Age (year)	14.36 $\pm$ 0.59	14.41 $\pm$ 0.60	14.27 $\pm$ 0.64	14.32 $\pm$ 0.65
Height (cm)	151.41 $\pm$ 8.40	152.37 $\pm$ 7.18	148.34 $\pm$ 5.99	148.94 $\pm$ 5.79
Weight (kg)	39.07 $\pm$ 5.93	40.65 $\pm$ 6.43	38.30 $\pm$ 5.64	39.84 $\pm$ 5.63
BMI (kg/m ²)	17.04 $\pm$ 2.56	17.54 $\pm$ 2.41	17.40 $\pm$ 2.33	18.01 $\pm$ 2.37

The mean and SD (Mean $\pm$ SD) values of age for tribal boys group was 14.36 $\pm$ 0.59 years and that of non-tribal boys group was 14.41 $\pm$ 0.60 years. Tribal girls group and non-tribal girls group were 14.27 $\pm$ 0.64 years & 14.32 $\pm$ 0.65 years respectively.

The mean and SD (Mean $\pm$ SD) values of height for tribal boys group was 151.41 $\pm$ 8.40 cm and that of non-tribal boys group was 152.37 $\pm$ 7.18 cm. Tribal girls group and non-tribal girls group were 148.34 $\pm$ 5.99 cm & 148.94 $\pm$ 5.79 cm respectively.

The mean and SD (Mean $\pm$ SD) values of weight for tribal boys group was 39.07 $\pm$ 5.93 kg and that of non-tribal boys group was 40.65 $\pm$ 6.43 kg. Tribal girls group and non-tribal girls group were 38.30 $\pm$ 5.64 kg & 39.84 $\pm$ 5.63 kg respectively.

The mean and SD (Mean $\pm$ SD) values of BMI for tribal boys group was $17.04 \pm 2.56 \text{ kg/m}^2$ and that of non-tribal boys group was $17.54 \pm 2.41 \text{ kg/m}^2$. Tribal girls group and non-tribal girls group were $17.40 \pm 2.33 \text{ kg/m}^2$ & $18.01 \pm 2.37 \text{ kg/m}^2$ respectively.

4.2 Motor Fitness

Mean and standard deviation (Mean $\pm$ SD) as descriptive statistics of speed, agility, explosive strength, balance, coordination, reaction time, and overall motor fitness of two boys groups and two girls groups have been presented in Table- 2.

Table 2: Mean and SD of motor fitness variables of two boys groups and two girls groups.

Groups Variables	Boys Groups		Girls Groups	
	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Speed (sec)	7.11 ± 0.64	7.99 ± 0.83	8.53 ± 1.01	9.06 ± 1.02
Agility (sec)	10.76 ± 0.69	11.12 ± 0.68	11.75 ± 0.75	12.42 ± 1.01
Explosive Strength (m)	1.86 ± 0.21	1.69 ± 0.22	1.47 ± 0.19	1.37 ± 0.19
Balance (sec)	17.27 ± 5.75	14.55 ± 4.98	17.68 ± 7.60	14.94 ± 5.59
Co-ordination (n)	23.43 ± 6.12	22.69 ± 5.39	15.59 ± 4.53	14.61 ± 4.89
Reaction Time (sec)	0.226 ± 0.043	0.232 ± 0.041	0.274 ± 0.035	0.275 ± 0.036
Overall Motor Fitness	302.92 ± 23.49	299.52 ± 23.72	299.39 ± 23.50	295.86 ± 23.80

The motor fitness variables comprised of speed (sec), agility (sec), explosive strength (m), balance (sec), co-ordination (n), reaction-time (sec), and overall motor fitness parameter and analysis of the data have been presented parameter wise.

4.2 (i) Speed (sec)

Descriptive statistics on speed has been presented in table-2. The mean and SD (Mean $\pm$ SD) values of speed for tribal boys group was 7.11 ± 0.64 sec and that of non-tribal boys group was 7.99 ± 0.83 sec. Tribal girls group and non-tribal girls group were 8.53 ± 1.01 sec and 9.06 ± 1.02 sec respectively.

Since the mean values of the speed parameter between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 3: Mean difference and t-values of speed performance (sec) of two boys groups and two girls groups.

Speed (sec)	Groups	Mean	SD	Mean Difference	t-value
	Tribal Boys	7.11	± 0.64	0.88	16.81*
	Non-Tribal Boys	7.99	± 0.83		
	Tribal Girls	8.53	± 1.01	0.53	7.43*
	Non-Tribal Girls	9.06	± 1.02		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 3 that the mean difference between tribal boys & non-tribal boys was 0.88 and the obtained t-value was 16.81 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was much lower than the obtained value.

It also appears from table no. 3 that the mean difference between tribal girls & non-tribal girls was 0.53 and the obtained t-value was 7.43 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from the table no. 3 and the graph (fig.4) reveal that tribal boys had significantly higher speed performance than non-tribal boys. Similarly, tribal girls had higher speed performance than non-tribal girls. In this parameter higher the performance lower was the time (score-tribal boys: 7.11 sec & non-tribal boys: 7.99 sec; tribal girls: 8.53 sec & non-tribal girls: 9.06 sec.). The mean values of the two boys groups and two girls groups on speed have been also graphically represented in figure-.4.

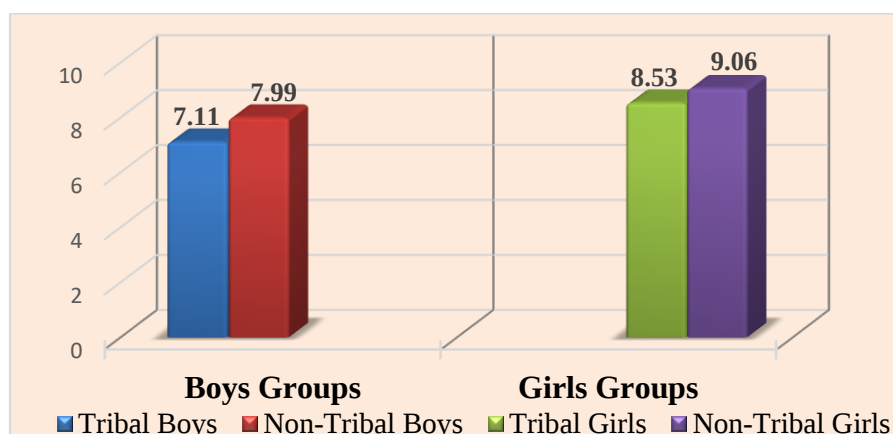


Figure 4: Bar diagram showing mean value of speed of two boys groups and two girls groups.

Discussion on Speed:

The results of the present study indicate that both groups of tribal students, tribal boys & tribal girls were better in speed than the non-tribal boys and non-tribal girls students respectively. A significant difference was observed in speed between two boys groups and two girls groups. The tribal boys and tribal girls were superior to non-tribal boys & non-tribal girls respectively; so far speed of movement was concerned. In a similar study, the tribal boys were found superior in speed than their non-tribal counterparts (Hansda & Bandopadhyay, 2019); (Beigh & Rajpal, 2018). Raghuvaran & Deepla, (2020) also showed tribal students had significantly higher speed than non-tribal students. Dhanabal, (2011) found that both the tribal boys & girls significantly better in speed than both the rural and urban boys & girls. Mandal, (2014) and Singh, et al. (2016) mention that the rural children of 12– 17 years were better at speed than the urban children. Therefore, the findings of the present study found similarities with the other related research reports in this field.

However, Devi, (2000) did not find any difference in speed performance between tribal and non-tribal groups both boys and girls.

Speed is the ability to perform a movement in a short time. It is highly movement specific, like strength and endurance. Speed also a conditional ability but unlike those two conditional abilities (strength & endurance). Speed depends to a considerable extent on neural regulations. As a result, speed is more complex in nature and is comparatively less trainable as compared to strength and endurance. The efficiency of the nervous system, which can be influenced only to a limited extent, a limiting factor in the development of speed (Uppal, 2001). The speed performance depends to a great extent on the explosive strength of the muscles concerned (Singh, 1991). The tribal subjects (both boys and girls) of the present study have also shown significantly higher scores in the performance of explosive strength (Table no.-5) and also higher scores in co-ordination (Table no.-7) than that of non-tribal subjects (both boys and girls). The difference observed in speed performance may be attributed to the genetic factor and typical lifestyle of the tribals, since both the groups are untrained and the quality is perhaps inborn. Therefore, the performance of speed among the subjects of the present study are quite usual, and present findings are in consonance with the other researchers, stated above.

4.2 (ii) Agility (sec)

Descriptive statistics on agility has been presented in table-2. The mean and SD (Mean $\pm$ SD) value of agility for the tribal boys group was 10.76 ± 0.69 sec. On the other hand, the non-tribal boys group was 11.12 ± 0.68 sec. Whereas the tribal girls group performed the test in 11.75 ± 0.75 sec and non-tribal girls performed the said test in 12.42 ± 1.01 sec.

Since the mean values of the agility parameter between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 4: Mean difference and t-values of agility performance (sec) of two boys groups and two girls groups.

Agility (sec)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	10.76	± 0.69	0.36	7.31*
	Non-Tribal Boys	11.12	± 0.68		
	Tribal Girls	11.75	± 0.75	0.67	10.59*
	Non-Tribal Girls	12.42	± 1.01		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 4 that the mean difference between tribal boys & non-tribal boys was 0.36 and the obtained t-value was 7.31 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 4 that the mean difference between tribal girls & non-tribal girls was 0.67 and the obtained t-value was 10.59 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was much lower than the obtained value.

The results as it appears from table no. 4 and the graph (fig.5) reveal that tribal boys had significantly higher agility performance than non-tribal boys. Similarly, tribal girls had higher agility performance than non-tribal girls. In this parameter higher the performance lower was the time (score- tribal boys: 10.76 sec & non-tribal boys: 11.12 sec; and tribal girls: 11.75 sec & non-tribal girls: 12.42sec.). The mean

values of the two boys groups and two girls groups on agility have been also graphically represented in figure-5.

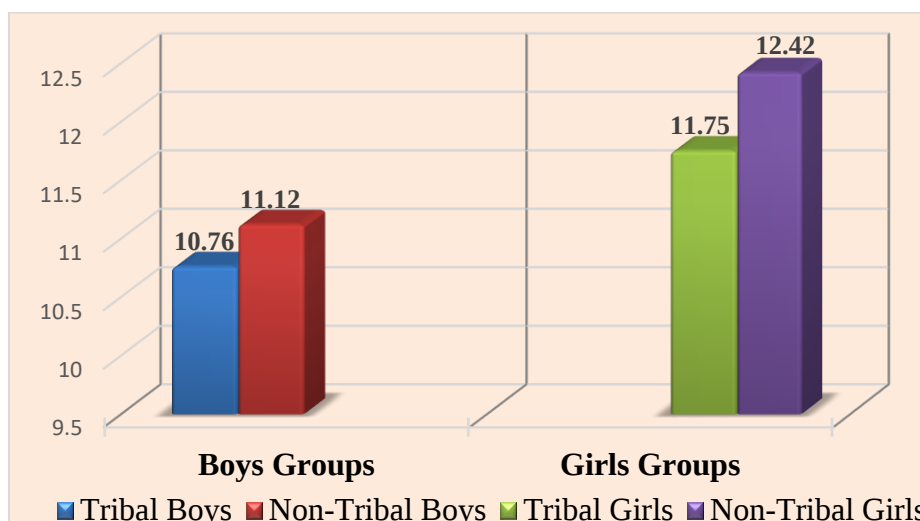


Figure 5: Bar diagram showing mean value of agility of two boys groups and two girls groups.

Discussion on Agility:

The results of the present study indicate that both groups of tribal students, tribal boys & tribal girls were better in agility performance than the non-tribal boys and non-tribal girls students respectively. A significant difference was observed in agility between two boys groups and two girls groups. The tribal boys and tribal girls were better in agility performance than the non-tribal boys & non-tribal girls respectively. Raghuvaran & Deepla, (2020); Singh (2014); Dhanabal, (2011) found that tribal students had significantly better agility than non-tribal students. Devi, (2000); Tikale & Durge, (2020) also found significant differences, the tribal girls are better in agility performance than non-tribal girls. Mandal, (2014) observed that the rural children are better performed in agility than the urban children. Chillon, Ortega, Ferrando, & Casajus, (2011) showed rural Spanish children and adolescents had better speed-agility than their urban peers. Therefore, the findings of the present study found are in similarity with the other related research reports in this field.

However, Beigh & Rajpal, (2018); and Devi, (2000) did not find any difference in agility performance between tribal and non-tribal boys.

Agility is the ability to change direction rapidly and accurately (Barrow & Mcgee, 1971; Johnson & Nelson, 1969). In a recent publication, some authors defined

agility to include whole- body change of direction as well as rapid movement and direction changes of limbs (Baechle, 1994). Agility has relationships with trainable physical qualities such as strength, power, and technique, as well as cognitive components such as visual-scanning techniques, visual-scanning speed, and anticipation (Sheppard & Young, 2006). Kakran & Mishra, (2015) and Pandey & Chaubey, (2015) said that explosive strength is the most dominating variable for the improvement of the agility of an individual. Many strength and conditioning coaches believe that there is indeed a strong relationship between straight sprinting speed and change of direction speed, as some articles and many training sessions tend to address both qualities simultaneously. Therefore, the performance of agility among the subjects of the present study are quite usual, and present findings are in consonance with the other researchers, stated above.

4.2 (iii) Explosive Strength (m)

Descriptive statistics on explosive strength has been presented in table-2. The mean and SD (Mean $\pm$ SD) value of explosive strength for the tribal boys group was 1.86 ± 0.21 m and that of the non-tribal boys group was 1.69 ± 0.22 m. The tribal girls group and non-tribal girls group were 1.47 ± 0.19 m and 1.37 ± 0.19 m respectively.

Since the mean values of explosive strength parameter between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 5: Mean difference and t-values of explosive strength performance (m) of two boys groups and two girls groups.

Explosive Strength (m)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	1.86	± 0.21	0.17	11.29*
	Non-Tribal Boys	1.69	± 0.22		
	Tribal Girls	1.47	± 0.19	0.10	7.01*
	Non-Tribal Girls	1.37	± 0.19		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no.5 that the mean difference between tribal boys & non-tribal boys was 0.17 and the obtained t-value was 11.29 which was statistically

significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.5 that the mean difference between tribal girls and non-tribal girls was 0.10 and the obtained t value was 7.01 which was also statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no.5 and the graph (fig.6) reveal that tribal boys had significantly more explosive strength than non-tribal boys. Similarly, tribal girls had more explosive strength than non-tribal girls. In this parameter higher the performance higher was the score (tribal boys: 1.86 m & non-tribal boys: 1.69 m; tribal girls: 1.47 m & non-tribal girls: 1.37 m.). The mean values of the two boys groups and two girls groups on explosive strength have been graphically represented in figure-6.

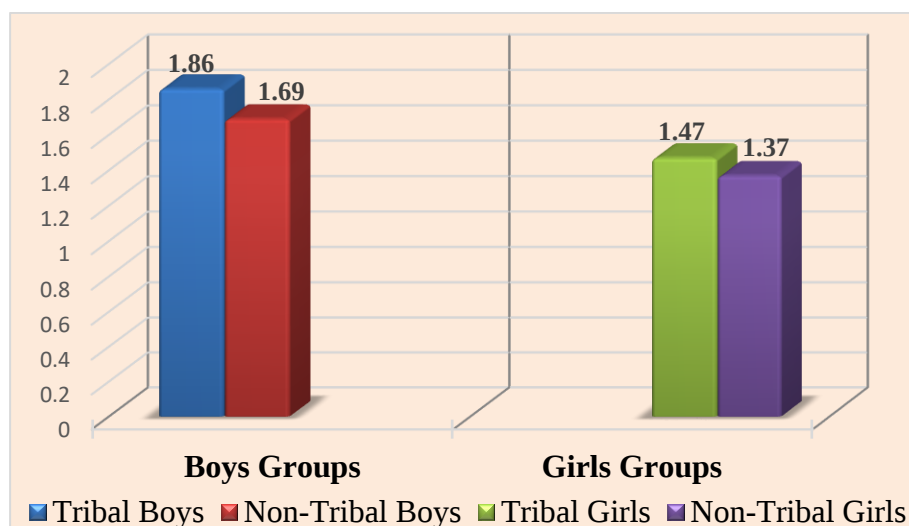


Figure 6: Bar diagram showing mean value of explosive strength of two boys groups and two girls groups.

Discussion on Explosive Strength:

The results of the present study indicate that both groups of tribal students, tribal boys & tribal girls were better in explosive strength than the non-tribal boys and non-tribal girls respectively. A significant difference was observed in explosive strength performance between two boys groups and two girls groups. The tribal boys and tribal girls were better in explosive strength performance than the non-tribal boys & non-tribal girls respectively. Devi, (2000); Baburao, (2017); Dhanabal, (2011)

found that both tribal boys and girls were superior in explosive strength than the non-tribal boys and girls. Therefore, the findings of the present study found are in similarity with the other related research reports in this field.

However, Hansda & Bandopadhyay, (2019) did not find any difference in agility performance between tribal and non-tribal boys. Mandal, (2014) and (Dhanabal, 2011) also found that there was no significant difference between urban and rural area schoolboys in Explosive Leg Power. However, Singh, (2014) showed that non-tribal players having more explosive strength compared to tribal players.

Explosive strength is the ability to overcome resistance at high speed. It is a combination of strength and speed abilities (Singh, 1991). Pandey & Chaubey, (2015) found a significant relationship between the explosive strength and agility of male football players. Kakran & Mishra, (2015) also found a significant relationship between explosive strength and agility of physical education students. The tribal subjects (both boys and girls) of the present study have also shown significantly higher scores in the performance of agility (Table no. 4) than that of non-tribal subjects (both boys and girls).

Strength and explosiveness depend on the types and size of the muscle's fibers. The proportion of these two types of muscle fibers is largely genetically determined and cannot be changed through training or by some other means. The persons who have muscles with favorable muscle fiber spectrum, therefore, have better strength ability (Singh,1991).

Explosive strength always finds expression in motor movements i.e., a form of dynamic strength. Explosive strength performance is markedly influenced by the level of motor coordination required for a movement.

The Tribal subjects (both boys and girls) of the present study have also shown higher scores in the performance in co-ordination (Table no.-7) than that of non-tribal subjects (both boys and girls).

The difference observed in explosive strength performance may be attributed to the genetic factor and typical lifestyle of the tribals. Tribals are, therefore, better in the performance of explosive strength among the subjects of the present study are quite usual, and present findings are in consonance with the other researchers, stated above.

4.2 (iv) Balance (sec)

Descriptive statistics on balance has been presented in table-2. The mean and SD (Mean $\pm$ SD) value of balance for the tribal boys group was 17.27 ± 5.75 sec and that of the non-tribal boys group was 14.55 ± 4.98 sec. Whereas tribal girls performed the test in 17.68 ± 7.60 sec and non-tribal girls performed the said test in 14.94 ± 5.59 sec.

Since the mean values of the balance parameter between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 6: Mean difference and t-values of balance performance (sec) of two boys groups and two girls groups.

Balance (sec)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	17.27	± 5.75	2.72	7.14*
	Non-Tribal Boys	14.55	± 4.98		
	Tribal Girls	17.68	± 7.60	2.74	5.79*
	Non-Tribal Girls	14.94	± 5.59		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 6 that the mean difference between tribal boys & non-tribal boys was 2.72 and the obtained t-value was 7.14 which was statistically significant. The difference was significant at 0.05 level. Since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.6 that the mean difference between tribal girls and non-tribal girls was 2.74 and the obtained t-value was 5.79 which was also statistically significant. The difference was significant at 0.05 level. Since the table value 1.96 for the df 798 which was lower than the obtained value..

The results as it appears from table no. 6 and the graph (fig.7) reveal that tribal boys had significantly more balance ability than non-tribal boys. Similarly, tribal girls had more ability to balance than non-tribal girls. In this parameter higher the performance higher was the score (tribal boys: 17.27 sec & non-tribal boys: 14.55 sec; tribal girls: 17.68 sec & non-tribal girls: 14.94 sec.). The mean values of the two boys groups and two girls groups on balance have been graphically represented in figure-7.

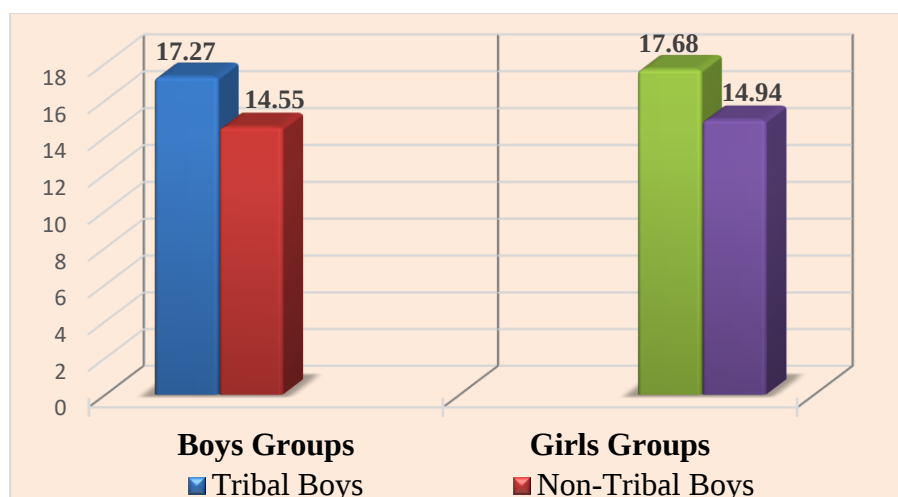


Figure 7: Bar diagram showing mean value of balance of two boys groups and two girls groups.

Discussion on Balance:

The results of the present study indicate that both groups of tribal students, tribal boys & tribal girls were better in balance than the non-tribal boys and non-tribal girls students respectively. A significant difference was observed in a balance between two boys groups and two girls groups. The tribal boys and tribal girls were better in balance than the non-tribal boys & non-tribal girls respectively. Rathakrishnan, 2011 & Mandal, (2014) found a significant difference between rural and urban groups. Therefore, the findings of the present study found are in similarity with the other related research reports in this field.

However, Cabedo, Unnithan, Guerra, & Roca, (2018) did not find any significant differences for static balance from 4 to 39 years of age. But the male subjects were better in static balance compared to females.

Balance is the ability to maintain the equilibrium of the body both in static and dynamic conditions (Uppal, 2001). Balance ability develops to a significant extent through various activities in childhood (Singh, 1991). Age/maturation may have an impact on the association of selected components of balance and lower-extremity muscle strength (Muehlbauer, Gollhofer, & Granacher, 2015). Muscle strength and physical ability are important for spinal sagittal alignment, and muscle strength improves body balance and reduce the risk of fall (Imagama, et al., 2013). Balance is an important element for agility (Chelladurai, & Yuhasz, 1977). Balance affects agility and speed positively, and agility and speed training have a positive effect on

balance, so balance, agility, and speed characteristics are complementary features (Acar & Eler, 2019).

The tribal subjects (both boys and girls) of the present study also showed significantly higher scores in the performance of agility (Table no.-4) and also higher score in speed (Table no.-3) than that of non-tribal subjects (both boys and girls). The difference observed in balance ability may be attributed to the genetic factor and typical lifestyle of the tribals, since both the groups are untrained and quality is perhaps inborn. Therefore, the performance of balance among the subjects of the present study is quite usual and found similarities with other researchers.

4.2 (v) Coordination (n)

Descriptive statistics on coordination has been presented in table-2. The mean and SD (Mean $\pm$ SD) value of coordination for the tribal boys group was 23.43 ± 6.12 n, and that of the non-tribal boys group was 22.69 ± 5.39 n. Tribal girls group and non-tribal girls group were 15.59 ± 4.53 n and 14.61 ± 4.89 n respectively.

Since the mean values of the coordination parameter between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 7: Mean difference and t-values of coordination performance (n) of two boys groups and two girls groups.

Coordination (n)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	23.43	± 6.12	0.74	1.83
	Non-Tribal Boys	22.69	± 5.39		
	Tribal Girls	15.59	± 4.53	0.98	2.96*
	Non-Tribal Girls	14.61	± 4.89		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 7 that the mean score of the coordination test is a little bit higher in tribal boys than the non-tribal boys, but the mean difference between tribal boys and non-tribal boys was 0.74 and obtained t-value was 1.83 which was not statistically significant at 0.05 levels.

It also appears from table no. 7 that the mean difference between tribal girls & non-tribal girls was 0.98 and the obtained t-value was 2.96 which was statistically

significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 7 and the graph (fig.8) reveal that tribal boys and non-tribal boys did not differ significantly, but the mean value of tribal boys slightly higher in co-ordination than the non-tribal boys. On the other hand, tribal girls had significantly higher coordination performance than the non-tribal girls. In this parameter higher the performance higher was the score (score -tribal boys: 23.43 n & non-tribal boys: 22.69 n; tribal girls: 15.59 n & non-tribal girls: 14.61 n.). The mean values of the two boys groups and two girls groups on coordination have been graphically represented in figure-8.

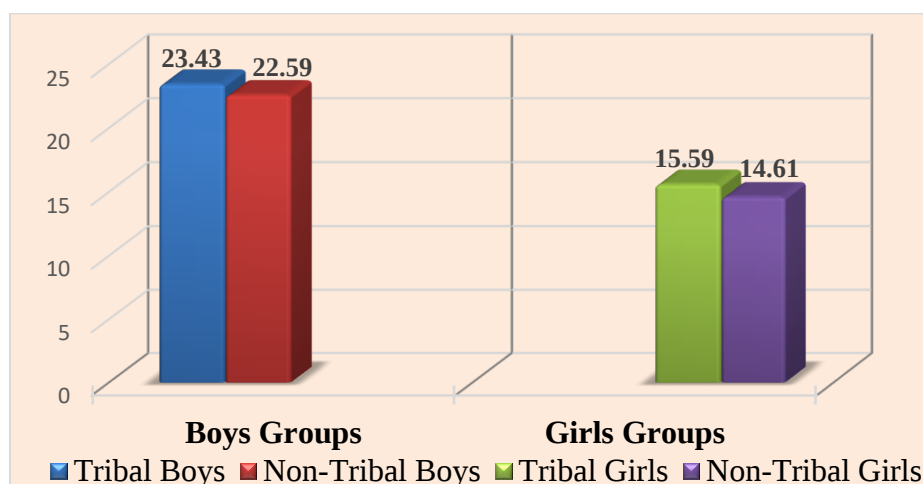


Figure 8: Bar diagram showing mean value of coordination of two boys groups and two girls groups.

Discussion on Coordination:

The results reveal that coordination did not differ significantly between selected tribal boys & non-tribal boys groups, but the mean value of tribal boys higher than non-tribal boys. In the case of girls groups tribal girls were significantly better in coordination ability than non-tribal girls. It is revealed from the findings of the study that the co-ordination of tribal boys and non-tribal boys differences was observed but not significant. The investigators like Dudhale & Bhate, (2015); Hansda & Bandopadhyay, (2019) observed no significant difference in co-ordination between tribal and non-tribal boys. The result of the present study also revealed that tribal girls were better coordination ability than the non-tribal girls. Mandal, (2014) observed the rural children were better in co-ordination than urban children. The

investigators like Nayak, (2015) was found girls exhibited superior hand-eye coordination as compared to tribal adolescent boys. Therefore, the findings of the present study found similarities with the other related research reports in this field.

However, Rathakrishnan, (2011) founds a significant difference between rural and urban school boys on coordination and the mean value of co-ordination is greater for urban school boys as compared to rural school boys.

Coordinative abilities (Coordination) always appear in a complex combination with one another as well as with conditional abilities and process of will, cognitive, and other psychic factors involved in the process of action or behavior regulation. It primarily depends on the motor control and regulation processes of CNS.

In coordinative abilities, the processes of motor coordination are just stabilized and perfected for the execution of a wide number of movements similar to each other. The learning of movements, however, has a positive effect on the coordinative abilities and vice-versa.

The subjects of the present study did not receive any such types of training during their developmental stage. The difference observed in co-ordination ability may be attributed to the typical lifestyle of the Tribals, since both the groups are untrained and quality is perhaps inborn. Therefore, the performance of co-ordination ability among the subjects of the present study is quite usual and found similarities with other researchers.

4.2 (vi) Reaction Time (sec)

Descriptive statistics on reaction-time has been presented in table-2. The mean and SD (Mean $\pm$ SD) value of reaction time for the tribal boys group was 0.226 ± 0.043 sec and that of the non-tribal boys group was 0.232 ± 0.041 sec. Whereas the tribal girls group performed the test in 0.274 ± 0.035 sec and the non-tribal girls group performed the said test in 0.275 ± 0.036 sec.

Since the mean values of the reaction time parameter between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 8: Mean difference and t-values of reaction time performance (sec) of two boys groups and two girls groups.

Reaction-time (sec)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	0.226	± 0.043	0.006	2.12*
	Non-Tribal Boys	0.232	± 0.041		
	Tribal Girls	0.274	± 0.035	0.001	0.22
	Non-Tribal Girls	0.275	± 0.036		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 8 that the mean difference between tribal boys & non-tribal boys was 0.006 and the obtained t-value was 2.12 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 8 that the mean difference between tribal girls & non-tribal girls was 0.001 and the obtained t-value was 0.22 which was not statistically significant. The difference was not significant at 0.05 level. Since the table value 1.96 for the df 798 which was greater than the obtained value.

The results as it appears from table no. 8 and the graph (fig.9) reveal that tribal boys had significantly higher reaction-time performance than non-tribal boys. On the other hand, tribal girls & non-tribal girls did not differ significantly. In this parameter higher the performance lower was the time (score -tribal boys: 0.226 sec & non-tribal boys: 0.232 sec; tribal girls: 0.274 sec & non-tribal girls: 0.275 sec.). The mean values of the two boys and two girls groups on reaction-time have been graphically represented in figure-9.

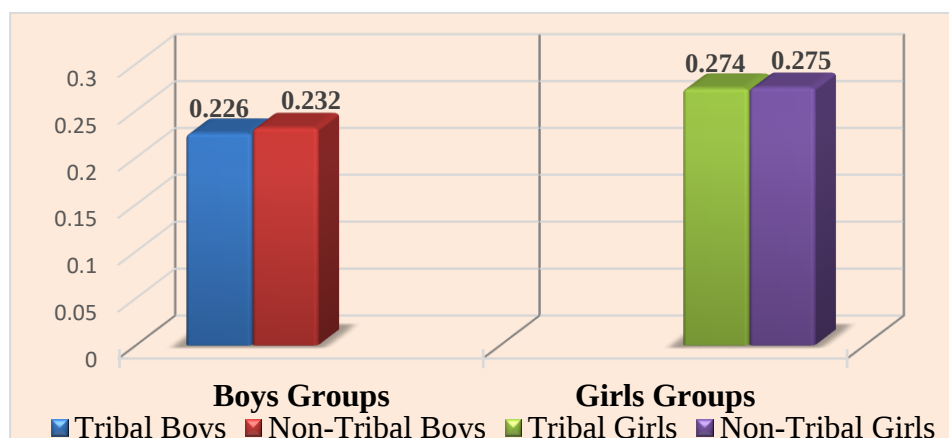


Figure 9: Bar diagram showing mean value of reaction time of two boys groups and two girls groups.

Discussion on Reaction-Time:

The results of the present study indicate that the tribal boys were better in reaction time than the non-tribal boys. The results also reveal that reaction time did not differ significantly between selected tribal girls & non-tribal girls, but the mean values of tribal girls slightly better than non-tribal girls. Saha & Halder, (2012) found the rural school-going children are better than urban school-going children. (Mandal, 2014) the observed urban group had a better reaction time than the rural group. Therefore, the findings of the present study found are in similarity with the other related research reports in this field.

However, Dudhale & Bhate, (2015) did not find any significant difference in reaction-time between tribal and non-tribal male gymnasts.

Reaction time is the time interval between the signal and the start of the movement (Singh, 1991). Moradi & Esmaeilzadeh, (2015) concluded that agility was significantly correlated to better reaction time in the school boys. The tribal subjects (both boys and girls) of the present study have also shown a higher score in the performance of agility (Table no.-4) than that of non-tribal subjects (both boys and girls). The difference observed in reaction-time may be attributed to the rough and tuff for their daily liking activities, which need to develop flexibility, agility, cardiorespiratory endurance, and muscular strength optimally; therefore, such results might have occurred in the study. Therefore, the performance of reaction time among the subjects of the present study is quite usual, and present findings align with the other researchers, stated above.

4.2 (vii) Overall Motor Fitness (The calculation of Overall Motor Fitness has already been given in the 3rd Chapter)

Descriptive statistics on overall motor fitness has been presented in table-2. The mean and SD (Mean $\pm$ SD) value of overall motor fitness for the tribal boys group was 302.92 ± 23.49 and that of the non-tribal boys group was 299.52 ± 23.72 . Tribal girls group and non-tribal girls group were 299.39 ± 23.50 and 295.86 ± 23.80 respectively.

Since the mean values of overall motor fitness between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 9: Mean difference and t-values of overall motor fitness of two boys groups and two girls groups.

Overall Motor Fitness	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	302.92	± 23.49	3.40	2.04*
	Non-Tribal Boys	299.52	± 23.72		
	Tribal Girls	299.39	± 23.50	3.53	2.12*
	Non-Tribal Girls	295.86	± 23.80		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 9 that the mean difference between tribal boys and non-tribal boys was 3.40 and the obtained t-value was 2.04 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 9 that the mean difference between tribal girls & non-tribal girls was 3.53 and the obtained t-value was 2.12 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 9 and the graph (fig.10) reveal that both tribal boys and tribal girls had significantly higher overall motor fitness performance than non-tribal boys and non-tribal girls respectively. In this parameter higher the performance higher was the score (tribal boys: 302.92 & non-tribal boys: 299.52; tribal girls: 299.39 & non-tribal girls: 295.86). The mean values of the two boys groups and two girls groups on overall motor fitness have been also graphically represented in figure-10.

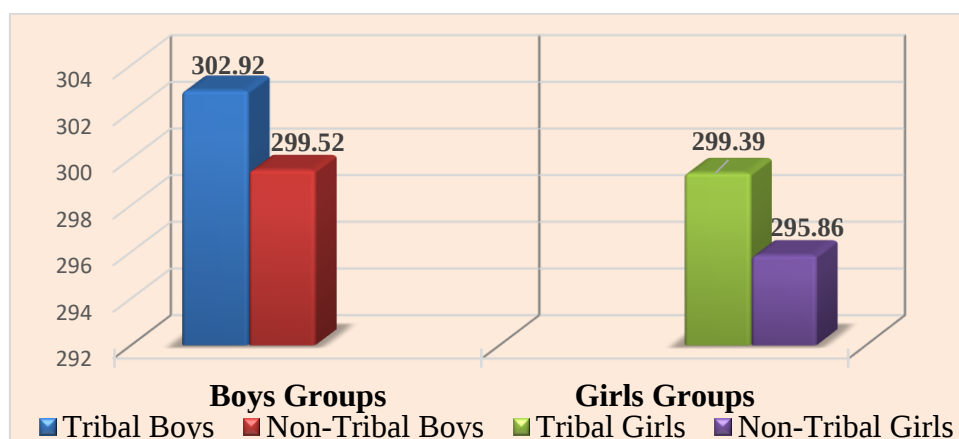


Figure 10: Bar diagram showing the mean value of overall motor fitness of two boys groups and two girls groups.

Discussion on Overall Motor Fitness:

The results of the present study indicate that both groups of tribal students, tribal boys & tribal girls were significantly better in overall motor fitness performance than the non-tribal boys and non-tribal girls respectively. In a similar study, the tribal boys were significantly better in motor fitness variables such as speed, agility, explosive strength, balance, coordination, and reaction time than their non-tribal counterpart (Hansda & Bandopadhyay, 2019); (Beigh & Rajpal, 2018) Raghuvaran & Deepla, (2020), (Dhanabal, 2011), (Singh, 2014), (Devi, 2000), (Tikale & Durge, 2020), (Rathakrishnan, 2011), (Dudhale & Bhate, 2015), (Saha & Halder, 2012). Similarly, the rural school children were better in motor fitness variables such as speed, agility, explosive strength, balance, coordination, and reaction time than the urban school students (Mandal, 2014), (Singh, Singh, & Singh, 2016). Chillon, Ortega, Ferrando, & Casajus, (2011) found the Rural Spanish children and adolescents had better cardiorespiratory fitness, upper- and lower-limb muscular fitness, speed-agility, and flexibility than their urban peers. Blerim, et al.,(2019) found that the children and adolescents from the rural environment show better results in cardiorespiratory fitness, muscle fitness of the upper and lower extremities, and have better coordination, speed, and agility in comparison with their urban peers. The place of residence, apart from other environmental factors, should be taken into account when building a strategy and interventions through which it will promote physical activity and health. Therefore, the findings of the present study found similarities with the other related research reports in this field.

The present study result revealed that the tribal subjects (both boys and girls) are shown better in overall motor fitness performance such as speed (Table no.-3), agility (Table no.-4), explosive strength (Table no.-5), balance (Table no.-6), coordination (Table no.-7), and reaction-time (Table no.-8) than that of non-tribal subjects (both boys and girls). The difference observed in overall motor fitness performance may be attributed to genetic factor, environmental factors, and their typical lifestyle of the tribals, since both the groups, are untrained and quality is perhaps inborn. Therefore, the performance of overall motor fitness among the subjects of the present study is quite usual, and present findings are in consonance with the other researchers, stated above.

4.3 Health Status

Mean and Standard Deviation (Mean $\pm$ SD) as descriptive statistics of the health status of two boys groups and two girls groups have been presented in Table-10.

Table 10: Mean and SD of health status (score) of two boys groups and two girls groups.

Groups Variables	Boys Groups		Girls Groups	
	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Health Status (score)	161.11 $\pm$ 13.33	168.27 $\pm$ 17.91	160.91 $\pm$ 14.29	165.44 $\pm$ 18.46

Table-10 represents the descriptive statistics like mean and standard deviation (Mean $\pm$ SD) of health status for two boys groups and two girls groups. The mean and SD (Mean $\pm$ SD) value of health status for tribal boys group was 161.11 $\pm$ 13.33 and that of non-tribal boys group was 168.27 $\pm$ 17.91. Tribal girls group and non-tribal girls group were 160.91 $\pm$ 14.29 and 165.44 $\pm$ 18.46 respectively.

Since the mean values of health status between Tribal and Non-Tribal boys groups and Girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 11: Mean difference and t-values of health status (score) of two boys groups and two girls groups.

Health Status (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	161.11	$\pm$ 13.33	7.16	6.41*
	Non-Tribal Boys	168.27	$\pm$ 17.91		
	Tribal Girls	160.91	$\pm$ 14.29	4.53	3.88*
	Non-Tribal Girls	165.44	$\pm$ 18.46		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 11 that the mean difference between tribal boys & non-tribal boys was 7.16 and the obtained t-value was 6.41 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 11 the mean difference between tribal girls and non-tribal girls was 4.53 and the obtained t-value was 3.88 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 11 and the graph (fig.11) reveal that non-tribal boys had significantly higher health status than tribal boys. Similarly, non-tribal girls had higher health status than tribal girls. In this parameter higher value was the better score (tribal boys:166.11 & non-tribal boys: 168.27, tribal girls:160.91 & non-tribal girls: 165.44). The mean values of two boys groups and two girls groups on health status have been graphically represented in figure-11.

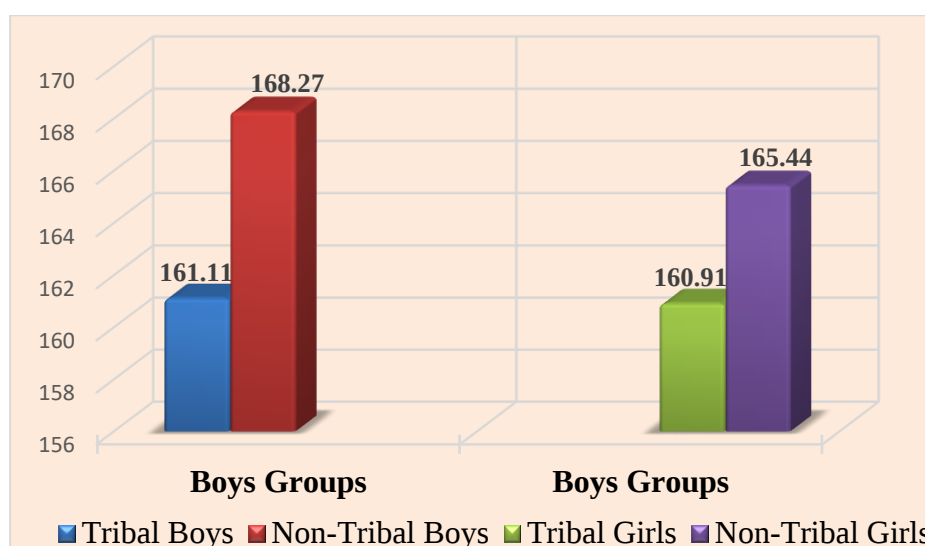


Figure 11: Bar diagram showing the mean value of health status of two boys groups and two girls groups.

Discussion on Health Status:

The result of the present study indicates that both groups of non-tribal, i.e., non-tribal boys & non-tribal girls were better in health status than the tribal boys & tribal girls respectively. A significant difference was observed in health status between two boys groups and two girls groups. The non-tribal boys & non-tribal girls were better than that of tribal boys & tribal girls respectively. In a similar study tribals (both boys and girls) were found to have poor nutritional status and health conditions, compared to the nontribal population (Divakar, et al., 2013), (Datta, Chattopadhyay, Das, & Mitra, 2015). Singh & Negi, (2019) observed that health status is very miserable and need a systematic policy intervention to revive and cure the health

condition of the most vulnerable population. National Family Health Survey (1998-99) has also reported that tribal health status is very poor, particularly the women in India as compared to the Non-Tribal population. Health status is highly and significantly related to family education status and socio-economic status (Dhargupta, Goswami, Sen, & Mazumder, 2009). Education is the most important factor for the development of health indicators (Dash , 2013).

In the present study health status of the tribal subjects (both boys girls) have shown significantly lower score than that of non-tribal subjects (both boys and girls). The difference observed in health status may be attributed to the genetic factors, socioeconomic status, and family education of the tribals (Dhargupta, Goswami, Sen, & Mazumder, 2009).

The sociocultural environment in which the tribal boys and tribal girls do belong are different from non-tribals in many respects. Tribals are still traditional, where modern concept and outlooks are limited. This may have some influence on their health status. Therefore, the health status among the subjects of the present study is quite usual, and present findings agree with the other researchers, stated above.

4.4 Anthropometric Measurements

4.4.1 Skinfold Measurements

Mean and standard deviation (Mean $\pm$ SD) as descriptive statistics of triceps skinfold, suprailiac skinfold, abdomen skinfold, and thigh skinfold of two boys groups and two girls groups have been presented in Table-12.

Table 12: Mean and SD of different skinfold measurements (mm) of two boys groups and two girls groups.

Groups → Variables ↓	Boys Groups		Girls Groups	
	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Triceps (mm)	6.30 $\pm$ 1.93	8.56 $\pm$ 3.51	11.73 $\pm$ 5.49	12.44 $\pm$ 4.17
Suprailiac (mm)	7.02 $\pm$ 2.62	10.30 $\pm$ 5.05	13.78 $\pm$ 4.09	15.12 $\pm$ 6.21
Abdominal (mm)	8.08 $\pm$ 3.19	12.08 $\pm$ 5.93	16.45 $\pm$ 6.82	17.79 $\pm$ 6.58
Thigh (mm)	9.95 $\pm$ 2.83	13.51 $\pm$ 4.82	17.20 $\pm$ 4.77	21.04 $\pm$ 6.42

The four different Skinfold measurements of triceps skinfold, suprailiac skinfold, abdomen skinfold, and thigh skinfold have been presented sequence wise.

4.4.1 (i) Triceps Skinfold (mm)

Descriptive statistics on triceps skinfold has been presented in table-12. The mean and SD (Mean $\pm$ SD) value of triceps skinfold of the subject of the tribal boys group, was 6.30 ± 1.93 mm and that of non-tribal boys group was 8.56 ± 3.51 mm. The triceps skinfold of the subjects of the tribal girls group was 11.73 ± 5.49 mm and the non-tribal girls group was 12.44 ± 4.17 mm.

Since the mean values of triceps skinfold between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 13: Mean difference and t-values of triceps skinfold (mm) of two boys groups and two girls groups.

Triceps Skinfold (mm)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	6.30	± 1.93	2.26	11.28*
	Non-Tribal Boys	8.56	± 3.51		
	Tribal Girls	11.73	± 5.49	0.71	2.06*
	Non-Tribal Girls	12.44	± 4.17		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 13 that the mean difference of triceps skinfold between tribal boys & non-tribal boys was 2.26 and the obtained t-value was 11.28 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.13 that the mean difference between tribal girls & non-tribal girls was 0.71 and the obtained t-value was 2.06 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 13 and the graphs (fig.12) reveal that non-tribal boys had significantly higher triceps skinfold than tribal boys. Similarly, non-tribal girls had higher triceps skinfold than tribal girls. The mean values of the two boys groups and two girls groups on triceps skinfold have been also graphically represented in figure-12.

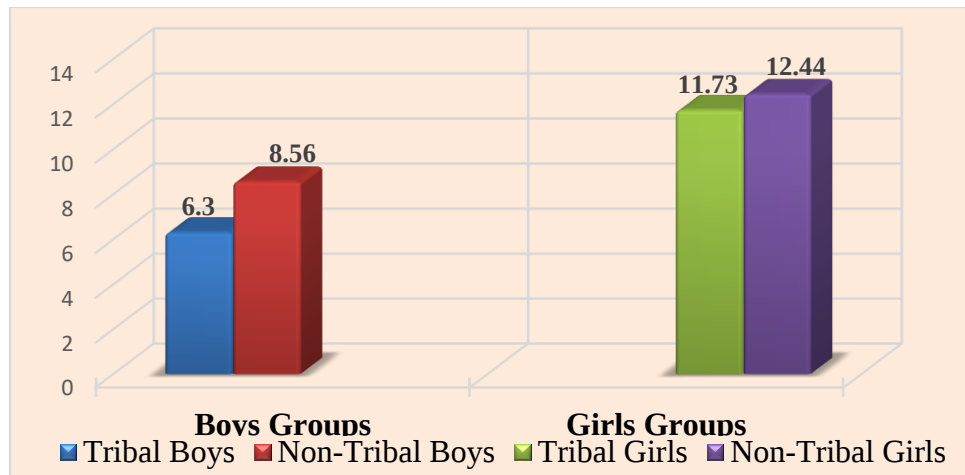


Figure 12: Bar diagram showing the mean value of triceps skinfold of two boys groups and two girls groups.

4.4.1 (ii) Suprailiac Skinfold (mm)

Descriptive statistics on suprailiac skinfold has been presented in table-12. The mean and SD (Mean $\pm$ SD) value of suprailiac skinfold of the subject of the tribal boys group, was 7.02 ± 2.62 mm and that of non-tribal boys group was 10.30 ± 5.05 mm. The suprailiac skinfold of the subjects of the tribal girls group was 13.78 ± 4.09 mm and the non-tribal girls group was 15.12 ± 6.21 mm.

Since the mean values of suprailiac skinfold between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 14: Mean difference and t-values of suprailiac skinfold (mm) of two boys groups and two girls groups.

Suprailiac Skinfold (mm)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	7.02	± 2.62	3.28	11.51*
	Non-Tribal Boys	10.30	± 5.05		
	Tribal Girls	13.78	± 4.09	1.34	3.60*
	Non-Tribal Girls	15.12	± 6.21		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 14 that the mean difference of suprailiac skinfold between tribal boys & non-tribal boys was 3.28 and the obtained t-value was 11.51 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 14 that the mean difference between tribal girls & non-tribal girls was 1.34 and the obtained t-value was 3.60 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 14 and the graphs (fig.13) reveal that non-tribal boys had significantly higher suprailiac skinfold than tribal boys. Similarly, non-tribal girls had higher suprailiac skinfold than tribal girls. The mean values of the two boys groups and two girls groups on suprailiac skinfold have been also graphically represented in figure-13.

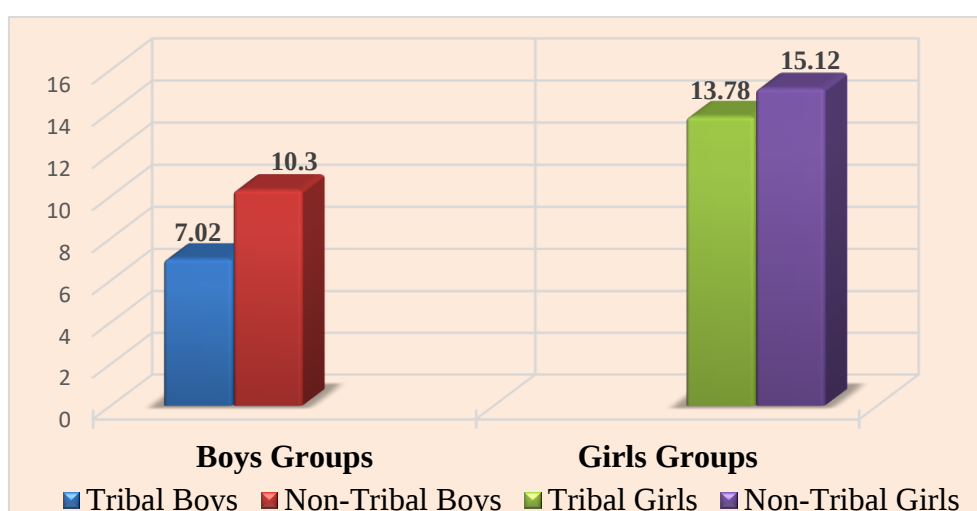


Figure 13: Bar diagram showing the mean value of suprailiac skinfold of two boys groups and two girls groups.

4.4.1 (iii) Abdominal Skinfold (mm)

Descriptive statistics on abdominal skinfold has been presented in table-12. The mean and SD (Mean $\pm$ SD) value of abdominal skinfold of the subject of the tribal boys group, was 8.08 ± 3.19 mm and that of non-tribal boys group was 12.08 ± 5.93 mm. The abdominal skinfold of the subjects of the tribal girls group was 16.45 ± 6.82 mm and the non-tribal girls group was 17.79 ± 6.58 mm.

Since the mean values of abdominal skinfold between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 15: Mean difference and t-values of abdominal skinfold (mm) of two boys groups and two girls groups.

Abdominal Skinfold (mm)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	8.08	± 3.19	4.00	11.89*
	Non-Tribal Boys	12.08	± 5.93		
	Tribal Girls	16.45	± 6.82	1.34	2.82*
	Non-Tribal Girls	17.79	± 6.58		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 15 that the mean difference of abdominal skinfold between tribal boys & non-tribal boys was 4.00 and the obtained t-value was 11.89 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.15 that the mean difference between tribal girls & non-tribal girls was 1.34 and the obtained t-value was 2.82 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 15 and the graphs (fig.14) reveal that non-tribal boys had significantly higher abdominal skinfold than tribal boys. Similarly, non-tribal girls had higher abdominal skinfold than tribal girls. The mean values of the two boys groups and two girls groups on abdominal skinfold have been also graphically represented in figure-14.

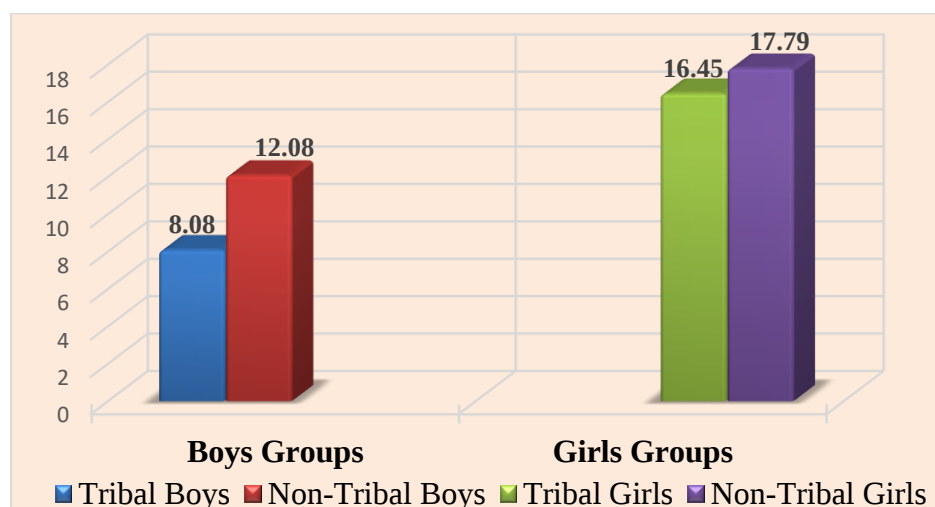


Figure 14: Bar diagram showing the mean value of abdominal skinfold of two boys groups and two girls groups.

4.4.1 (iv) Thigh Skinfold (mm)

Descriptive statistics on thigh skinfold has been presented in table-12. The mean and SD (Mean $\pm$ SD) value of thigh skinfold of the subject of the tribal boys group, was 9.95 ± 2.83 mm and that of non-tribal boys group was 13.51 ± 4.82 mm. The thigh skinfold of the subjects of the tribal girls group was 17.20 ± 4.77 mm and the non-tribal girls group was 21.04 ± 6.42 mm.

Since the mean values of thigh skinfold between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 16: Mean difference and t-values of thigh skinfold (mm) of two boys groups and two girls groups.

Thigh Skinfold (mm)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	9.95	± 2.83	3.56	12.71*
	Non-Tribal Boys	13.51	± 4.82		
	Tribal Girls	17.20	± 4.77	3.84	9.58*
	Non-Tribal Girls	21.04	± 6.42		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 16 that the mean difference of thigh skinfold between tribal boys & non-tribal boys was 3.56 and the obtained t-value was 12.71 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 16 that the mean difference between tribal girls & non-tribal girls was 3.84 and the obtained t-value was 9.58 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 16 and the graphs (fig.15) reveal that non-tribal boys had significantly higher thigh skinfold than tribal boys. Similarly, non-tribal girls had higher thigh skinfold than tribal girls. The mean values of the two boys groups and two girls groups on thigh skinfold have been also graphically represented in figure-15.

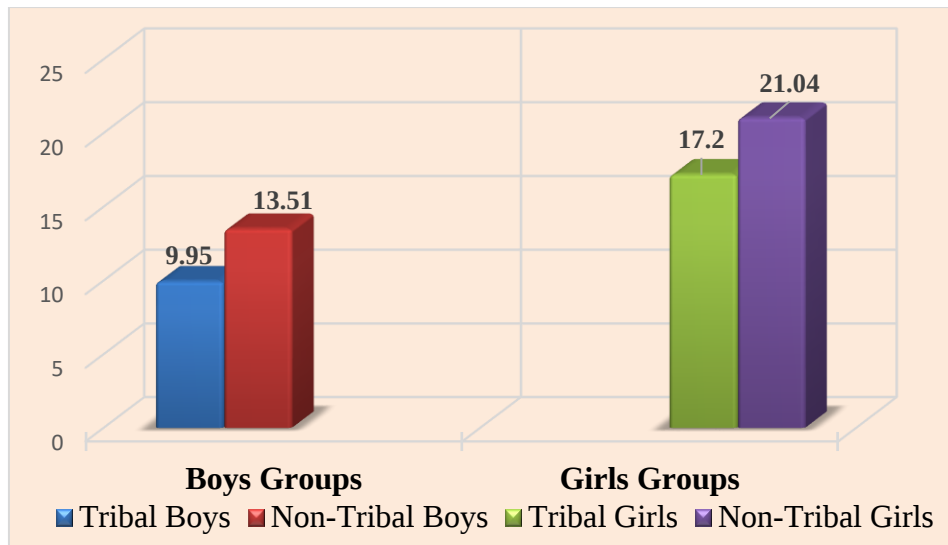


Figure 15: Bar diagram showing the mean value of thigh skinfold of two boys groups and two girls groups.

Discussion on Skinfold:

The results of the present study indicate the four important skinfold measurements were considered triceps skinfold, suprailiac skinfold, abdominal skinfold, and thigh skinfold. A significant difference was observed in all skinfold measurement between tribal and non-tribal boys groups and girls groups respectively. The non-tribal boys & non-tribal girls had significantly higher in all skinfold measurements than the tribal boys & tribal girls respectively. Singh & Tara, (2019) found that non-tribal players possessed significantly greater triceps skin-fold, forearm skinfold, biceps skin-fold and sub-scapular skinfold than tribal senior secondary school players. Tara & Singh, (2017) also found a significant difference between tribal and non-tribal in suprailiac, thigh and calf skinfold width and indicates that non-tribal players have greater skinfold width of suprailiac, thigh and calf skinfold width than tribal.

However, Singh, Singh & Singh, (2017) did not find any significant difference in supra-iliac skinfold thicknesses between rural and urban children but the mean value of rural children were greater than urban children.

The measurement of skinfold thickness regarded as a fundamental method for providing an estimation of subcutaneous body fat as well as for anthropometric assessment of body composition. Skinfold thickness highly correlated with sports performance observed by Legaz and Serrano (2005).

In the present study non-tribal adolescents (both boys and girls) possess greater value in all skinfold measurement of triceps skin-fold, suprailliac skin-fold, abdominal skin-fod, and thigh skinfold than their counterpart tribal adolescents. The tribal adolescents (both boys and girls) possess lower value in all skinfold measurements. The differences whatsoever they may exhibit in their body physique or skin fold will mainly be due to their genetic makeup and more activity-oriented to their rough and tough environmental condition and their struggle full life style.

4.4.2 Body Composition

Mean and standard deviation (Mean $\pm$ SD) as descriptive statistics of body composition in the form of body fat %, fat mass, and lean body mass of two boys groups and two girls groups have been presented in Table-17 sequentially.

Table 17: Mean and SD of body composition of two boys groups and two girls groups.

Groups → Variables ↓	Boys Groups		Girls Groups	
	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Body fat %	5.21 $\pm$ 1.73	8.55 $\pm$ 1.86	17.88 $\pm$ 2.28	19.63 $\pm$ 3.54
Fat Mass (kg)	2.03 $\pm$ 0.42	3.48 $\pm$ 1.10	6.85 $\pm$ 1.52	7.82 $\pm$ 1.86
Lean Body Mass (kg)	37.04 $\pm$ 5.03	37.17 $\pm$ 5.60	31.45 $\pm$ 4.38	32.02 $\pm$ 4.46

4.4.2 (i) Body fat %

Descriptive statistics on body fat % has been presented in table-17. The mean and SD value of body fat %, of the subject of the tribal boys group, was 5.21 $\pm$ 1.73% and that of non-tribal boys group was 8.55 $\pm$ 1.86 %. The body fat% of the subjects of the tribal girls group was 17.88 $\pm$ 2.28% and the non-tribal girls group was 19.63 $\pm$ 3.54%.

Since the mean values of body fat % between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 18: Mean difference and t-values of body fat % of two boys groups and two girls groups.

Body Fat%	Groups	Mean	SD	Mean Difference	t- value
	Tribal boys	5.21	± 1.73	3.34	26.31*
	Non-Tribal boys	8.55	± 1.86		
	Tribal girls	17.88	± 2.28	1.75	8.30*
	Non-Tribal girls	19.63	± 3.54		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 18 that the mean difference of body fat % between tribal boys & non-tribal boys was 3.34 and the obtained t-value was 26.31 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.18 that the mean difference between tribal girls & non-tribal girls was 1.75 and the obtained t-value was 8.30 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no.18 and the graphs (fig.16) reveal that non-tribal boys had significantly higher body fat% than tribal boys. Similarly, non-tribal girls had more body fat% than tribal girls. The mean values of the two boys groups and two girls groups on body fat% have been also graphically represented in figure-16.

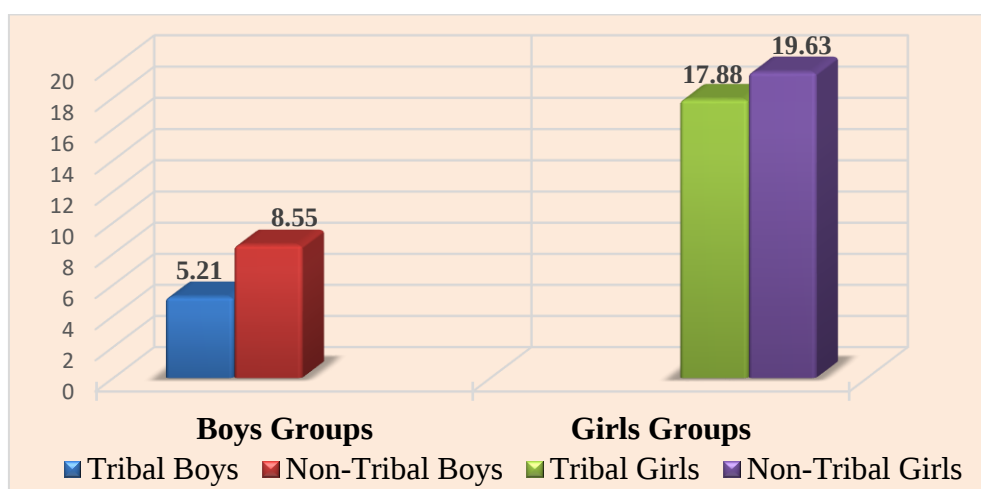


Figure 16: Bar diagram showing the mean value of body fat% of two boys groups and two girls groups.

4.4.2 (ii) Fat Mass (kg)

Descriptive statistics on fat mass has been presented in table-17. The mean and SD value of the fat mass of the subject of the tribal boys group was 2.03 ± 0.42 kg and that of the non-tribal boys group was 3.48 ± 1.10 kg. The fat mass of the subjects of the tribal girls group was 6.85 ± 1.52 kg and the non-tribal girls group was 7.82 ± 1.86 kg.

Since the mean values of fat mass between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 19: Mean difference and t-values of fat mass (kg) of two boys groups and two girls groups.

Fat Mass (kg)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	2.03	± 0.42	1.45	24.62*
	Non-Tribal Boys	3.48	± 1.10		
	Tribal Girls	6.85	± 1.52	0.97	8.04*
	Non-Tribal Girls	7.82	± 1.86		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 19 that the mean difference of body fat mass between tribal boys & non-tribal boys was 1.45 and the obtained t-value was 24.62 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.19 that the mean difference between tribal girls & non-tribal girls was 0.97 and the obtained t-value was 8.04 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 19 and the graphs (fig.17) reveal that non-tribal boys had significantly higher fat mass than tribal boys. Similarly, non-tribal girls had more body fat mass than tribal girls. The mean values of the two boys groups and two girls groups on body fat mass have been also graphically represented in figure-17.

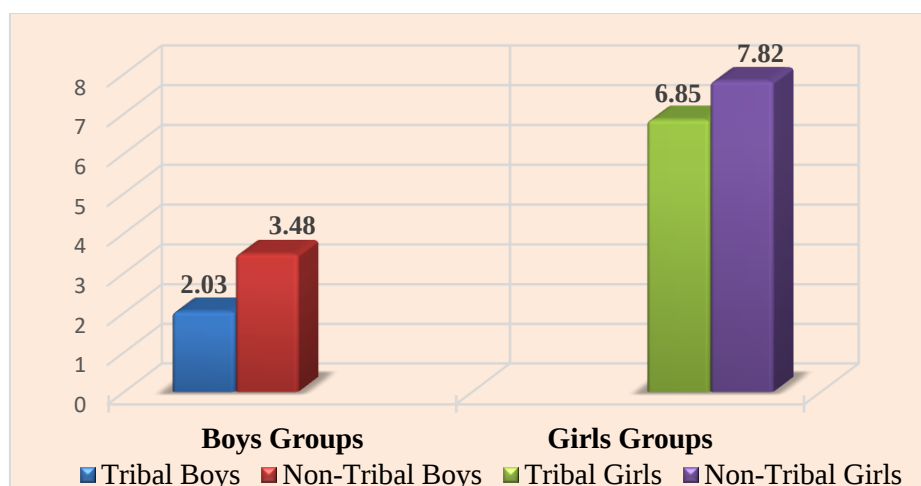


Figure 17: Bar diagram showing the mean value of fat mass of two boys groups and two girls groups.

4.4.2 (iii) Lean Body Mass (kg)

Descriptive statistics on lean body mass has been presented in table-17. The mean and SD (Mean $\pm$ SD) value of the lean body mass of the subject of the tribal boys group was 37.04 ± 5.03 kg and that of the non-tribal boys group was 37.17 ± 5.60 kg. The lean body mass of the subjects of the tribal girls group was 31.45 ± 4.38 kg and the non-tribal girls group was 32.02 ± 4.46 kg.

Since the mean values of lean body mass between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 20: Mean difference and t-values of lean body mass (kg) of two boys groups and two girls groups.

Lean Body Mass (kg)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	37.04	± 5.03	0.13	0.34
	Non-Tribal Boys	37.17	± 5.60		
	Tribal Girls	31.45	± 4.38	0.57	1.80
	Non-Tribal Girls	32.02	± 4.46		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 20 that the mean difference of lean body mass between tribal boys & non-tribal boys was 0.13 and the obtained t-value was 0.34 which was not statistically significant at 0.05 level.

It also appears from table no.20 that the mean difference between tribal girls & non-tribal girls was 0.57 and the obtained t-value was 1.80 which was statistically not significant at 0.05 level.

The mean values of the two boys groups and two girls groups on lean body mass have been also graphically represented in figure-18.

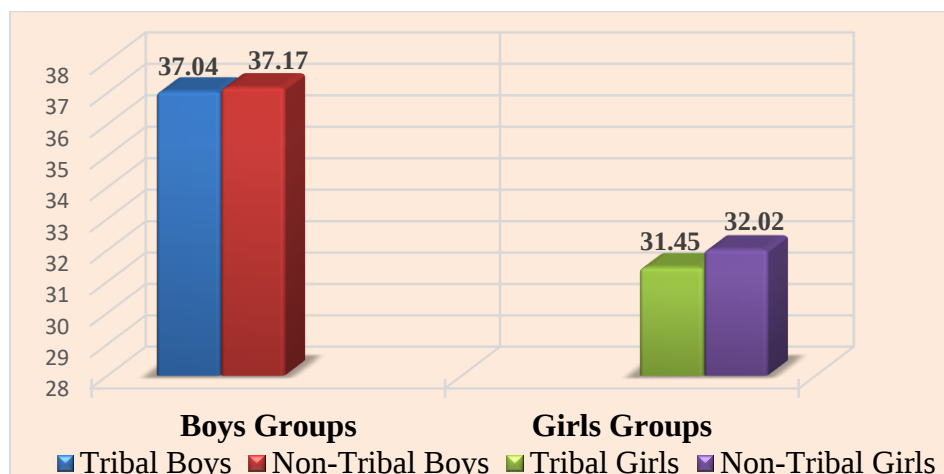


Figure 18: Bar diagram showing the mean value of lean body mass of two boys groups and two girls groups.

Discussion on Body Composition:

The results of the present study indicate the three parameters as body composition considered here, namely body fat %, fat mass, and lean body mass. The significant difference was observed in body fat % and fat mass between tribal and non-tribal (both boys and girls). The non-tribal boys and girls were significantly higher in body fat % and fat mass than the tribal boys and girls respectively. On the other hand, lean body mass did not differ significantly between tribal and non-tribal (both boys and girls). Manna, Pan, & Chowdhury, (2015) showed that significant differences existed between tribal and non-tribal children in body composition. Kangane and More (2013) reported that Maharashtra children in which rural boys had significantly higher body fat percentage than the urban boys.

However, Singh, Singh & Singh (2017) did not find any significant difference in body fat percent and total body fat mass between the rural and urban children but the rural children were found to have significantly greater lean body mass as compared to their urban counterparts. Vyas, Thakur & Parmar, (2012) also revealed

that the city and rural boys of Gandhi Nagar do not demonstrate significant differences in their body composition.

Body composition is a very important component of health-related physical fitness because it deals with the human body. Body composition is an important indicator for evaluating healthy and nutritional status. It is concluded from the present study that tribal had less adiposity as compared to non-tribal boys and girls. The negative or inactive life style in comparison to tribal population coupled with increased in energy intake seems to be the reason for increase in fatness in non-tribal boys and girls. These two group i.e. tribal and non-tribal don't live together in geographical proximity and their nature of physical work is also not similar. This might be due to fact that the tribal boys have a more activity-oriented environment and more physical workload due to engagement in agriculture-related works.

4.5 Psychosocial Parameters

Psychosocial parameters were measured by academic anxiety, stress, and adjustment.

4.5.1 Academic Anxiety (score)

Mean and standard (Mean $\pm$ SD) as descriptive statistics of academic anxiety, of both tribal and non-tribal subjects, has been presented in Table-21.

Table 21: Mean and SD of academic anxiety of two boys groups and two girls groups.

Groups → Variables ↓	Boys Groups		Girls Groups	
	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Academic Anxiety (score)	11.56 $\pm$ 4.65	10.75 $\pm$ 4.58	11.68 $\pm$ 4.61	10.83 $\pm$ 4.51

Descriptive statistics on academic anxiety has been presented in table-21. The mean and SD (Mean $\pm$ SD) value of academic anxiety of the subject of the tribal boys group was 11.56 $\pm$ 4.65 and that of non-tribal boys group was 10.75 $\pm$ 4.58. Tribal girls group and non-tribal girl groups were 11.68 $\pm$ 4.61 and 10.83 $\pm$ 4.51 respectively.

Since the mean values of academic anxiety between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 22: Mean difference and t-values of academic anxiety of two boys groups and two girls groups.

Academic Anxiety	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	11.56	± 4.65	0.81	2.48*
	Non-Tribal Boys	10.75	± 4.58		
	Tribal Girls	11.68	± 4.61	0.85	2.63*
	Non-Tribal Girls	10.83	± 4.51		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 22 that the mean difference of academic anxiety between tribal boys & non-tribal boys was 0.81 and the obtained t-value was 2.48 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.22 that the mean difference between tribal girls & non-tribal girls was 0.85 and the obtained t-value was 2.63 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 22 and the graphs (fig.19) reveal that tribal boys and tribal girls had significantly higher academic anxiety than non-tribal boys and non-tribal girls respectively. In this parameter lower value was the better score (tribal boys:11.56 & non-tribal boys: 10.75, tribal girls:11.68 & non-tribal girls: 10.83). The mean values of the two boys groups and two girls groups on academic anxiety have been also graphically represented in figure-19.

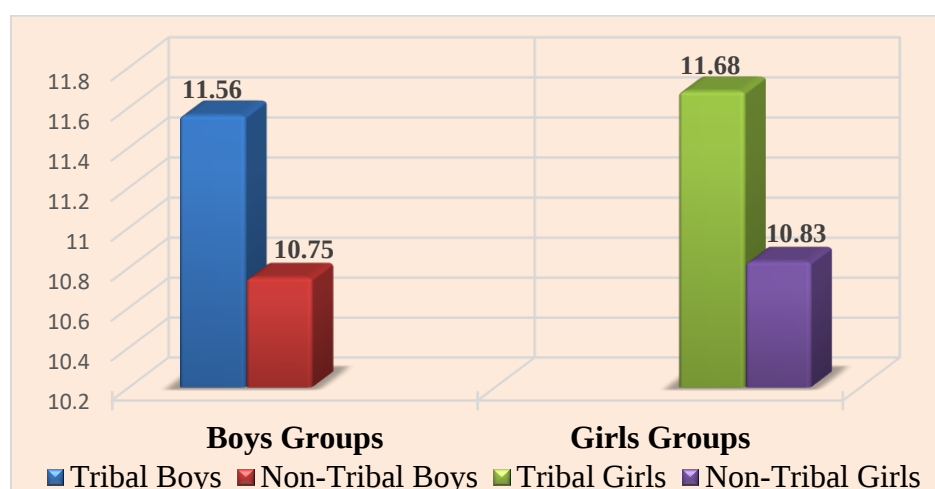


Figure 19: Bar diagram showing the mean value of academic anxiety of two boys groups and two girls groups.

Discussion on Academic Anxiety:

The results of the present study indicate that both groups of tribal students, tribal boys & tribal girls were high academic anxiety than the non-tribal boys & non-tribal girls respectively. The significant difference was observed in academic anxiety between two boys groups and two girls groups. Chauhan, (2016) and Thakur & Kumar, (2015) found a significant difference in the academic anxiety between urban and rural students and urban adolescents experience a significantly low level of academic anxiety than their rural counterparts. Vig & Chawla, (2013) also found rural girls significantly higher levels of academic anxiety as compared to urban girls.

However, Kumar, (2013) & Bihari, (2014) & Banga & Sharma, (2016) did not find any difference in the academic anxiety level of adolescents based on gender and location (rural and urban).

Today, anxiety is a common phenomenon in everyday life. It plays a crucial role in human life because all of us are the victim of anxiety in different ways (Goodstein & Lanyon, 1975). Academic anxiety is an important educational problem that affects millions of students in colleges and schools over the world each year. Although a low level of anxiety can cause positive motivation for the improvement of educational functioning, high levels of it can cause a disturbance in concentration, attention, storage of knowledge, recall, and educational reduction. Academic anxiety is a common issue that students cannot ignore if they want to succeed in school. If academic anxiety isn't properly addressed, it can have many serious and lasting consequences, such as causing a student to procrastinate, perform poorly on schoolwork, fail classes and withdraw from socializing (Kumar, 2013). In the present study, Tribal Subjects (both boys & girls) have shown anxious for academic anxiety but the non-tribal subjects (both boys & girls) have shown less anxious for academic anxiety. Socio-economic status and home environment affect the level of academic anxiety of the adolescents (Kumar, 2013) . Low socioeconomic status school students suffer more from academic anxiety (Siddiqui & Rehman, (2014) & Thakur & Kumar, (2015). The difference observed in academic anxiety may be attributed to the home environment factor, socioeconomic status, and typical lifestyle of the tribals (Thakur & Kumar, 2015 & Kumar, 2013). Therefore, the performance of academic anxiety among the subjects of the present study are quite usual, and present findings are in consonance with the other researchers, stated above.

4.5.2 Stress (score)

Mean and standard deviation (Mean $\pm$ SD) as descriptive statistics of different dimensions of stress, namely pressure, physical stress, anxiety, frustration, and overall stress of two boys groups and two girls groups have been presented in Table-23.

Table 23: Mean and SD of different dimension of the stress of two boys groups and two girls groups.

Variables Groups → ↓		Boys Groups		Girls Groups	
		Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)	Tribal (Mean $\pm$ SD)	Non-Tribal (Mean $\pm$ SD)
Stress (score)	Pressure	6.68 $\pm$ 2.11	5.47 $\pm$ 2.29	6.12 $\pm$ 2.25	5.20 $\pm$ 2.01
	Physical Stress	1.43 $\pm$ 0.99	1.27 $\pm$ 1.05	1.60 $\pm$ 1.08	1.52 $\pm$ 1.05
	Anxiety	5.20 $\pm$ 2.39	3.54 $\pm$ 2.51	4.81 $\pm$ 2.42	4.05 $\pm$ 2.42
	Frustration	3.18 $\pm$ 1.94	2.14 $\pm$ 1.83	3.19 $\pm$ 1.81	2.60 $\pm$ 1.96
	Overall Stress	16.49 $\pm$ 5.25	12.42 $\pm$ 4.76	15.72 $\pm$ 5.43	13.37 $\pm$ 5.37

The stress scale comprised of pressure, physical stress, anxiety, frustration, and overall stress have been presented on the dimension wise.

4.5.2 (i) Pressure

Descriptive statistics on pressure has been presented in table-23. The mean and SD (Mean $\pm$ SD) values of pressure for the Tribal boys group were 6.68 $\pm$ 2.11 and that of the Non-Tribal boys group was 5.47 $\pm$ 2.29. Tribal girls group and Non-Tribal girls group were 6.12 $\pm$ 2.25 and 5.20 $\pm$ 2.01 respectively.

Since the mean values of pressure between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 24: Mean difference and t-values of pressure of two boys groups and two girls groups.

Pressure (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	6.68	$\pm$ 2.11	1.21	7.76*
	Non-Tribal Boys	5.47	$\pm$ 2.29		
	Tribal Girls	6.12	$\pm$ 2.25	0.92	6.07*
	Non-Tribal Girls	5.20	$\pm$ 2.01		

**Significant at 0.05 level (table value 1.96, df-798)*

It appears from table no.24 that the mean difference between tribal boys & non-tribal boys was 1.21 and the obtained t-value was 7.76 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 24 that the mean difference between tribal girls & non-tribal girls was 0.92 and the obtained t-value was 6.07 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 24 and the graphs (fig.20) reveal that tribal boys had significantly higher pressure than non-tribal boys. Similarly, tribal girls had higher pressure than non-tribal girls. In this parameter, lower values were the better score (tribal boys: 6.68 & non-tribal boys: 5.47; tribal girls: 6.12 & non-tribal girls: 5.20). The mean values of the two boys groups and two girls groups on pressure have been also graphically represented in figure-20.

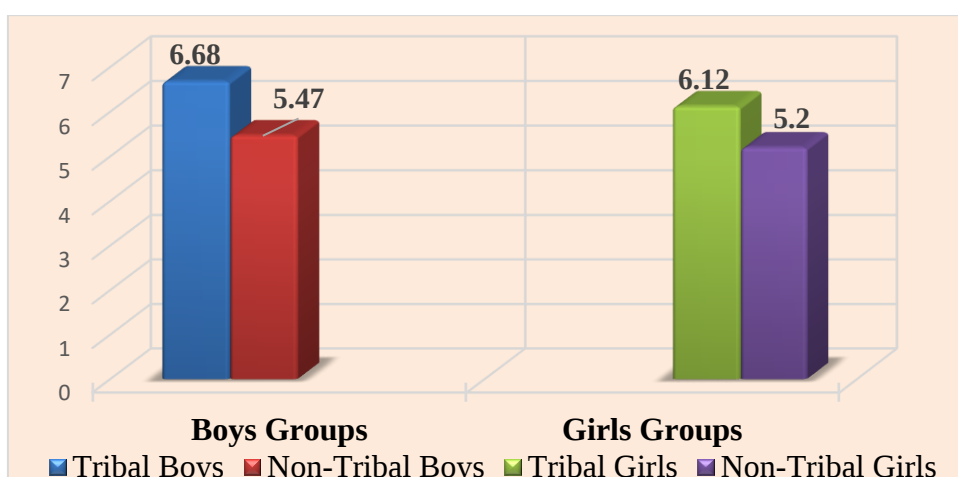


Figure 20: Bar diagram showing mean value of pressure of two boys groups and two girls groups.

4.5.2 (ii) Physical Stress

Descriptive statistics on physical stress has been presented in table-23. The mean and SD (Mean $\pm$ SD) values of physical stress for the tribal boys group were 1.43 ± 0.99 and that of the non-tribal boys group was 1.27 ± 1.05 . Tribal girls group and non-tribal girls group were 1.60 ± 1.08 and 1.52 ± 1.05 respectively.

Since the mean values of physical stress between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 25: Mean difference and t-values of physical stress of two boys groups and two girls groups.

Physical stress (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	1.43	± 0.99	0.16	2.17*
	Non-Tribal Boys	1.27	± 1.05		
	Tribal Girls	1.60	± 1.08	0.08	1.06
	Non-Tribal Girls	1.52	± 1.05		

***Significant at 0.05level (table value 1.96, df-798)**

It appears from table no. 25 that the mean difference between tribal boys & non-tribal boys was 0.16 and the obtained t-value was 2.17 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 25 that the mean difference between tribal girls & non-tribal girls was 0.08 and the obtained t-value was 1.06 which was not statistically significant at 0.05 level.

The results as it appears from the table no. 25 and the graphs (fig.21) reveal that tribal boys had significantly higher in physical stress than non-tribal boys. On the other hand, tribal and non-tribal girls did not differ significantly. The mean values of the two boys groups and two girls groups on physical stress have been also graphically represented in figure-21.

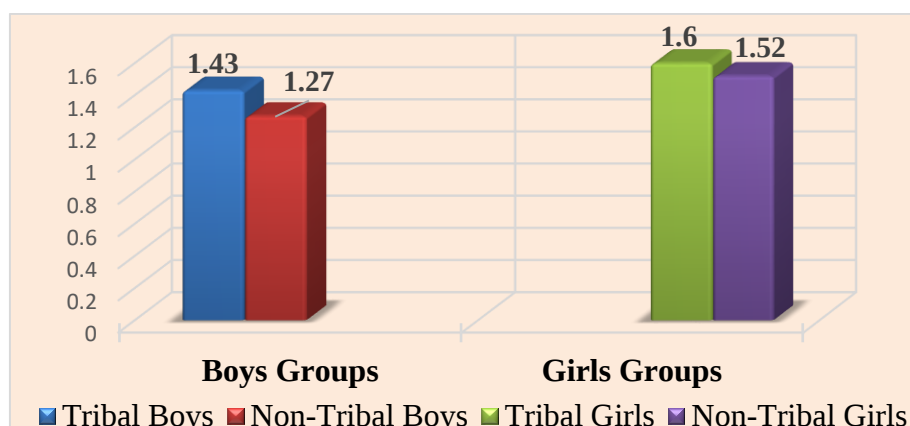


Figure 21: Bar diagram showing mean value of physical stress of two boys groups and two girls groups.

4.5.2 (iii) Anxiety

Descriptive statistics on anxiety has been presented in table-23. The mean and SD (Mean $\pm$ SD) values of anxiety for the tribal boys group were 5.20 ± 2.39 and that of the non-tribal boys group was 3.54 ± 2.51 . Tribal girls group and non-tribal girls group were 4.81 ± 2.42 and 4.05 ± 2.42 respectively.

Since the mean values of anxiety between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 26: Mean difference and t-values of anxiety of two boys groups and two girls groups.

Anxiety (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	5.20	± 2.39	1.66	9.65*
	Non-Tribal Boys	3.54	± 2.51		
	Tribal Girls	4.81	± 2.42	0.76	4.41*
	Non-Tribal Girls	4.05	± 2.42		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 26 that the mean difference between tribal boys & non-tribal boys was 1.66 and the obtained t-value was 9.65 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 26 that the mean difference between tribal girls & non-tribal girls was 0.76 and the obtained t-value was 4.41 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 26 and the graphs (fig.22) reveal that tribal boys had significantly higher anxiety than non-tribal boys. Similarly, tribal girls had higher anxiety than non-tribal girls. In this parameter, lower values were the better score (tribal boys: 5.20 & non-tribal boys: 3.54; tribal girls: 4.81 & non-tribal girls: 4.05). The mean values of the two boys groups and two girls groups on anxiety have been also graphically represented in figure-22.

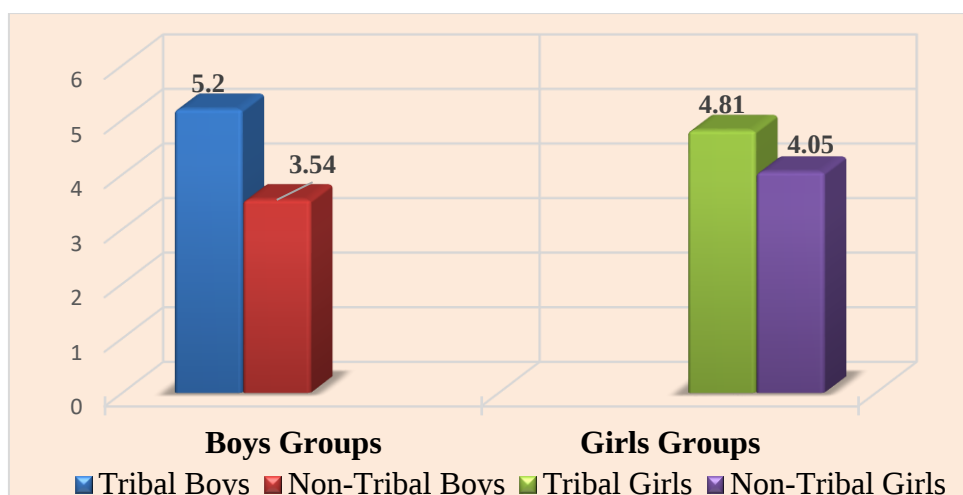


Figure 22: Bar diagram showing the mean value of anxiety of two boys groups and two girls groups.

4.5.2 (iv) Frustration

Descriptive statistics on frustration has been presented in table-23. The mean and SD (Mean $\pm$ SD) values of frustration for the tribal boys group were 3.18 ± 1.94 and that of the non-tribal boys group was 2.14 ± 1.83 . Tribal girls group and non-tribal girls group were 3.19 ± 1.81 and 2.60 ± 1.96 respectively.

Since the mean values of frustration between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 27: Mean difference and t-values of frustration of two boys groups and two girls groups.

Frustration (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	3.18	± 1.94	1.04	7.75*
	Non-Tribal Boys	2.14	± 1.83		
	Tribal Girls	3.19	± 1.81	0.59	4.40*
	Non-Tribal Girls	2.60	± 1.96		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 27 that the mean difference between tribal boys & non-tribal boys was 1.04 and the obtained t-value was 7.75 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 27 that the mean difference between tribal girls & non-tribal girls was 0.59 and the obtained t-value was 4.40 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 27 and the graphs (fig.23) reveal that tribal boys had significantly more frustration than non-tribal boys. Similarly, tribal girls had more frustration than non-tribal girls. In this parameter, lower values were the better score (tribal boys: 3.18 & non-tribal boys: 2.14; tribal girls: 3.19 & non-tribal girls: 2.60). The mean values of the two boys groups and two girls groups on frustration have been also graphically represented in figure-23.

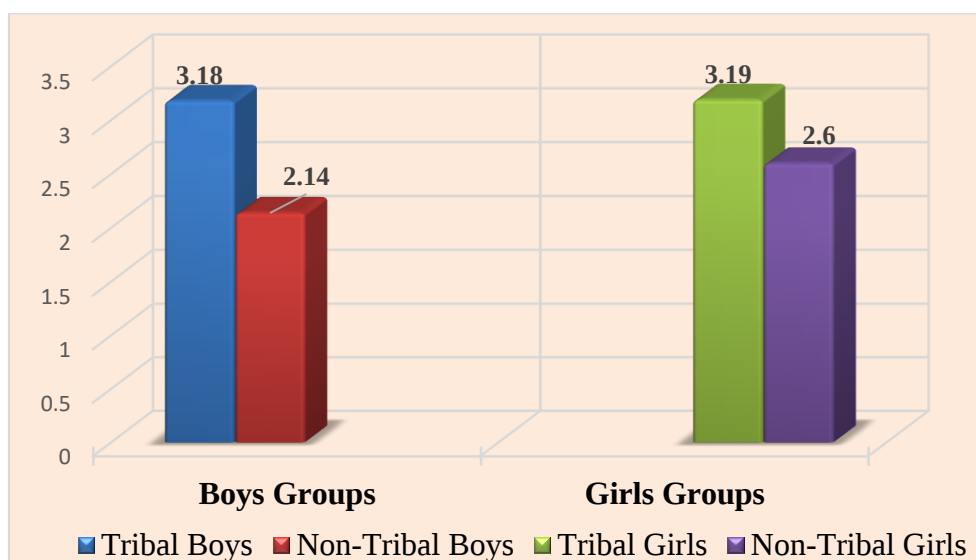


Figure 23: Bar diagram showing the mean value of frustration of two boys groups and two girls groups

4.5.2 (v) Overall Stress

Descriptive statistics on overall stress has been presented in table-23 (page no.-86). The mean and SD (Mean $\pm$ SD) value of stress of the subject of the tribal boys group was 16.49 ± 5.25 and that of the non-tribal boys' group was 12.42 ± 4.76 . Tribal girls group & non-tribal girls group were 15.72 ± 5.43 and 13.37 ± 5.37 respectively.

Since the mean values of overall stress between two boys groups and two girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 28: Mean difference and t-values of overall stress of two boys groups and two girls groups

Overall Stress (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	16.49	± 5.25	4.07	11.40*
	Non-Tribal Boys	12.42	± 4.76		
	Tribal Girls	15.72	± 5.43	2.35	6.15*
	Non-Tribal Girls	13.37	± 5.37		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no.28 that the mean difference of overall stress between tribal boys & non-tribal boys was 4.07 and the obtained t-value was 11.40 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was much lower than the obtained value.

It also appears from table no.28 that the mean difference between tribal girls & non-tribal girls was 2.35 and the obtained t-value was 6.15 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from the table no. 28 and the graphs (fig.24) reveal that tribal boys and tribal girls had a significantly higher level of overall stress than non-tribal boys and non-tribal girls respectively. In this parameter, lower values were the better score (tribal boys: 16.49 & non-tribal boys: 12.42; tribal girls: 15.72 & non-tribal girls: 13.37). The mean values of the two boys groups and two girls groups on overall stress have been also graphically represented in figure-24.

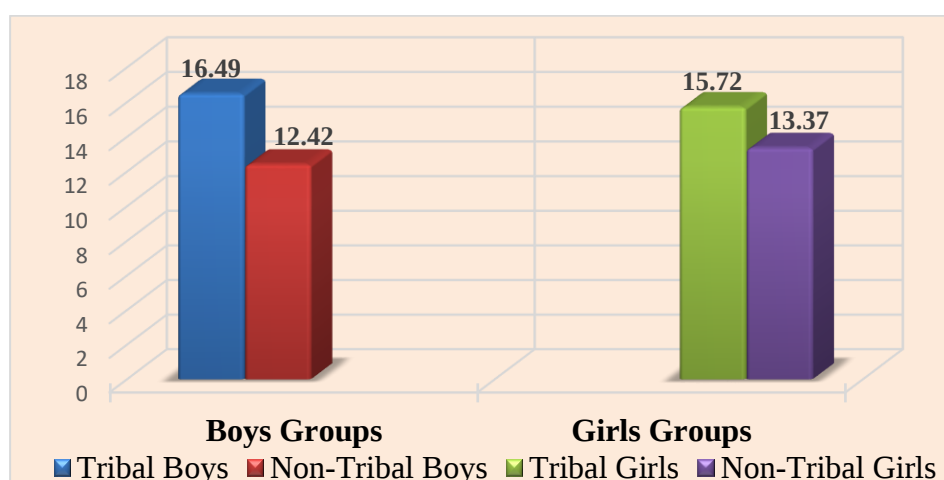


Figure 24: Bar diagram showing mean value of overall stress of two boys groups and two girls groups.

Discussion on Stress:

The result of the present study indicates that the significant difference between two boys groups and two girls groups on the dimension of pressure, physical stress, anxiety, frustration, and overall stress has existed. Both the tribal boys & tribal girls faced a high level of stress-related problems than the non-tribal boys & non-tribal girls respectively. Both the non-tribal boys & non-tribal girls showed better on the dimension of pressure, physical stress, anxiety, frustration, and overall stress as compared to their counterparts. It also clear that the level of stress of the tribal students (both boys and girls) was found to a moderate level of stress and non-tribal (both boys and girls) was found to a low level of stress. Singh & Dewan (2018) showed the tribal has a high level of depression and stress as compared to the non-tribal sample group. Dey, Rahman, Bairagi & Roy (2014) found that there was a significant difference between rural and urban adolescents according to stress. Bajaj & Kaur, (2020) also found a significant difference exists between mean scores of the variable of the stress of urban and rural school-going children.

From the above discussion, the tribal both boys & girls are facing more stress-related problems than the non-tribal (both boys and girls). This may be due to uncertain career-related problems (Akhtar, 2012). This may also be attributed to variations in cultural values and norms. Both groups have a different cultural ethos which makes them distinct from each other. Non-tribal students are showing better adjustments in social, home, and health dimensions. There are many factors influences students' stress such parenting style, parents' education background, the environment of the students which can give impact in students life (Akhtar, 2012). As a matter of fact, non-tribal students are showing a low level of stress than tribal students. Therefore, the findings of the present study relating to stress are quite usual, and present findings are in consonance with the other researchers, stated above.

4.5.3 Adjustment (score)

Mean and standard deviation (Mean $\pm$ SD) as descriptive statistics of different dimensions of emotional adjustment, social adjustment, educational adjustment, and overall adjustment of two boys groups and two girls groups have been presented in Table-29.

Table 29: Mean and SD of different dimension of adjustment of two boys group and two girls groups.

Variables Groups →		Boys Groups		Girls Groups	
		Tribal (Mean ± SD)	Non-Tribal (Mean ± SD)	Tribal (Mean ± SD)	Non-Tribal (Mean ± SD)
Adjustment (score)	Emotional Adjustment	14.90 ± 5.13	12.17 ± 5.74	14.32 ± 5.15	10.03 ± 5.48
	Social Adjustment	16.28 ± 4.42	14.20 ± 4.85	16.64 ± 4.20	14.06 ± 4.51
	Educational Adjustment	16.10 ± 4.28	13.57 ± 5.31	16.08 ± 3.88	12.65 ± 4.81
	Overall Adjustment	47.28 ± 9.58	39.94 ± 13.07	47.04 ± 8.11	36.74 ± 11.67

The adjustment inventory comprised of emotional adjustment, social adjustment, educational adjustment, and overall adjustment have been presented on the dimension wise.

4.5.3 (i) Emotional Adjustment

Descriptive statistics on emotional adjustment has been presented in table-29. The mean and SD (Mean ± SD) values of emotional adjustment for the tribal boys group were 14.90 ± 5.13 and that of the non-tribal boys group was 12.17 ± 5.74. Tribal girls group and non-tribal girls group were 14.32 ± 5.15 and 10.03 ± 5.48 respectively.

Since the mean values of emotional adjustment between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 30: Mean difference and t-values of emotional adjustment of two boys groups and two girls groups

Emotional Adjustment (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	14.90	± 5.13	2.73	7.09*
	Non-Tribal Boys	12.17	± 5.74		
	Tribal Girls	14.32	± 5.15	4.29	11.39*
	Non-Tribal Girls	10.03	± 5.48		

**Significant at 0.05 level (table value 1.96, df-798)*

It appears from table no. 30 that the mean difference between tribal boys & non-tribal boys was 2.73 and the obtained t-value was 7.09 which was statistically

significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 30 that the mean difference between tribal girls & non-tribal girls was 4.29 and the obtained t-value was 11.39 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was much lower than the obtained value.

The results as it appears from table no. 30 and the graphs (fig.25) reveal that non-tribal boys had a significantly better score in emotional adjustment than tribal boys. Similarly, non-tribal girls had higher emotional adjustment than tribal girls. In this parameter, lower values were the better score (tribal boys: 14.90 & non-tribal boys: 12.17; tribal girls: 14.32 & non-tribal girls: 10.03). The mean values of the two boys groups and two girls groups on emotional adjustment have been also graphically represented in figure-25.

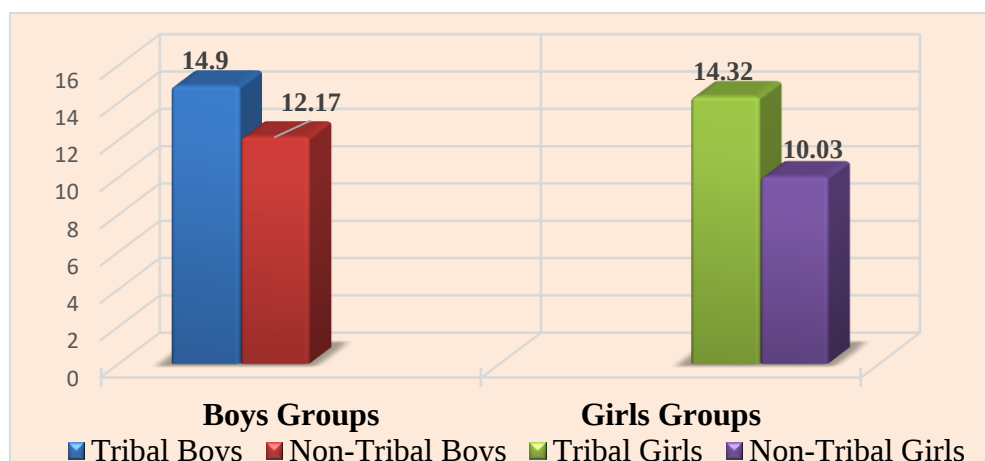


Figure 25: Bar diagram showing mean value of emotional adjustment of two boys groups and two girls groups.

4.5.3 (ii) Social Adjustment

Descriptive statistics on social adjustment has been presented in table-29. The mean and SD (Mean $\pm$ SD) values of social adjustment for the tribal boys group were 16.28 ± 4.42 and that of the non-tribal boys group was 14.20 ± 4.85 . Tribal girls group and non-tribal girls group were 16.64 ± 4.20 and 14.06 ± 4.51 respectively.

Since the mean values of social adjustment between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 31: Mean difference and t-values of social adjustment of two boys groups and two girls groups.

Social Adjustment (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	16.28	± 4.42	2.08	6.35*
	Non-Tribal Boys	14.20	± 4.85		
	Tribal Girls	16.64	± 4.20	2.58	8.35*
	Non-Tribal Girls	14.06	± 4.51		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 31 that the mean difference between tribal boys & non-tribal boys was 2.08 and the obtained t-value was 6.35 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 31 that the mean difference between tribal girls & non-tribal girls was 2.58 and the obtained t-value was 8.35 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

The results as it appears from table no. 31 and the graphs (fig.26) reveal that non-tribal boys and non-tribal girls were significantly better in social adjustment than tribal boys and tribal girls respectively. In this parameter, lower values were the better score (tribal boys: 16.28 & non-tribal boys: 14.20; tribal girls: 16.64 & non-tribal girls: 14.06). The mean values of the two boys groups and two girls groups on social adjustment have been also graphically represented in figure-26.

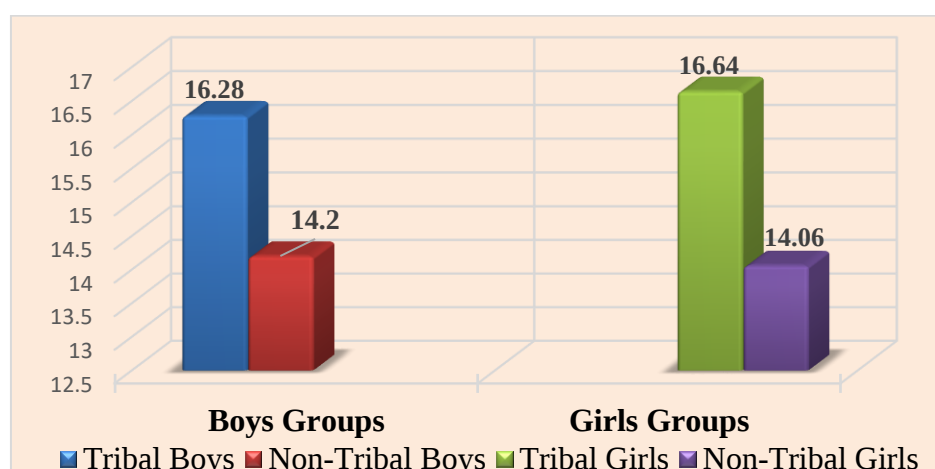


Figure 26: Bar diagram showing mean value of social adjustment of two boys groups and two girls groups.

4.5.3 (iii) Educational Adjustment

Descriptive statistics on educational adjustment has been presented in table-29. The mean and SD values of educational adjustment for the tribal boys group was 16.10 ± 4.28 and that of the non-tribal boys group was 13.57 ± 5.31 . Tribal girls group and non-tribal girls group were 16.08 ± 3.88 and 12.65 ± 4.81 respectively.

Since the mean values of educational adjustment between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 32: Mean difference and t-values of educational adjustment of two boys groups and two girls groups.

Educational Adjustment (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	16.10	± 4.28	2.53	7.39*
	Non-Tribal Boys	13.57	± 5.31		
	Tribal Girls	16.08	± 3.88	3.43	11.06*
	Non-Tribal Girls	12.65	± 4.81		

***Significant at 0.05level (table value 1.96, df-798)**

It appears from table no. 32 that the mean difference between tribal boys & non-tribal boys was 2.53 and the obtained t-value was 7.39 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no. 32 that the mean difference between tribal girls & non-tribal girls was 3.43 and the obtained t-value was 11.06 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was much lower than the obtained value.

The results as it appears from table no.32 and the graphs (fig.27) reveal that non-tribal boys and non-tribal girls had significantly better educational adjustment than tribal boys and tribal girls respectively. In this parameter, lower values were better than the score (tribal boys: 16.10 & non-tribal boys: 13.57; tribal girls: 16.08 & non-tribal girls: 12.65). The mean values of the two boys groups and two girls groups on educational adjustment have been also graphically represented in figure-27.

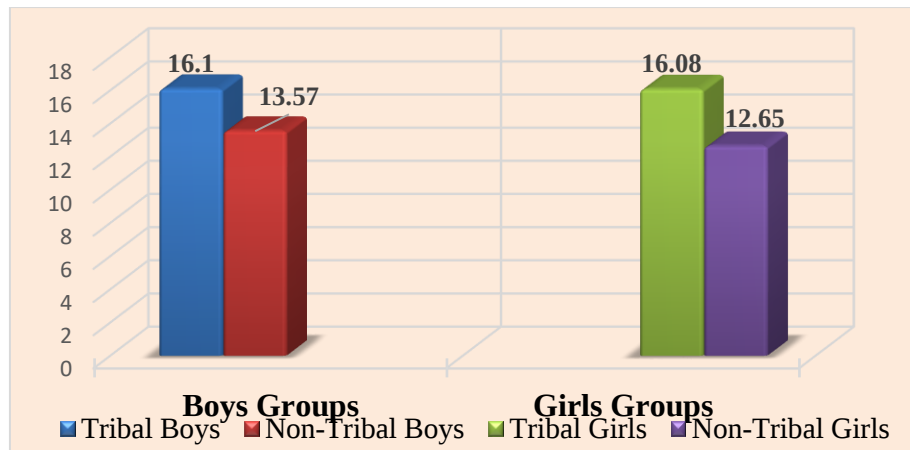


Figure 27: Bar diagram showing mean value of educational adjustment of two boys groups and two girls groups.

4.5.3. (iv) Overall Adjustment

Descriptive statistics on overall adjustment has been presented in table-29. The mean and SD (Mean $\pm$ SD) value of the overall adjustment of the subject of the tribal boys group was 47.28 ± 9.58 and that of non-tribal boys group was 39.94 ± 13.07 . Tribal girls group and non-tribal girls group were 47.04 ± 8.11 and 36.74 ± 11.67 respectively.

Since the mean values of overall adjustment between tribal and non-tribal boys groups and girls groups respectively were not equal, it was necessary to conduct a t-test to find the significant difference if any between the means.

Table 33: Mean difference and t-values of overall adjustment of two Boys groups and two Girls groups

Overall Adjustment (score)	Groups	Mean	SD	Mean Difference	t- value
	Tribal Boys	47.28	± 9.58	7.34	8.91*
	Non-Tribal Boys	39.94	± 13.07		
	Tribal Girls	47.04	± 8.11	10.30	14.49*
	Non-Tribal Girls	36.74	± 11.67		

***Significant at 0.05 level (table value 1.96, df-798)**

It appears from table no. 33 that the mean difference of overall adjustment between tribal boys & non-tribal boys was 7.34 and the obtained t-value was 8.91 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was lower than the obtained value.

It also appears from table no.33 that the mean difference between tribal girls & non-tribal girls was 10.30 and the obtained t-value was 14.49 which was statistically significant. The difference was significant at 0.05 level since the table value 1.96 for the df 798 which was much lower than the obtained value.

The results as it appears from table no. 33 and the graphs (fig.28) reveal that non-tribal boys had significantly higher adjustment ability than tribal boys. Similarly, non-tribal girls had higher adjustment ability than tribal girls. In this parameter lower value was the better score (tribal boys: 47.28 & non-tribal boys: 39.94; tribal girls: 47.04 & non-tribal girls: 36.74). The mean values of the two boys groups and two girls groups on overall adjustment have been also graphically represented in figure-28.

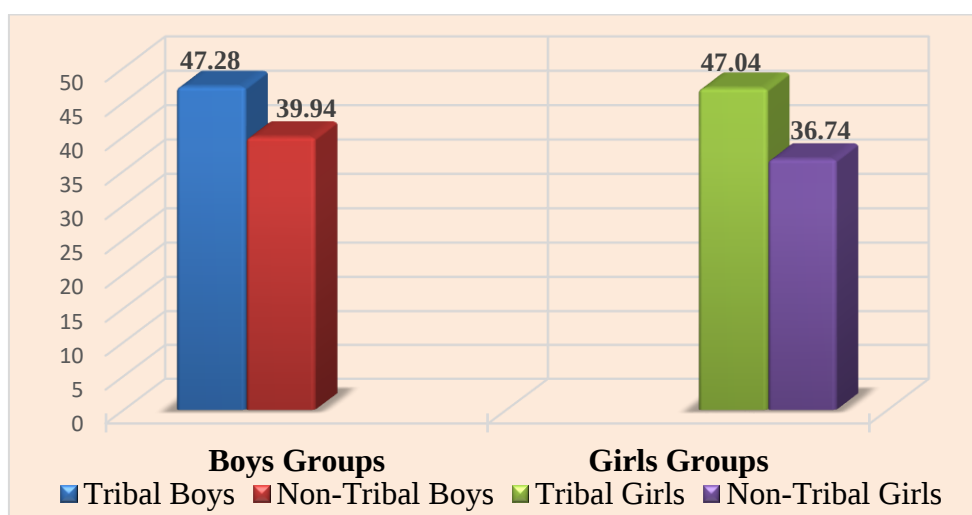


Figure 28: Bar Diagram showing Mean value of overall adjustment of two boys groups and two girls groups

Discussion on Overall Adjustment:

The result of the present study indicates that the significant difference between two boys groups and two girls groups on the dimension of emotional adjustment, social adjustment, educational adjustment, and overall adjustment has existed. Both the tribal (boys & girls) possessed more adjustment related problems than the non-tribal boys & non-tribal girls respectively. Non-tribal showed better on the dimension of emotional adjustment, social adjustment, educational adjustment, and overall adjustment as compared to their counterparts. It also clear that the level of adjustment of the tribal students (both boys and girls) was found to average adjustment and a non-tribal student (both boys and girls) was found above-average adjustment. Das &

Deb (2013) found that there was a significant difference between social adjustment patterns among tribal and non-tribal students. Akhtar (2012) also found that significant differences between tribal and non-tribal on the dimension of the home, health, social and emotional adjustment. Tribal students are showing mal-adjustment in home, health, and social dimension as compared to their counterparts. Lata (2015) concluded that the students of rural background studying in the school of urban areas were not well adjusted and had to face many related problems in the areas viz. social, emotional, and academic. Alam (2018) observed that urban senior secondary school students are better adjusted than their rural counterparts. The reason for their better adjustment might be due to relatively more facilities available to test their intellect in academic and non-academic activities leading to satisfaction and mental peace in comparison to their rural fellowmen.

From the above discussion, the tribal boys and tribal girls are faced more adjustment related problems on the dimension of emotional adjustment, social adjustment, educational adjustment, and overall adjustment. This may be due to uncertain career-related problems (Akhtar, 2012). This may also be attributed to variations in cultural values and norms. Both groups have a different cultural ethos which makes them distinct from each other. As a matter of fact, non-tribal students are showing better adjustments in emotional, social, and educational dimensions, contrary to its tribal students (both boys and girls). Therefore, the performance of adjustment ability among the subjects of the present study are quite usual, and present findings are in consonance with the other researchers, stated above.

4.6 Concluding Remarks on Findings:

All relevant data and discussion on the basis of findings have been made in this chapter.

The results and findings have put forward two contradictory aspects. Motor fitness was one of the most important criteria in this study and both tribal boys and tribal girls proved to be better in all the motor fitness test in comparison to their non-tribal counterparts. Whereas in other criteria for example health status and psychosocial aspects non-tribal secured better scores. Health status, in this study is measured by Optimum Health Scale (OHS) and in composite score non-tribals were better than the tribals. In a number of research works it have been shown that health status not necessarily always related to motor fitness status. Where as in a very lower

level both may be related, for example when a person is sick/ill his or her fitness status may also be low but at higher level they may not be essentially related, for example Magic Johnson internationally famous basketball players was suffering from aids when he was top performers such example are not scanty.

The health status was measured by Optimum Health Scale (OHS) in this study, which was comprised of 45 different types of questions where subjects are to put his or her agreements or disagreements in respects of some statements. It may so happen that these statements are not related to motor fitness capacity. Therefore, the findings of motor fitness and health status are to a large extent independent.

The sociocultural environment in which the tribal boys and tribal girls do belong are different from non-tribals in many respects. Tribals are still traditional, where modern concept and outlooks are limited. This may have some influence on their health status (OHS). It may not be out of place to mention that as per norms for interpretation of the level of Optimum Health (manual for OHS) both the tribal and non-tribal subjects (boys & girls) have been graded “d”, means “average health”. The fitness status of tribals are generally expected to be better than non-tribals and this is due to innate neuromotor capacity, which has a genetic bias and lifestyle specific.

Regarding fat mass, body fat% and lean body mass, statistical analyses shown significant differences between the groups but the actual value of both the groups are rather slightly below the average level. Therefore, the variation in these parameters are quite normal particularly in respect of health and motor fitness.

In psychosocial parameters for example academic anxiety, stress and adjustment, the non-tribals have secured better score than the tribals. Again, the previous analysis also holds good here. That is the sociocultural environment of both tribal and non-tribal are different. The higher score among the non-tribals are not unexpected since generally non-tribals are more enlightened than the tribals. Tribals are not accustomed with the various social norms by which assessment in this study have been made. Therefore, in overall conclusion it may be stated that motor fitness is an independent factor not necessarily influenced by sociocultural aspects. Whereas health status and psychosocial aspects as measured in this study are very much related to social and cultural environment, where two classes of subjects of the study are habitant. Therefore, findings of this study are justified. However specific conclusion are made in chapter-v.

CHAPTER-V

SUMMARY, CONCLUSION & RECOMMENDATION

5.1 Summary

5.2 Conclusion

5.3 Recommendation

CHAPTER -V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

In this chapter the summary of the previous chapters of this report has been presented. The conclusions on the basis of the results obtained and the recommendations for future study have also been included in this chapter.

5.1 Summary:

Indian society is a traditional one which is highly stratified and suffers from wide socio- economic disparities and cultural diversities. According to the report of the Education Commission (1964-1966) “The Indian society is hierarchical, stratified and deficient in vertical mobility.” This society of ours has many social divisions, which have been persisting through the centuries. These divisions consist of poor and rich people on the one hand, touchable and non-touchable on the other. Nevertheless, our society is also divided into tribals and non-tribals. The tribals in India have suffered from environmental deficiencies for ages. They have confined themselves to their own bounds, cutting themselves off from civilized societies. The tribal population in India numerically constitutes a small segment of the total population of the country but is a significant part of the population. Most of the Scheduled tribe people lives in rural areas and their population comprise 10.4 % of the total rural population of the country (Census of India, 2001). They usually staying in rural areas, in a small locality, absolutely illiterate poor, hardly clad in clothes, usually dark and frail, fully living within their own community.

It is a matter of common knowledge that tribal lands are brought up in the lap of open natural space and outdoor setting of vigorous life. Most of the tribals people are laborious. The main occupations of tribals are handicraft, wood work and selling fruits which are found in forest. Some of them are farmers also (Majumdar, 1961). Because of this conducive environment, their physical capabilities in running, jumping, throwing and such other natural activities are tremendously developed.

It is believed that the growth and development are influenced by a number of factors. Broadly these can be classified under two heads - hereditary and environmental. These factors are independent as well as inter-dependent. The general belief regarding their role on individual's growth and development is that the heredity provides

potentialities and environment actualizes these potentialities. Heredity limits boundaries and environment directs the achievement within the boundaries.

In physical education and sports the study of the status of physical growth and motor fitness, health status and psychosocial parameters indicates an important area. This is because the basic philosophy of today's child centric education dictates that the curriculum content, methodology, evaluation procedure and even the aim and objectives of school education should be planned and formulated considering the need and capabilities, interests and aptitudes of the children. This is specifically important for physical education because it deals with the practical situations of motor learning in addition to teaching learning situations in classroom set up.

During adolescent stage is vital for all community students (Tribal & Non-Tribal) because, adolescence is the developmental period of transitional stage of physical and mental development that occurs between childhoods to adulthood (age of majority). This transition involves biological, social and psychological changes. The World Health Organization identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. The process of adolescence is a period of preparation for adulthood during which time several key developmental experiences occur. Besides physical and sexual maturation, these experiences include movement toward social and economic independence, and development of identity, the acquisition of skills needed to carry out adult relationships and roles, and the capacity for abstract reasoning. In this regard human life is considered to be the path of journey that starts with pre-natal stage and thereafter follows intermediate stages of early childhood, late childhood, pre-adolescence, adolescence, adulthood and finally ends with death. Each and every stage of growth and development has its unique characteristics. A detailed study of these characteristics has been the essential features for medical practitioners, psychologists, anthropologists and educators.

A number of studies have been conducted in the area of physical growth and development of children but specially the information regarding motor fitness, health status and psychosocial parameters of tribal and non-tribal adolescents (both boys and girls) has been attempted to a lesser degree. To compare the individuals with one another, to evaluate the performance of individuals and to understand the overall status in general is essential to study and analyze these parameters. These documents are not

available for the adolescents of West Bengal in general. This need motivated the present researcher to take up this project entitled " A Comparative Study Between Tribal and Non-Tribal Adolescents in Respect to Motor Fitness Health Status Anthropometric and Psychosocial Parameters".

A total number of 1600 school students of West Bengal were the subjects of the present study. In West Bengal, 23 districts are divided under five administrative divisions, namely Jalpaiguri division, Malda division, Burdwan division, Presidency division and Medinipur division. The researcher has selected two districts in every division. The total number of 10 (ten) district was selected from five administrative divisions. Jalpaiguri division, Alipurduar & Jalpaiguri districts was selected for the present study. In the Malda division, Dakshin Dinajpur & Murshidabad districts was selected for the study. In the Burdwan division, Birbhum & Hoogly districts was selected for the study. In the Presidency division, Nadia & North 24 Parganas districts were selected for the study. In the Medinipur division, Purulia and Purba-Mednipur districts were selected for the study.

The study was conducted one thousand six hundred individuals ($n = 1600$) out of which eight hundred ($n=800$) were tribal students and they sub-divided into four hundred tribal boys ($n = 400$) and four hundred tribal girls ($n= 400$), selected from the school of different districts of West Bengal. Another eight hundred ($n=800$) were non-tribal students. They were also divided into four hundred non-tribal boys ($n = 400$) and four hundred non-tribal girls ($n= 400$) and they were selected from the school of different districts of West Bengal. Their age ranged from 13 to 15 years.

The selected motor fitness components were speed, agility, explosive strength, balance, co-ordination, reaction time and overall motor fitness. For measuring health status, Optimum Health Scale (OHS) was selected for the present study. The selected anthropometric measurements, likes triceps skinfold, suprailiac skinfold, abdominal skinfold, thigh skinfold, and body composition (body fat %, fat mass & lean body mass) were selected for the present study. On the other hand, psychosocial parameters were included academic anxiety, stress (pressure, physical stress, anxiety, frustration and overall stress), and adjustment (emotional adjustment, social adjustment, educational adjustment and overall adjustment) were conducted for all the subjects of the present study.

The different parameters were tested using standard procedure.

The data were analyzed statistically. The descriptive statistics was measured by mean and standard deviation. Difference between two means were tested by 't' test.

5.2 Conclusions

On the basis of analysis of data and interpretation of results the following conclusions were drawn.

A. Motor Fitness

1. Tribal boys and tribal girls were found significantly better in speed and agility performance than non-tribal boys and non-tribal girls respectively.
2. Tribal boys and tribal girls had significantly better in explosive strength and balance than non-tribal boys and non-tribal girls respectively.
3. Tribal girls had significantly better in co-ordination than non-tribal girls. However, difference between two boys groups was not significant.
4. Tribal boys had significantly better in reaction-time than non-tribal boys. However, difference between two girls groups was not significant.
5. Tribal boys and tribal girls had significantly better in overall motor fitness than non-tribal boys and non-tribal girls respectively.

B. Health Status

1. Non-tribal boys and non-tribal girls had significantly better in health status (OHS) than tribal boys and tribal girls respectively.

C. Anthropometric

1. Non-tribal boys and non-tribal girls had significantly higher in triceps skinfold, suprailiac skinfold, abdominal skinfold, and thigh skinfold measurements than tribal boys and tribal girls respectively.
2. Non-tribal boys and non-tribal girls had higher body fat% and fat mass than tribal boys and tribal girls respectively.
3. Lean body mass was not significantly difference between two boys groups and two girls groups.

D. Psychosocial Parameters

I. Academic Anxiety

1. Tribal boys and tribal girls had significantly higher in academic anxiety than non-tribal boys and non-tribal girls respectively.

II. Stress

1. Tribal boys and tribal girls had significantly higher score in pressure than non-tribal boys and non-tribal girls respectively.
2. Tribal boys had higher score in physical stress than non-tribal boys. However, difference between two girls' groups was not significant.
3. Tribal boys and tribal girls were significantly higher in anxiety score than non-tribal boys and non-tribal girls respectively.
4. Tribal boys and tribal girls had significantly more frustration than non-tribal boys and non-tribal girls respectively.
5. Tribal boys and tribal girls had faced more overall stress related problems than non-tribal boys and non-tribal girls respectively.

III. Adjustment

1. Non-tribal boys and non-tribal girls had significantly better in emotional adjustment than tribal boys and tribal girls respectively.
2. Non-tribal boys and non-tribal girls had significantly better in social adjustment than tribal boys and tribal girls respectively.
3. Non-tribal boys and non-tribal girls had significantly better in educational adjustment than tribal boys and tribal girls respectively.
4. Tribal boys and tribal girls had possessed more adjustment related problems than non-tribal boys and non-tribal girls respectively.

5.3 Recommendations

On the basis of results obtained and conclusions drawn the following recommendations were made:

1. Similar study may also be conducted for other anthropometric and motor fitness parameters for school going children.
2. In the present study only, a few psychosocial parameters were considered. A lot of more variables on psychosocial parameters with sociological perspective may throw new light.
3. Due to various reasons the present study was restricted to 13 to 15 years age group of boys' and girls' subjects. It would be worthwhile to conduct similar study on other age group also.
4. Similar study may be conducted on height-weight matched population.

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APPENDICES

APPENDIX -A

Questionnaire Conversion Certificates

To whom it may concern

This is certified that the overall meaning of the following questionnaires after their conversion from English to Bengali has remained the same. I hold this opinion that the Bengali version of the said questionnaires, if used for research work, will serve the same purpose as they do when the English version is used.

Name of the Questionnaires:

No.	Parameters	Questionnaires Name	Author
13.	Health Status	: Optimum Health Scale (OHS)	: (Kumar & Bala, 2016)
14.	Academic Anxiety	: Academic Anxiety Scale	: (Singh & Gupta, 2013)
15.	Stress	: Stress Scale	: (Lakshmi & Narin, 2014)
16.	Adjustment	: Adjustment Scale	: (Sinha & Singh, 2013)

Signature:

[Signature]
25.9.2021
Dr. Ashok Kr. Biswas
Professor,
Department of Physical Education
Jadavpur University



To whom it may concern

This is certified that the overall meaning of the following questionnaires after their conversion from English to Bengali has remained the same. I hold this opinion that the Bengali version of the said questionnaires, if used for research work, will serve the same purpose as they do when the English version is used.

Name of the Questionnaires:

No.	Parameters	Questionnaires Name	Author
5.	Health Status	: Optimum Health Scale (OHS)	: (Kumar & Bala, 2016)
6.	Academic Anxiety	: Academic Anxiety Scale	: (Singh & Gupta, 2013)
7.	Stress	: Stress Scale	: (Lakshmi & Narin, 2014)
8.	Adjustment	: Adjustment Scale	: (Sinha & Singh, 2013)

Signature:

[Signature]
Dr. Parimal Debnath
Former Professor,
Department of Physical Education
Jadavpur University.

DR. PARIMAL DEBNATH
FORMER PROFESSOR
DEPT. OF PHYSICAL EDUCATION
JADAVPUR UNIVERSITY

To whom it may concern

This is certified that the overall meaning of the following questionnaires after their conversion from English to Bengali has remained the same. I hold this opinion that if the Bengali version of the said questionnaires, if used for research work, will serve the same purpose as they do when the English version is used.

Name of the Questionnaires:

Questionnaires			
No.	Parameters	Questionnaires Name	Author
1.	Health Status	: Optimum Health Scale (OHS)	: (Kumar & Bala, 2016)
2.	Academic Anxiety	: Academic Anxiety Scale	: (Singh & Gupta, 2013)
3.	Stress	: Stress Scale	: (Lakshmi & Narin, 2014)
4.	Adjustment	: Adjustment Scale	: (Sinha & Singh, 2013)

[Signature]
Dr. A.K. Banerjee
Former Professor,
Dept. of Physical Education
University of Kalyani.

To whom it may concern

This is certified that the overall meaning of the following questionnaires after their conversion from English to Bengali has remained the same. I hold this opinion that if the Bengali version of the said questionnaires, if used for research work, will serve the same purpose as they do when the English version is used.

Name of the Questionnaires:

Questionnaires			
No.	Parameters	Questionnaires Name	Author
5.	Health Status	: Optimum Health Scale (OHS)	: (Kumar & Bala, 2016)
6.	Academic Anxiety	: Academic Anxiety Scale	: (Singh & Gupta, 2013)
7.	Stress	: Stress Scale	: (Lakshmi & Narin, 2014)
8.	Adjustment	: Adjustment Scale	: (Sinha & Singh, 2013)

[Signature]
Dr. Sudarshan Bhowmick
Former Professor,
Dept. of Physical Education
University of Kalyani.

APPENDIX -B

Data Collection Certificates in Jalpaiguri Division

Phone: (03663) 233229
No.
Form: Secretary / Headmaster
Vocational Code No- 8800, NCC Troop No- 439, IED Resource Centre
GAIRKATA HIGH SCHOOL (XII)
H.S. Recog. Memo No. 631/OSD/SD/87
P.O.: GAIRKATA, DIST.: JALPAIGURI, PIN No.: 735212

Date:
INDEX No. NI-036
H.S. Code No. 08019

To:

Ref:
Sub: Certificate

This is to certify that Sr. Research Scholar, Mr. Mritunjay Biswas, Deptt. of Physical Education, Jadavpur University has done research information and data collection from the students in this institution.

Tejpr
Headmaster
Gaikata High School (XII)
P.O. Gaikata, Dist. Jalpaiguri

Memo No:
From: President / Secretary / Headmistress
Date:
Index No. JH-188
H.S. Code No. 108260

GAIRKATA GIRLS' HIGH SCHOOL (H.S.)
H.S. Recognition No. DS (ACA) SD / 0282 / RECOG / 2015
P.O. - Gaikata, Dist. Jalpaiguri, PIN- 735212 (W.B.)
Ph.No.-96478 10816 E-mail-gaikatagirls.jal@gmail.com

To:

Ref:
Sub: **To Whom It May Concern**

This is certified that Mr. Mritunjay Biswas, son of Dwijen Biswas, Sr. Research scholar from Jadavpur University, has successfully completed his ability and research survey on "comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial parameters". He examined Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.

22-08-19
Headmistress
Gaikata Girls' High School (H.S.)
P.O. Gaikata, Dist. Jalpaiguri

From: Headmaster
Secretary
Index No.: 23-051 (S.E.)
Code No.: 208039 (S.S.)

Rangalibazna Mohan Singh High School (H.S.)
P.O. Rangalibazna, Dist. Alipurduar-735213
E-mail-rangalibazna@rediffmail.com, Mobile: 7407538666

Ref. No.
Date: 22.08.2019

To Whom it may concern.

This is to certify that Sri Mritunjay Biswas, Senior Research scholar, Dept. of Physical Education, Jadavpur University. He has shown his ability and expertise with about sixty Tribal students of this Institution, through gathering some information. In this regard he collected some necessary data. He engaged in our school on 22.08.2019 for above mentioned practical work.

I wish him all success in future endeavors.

22-08-2019
Head Master
Rangalibazna M.S. High School (H.S.)
P.O. Rangalibazna, Dist. Alipurduar

MOBILE: 9832302015
Index No: 19-003 6 Institute Code (H.S.) 10205

VIDYASHRAM DIVYAJYOTI VIDYANIKETAN HIGH SCHOOL (XII)
Co-Educational (Govt. Sponsored)
P.O. Rangalibazna, Dist. Alipurduar-735213
Estd.- 1970

From: H.M./Secretary/President
Ref. No.
Date: 23.08.2019

TO WHOM IT MAY CONCERN

This is to certify that Sr. Research Scholar Mr. Mritunjay Biswas, Dept. of Physical Education, Jadavpur University has shared his ability and expertise with the students in this institution through various experiments on 21.08.2019.

I wish him the very best in all his future endeavours.

23-08-2019
Vidyashram Divyajyoti Vidyaniketan High School (XII)
P.O. Rangalibazna, Dist. Alipurduar

APPENDIX -B

Data Collection Certificates in Malda Division



SCHOOL ID - Q1-065 ESTD : 1950 MCB : 9494513859
BENGALI (ANGLO) H.S. Code No- 28038
A NON PROFITABLE INSTITUTION

RAJIBPUR ST. JOSEPH HIGH SCHOOL

(A Christian Minority Institution, under Article 30, Control & Governed by : Catholic Diocese of Raigarh, Uttar Dinajpur, W.B.)
P.O - RAJIBPUR, P.S - GANGARAMPUR, DIST - DAISHIN DINAJ PUR, PIN - 733124, WEST BENGAL

Certificate

This is to certify that Sr. Research Scholar Mr. Mrityunjay Biswas, Dept. of Physical Education, Jadavpur University has done research information and data collection from the students in this Institution.


14/08/2019
Teacher in Charge
Rajibpur St. Joseph High School
P.O. Rajibpur, Dist-D/Dinajpur

From : Headmaster, Ph : 7584514047


Sukdevpur S.C. High School (H.S)
Govt. Sponsored & Co-Educational

H.S. Code : 118044 P.O. : Sukdevpur
Index No.: Q1-076 Dist : D/Dinajpur
Memo No. : Date : 14/08/2019

To whom it may concern

This is certified that Sri Mrityun Joy Biswas SR, Research scholar, Jadavpur University has collected his Research Data on 13.08.2019 of my school.

I wish he will succeed his every step.


Signature of the Headmaster
Sukdevpur S.C. High School (H.S)
P.O. Sukdevpur, Dist-D/Dinajpur


Pranabananda Tribal Residential Girls' School
ESTD : 2000
Organised By : Bharat Sevashram Sangha
Recognised By : Government of India
Under the Aegis of Ministry of Tribal Affairs.
VIII - P.O. Chanaik * P.S. Nabagram * Dist-Murshidabad * Pin-742184
Trib. No. (School), Mob. No. (H.M.)

Ref. No. : Date :

From :-
The Headmistress

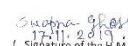
To Whom It may Concern

This is to certify that Sr. Research Scholar Mr. Mrityunjay Biswas, Department of Physical Education, Jadavpur University has done research information and data collection from the students in this institution.

During this period of research programme, our game teacher Pali Pramanik saw him very sincere, curious, analytical and hard working.

I wish him all the best in his future.

Date:- 17th November, 2019


17.11.2019
(Signature of the H.M.)
Headmistress
Pranabananda Tribal Residential Girls' School
Orgd. By Bharat Sevashram Sangha
Regd. By Government of India
Vill & P.O. Chanaik, Dist-Murshidabad

NEHRUNAGAR ADIBASI HIGH SCHOOL
Index No. - E2-087
P.O. - PALSANDA MORE DIST. - MURSHIDABAD
Email : nehrunagaradibasihighschool@gmail.com

Memo No. : Date : 16.11.19

From :
The Headmaster / Secretary / Administrator

To :


To Whom It May Concern

This is certified that Mr. Mrityunjay Biswas, Son of Dwijen Biswas, Sr. Research scholar from Jadavpur University, has successfully completed his ability and research survey on " comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial ". He examined Tribal and Non- Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.


16.11.19
Teacher in Charge
Nehrunagar Adibasi High School
P.O. Palsanda More, Murshidabad

APPENDIX -B

Data Collection Certificates in Burdwan Division

NISCHINTAPUR MADHYAMIK VIDYALAYA (High School)
(Govt. Sponsord) Index No.- 12-129
ESTD.- 2000
BLOCK.- RAMPURHAT - I : P.O.- RAMPURHAT : DIST.- BIRBHUM

Memo No. _____ Date: 21.11.2018

From: Secretary / Headmaster / President

To Whom It May Concern

This is certified that Mr. Mrityunjay Biswas, son of Dwijen Biswas, Sr. Research school from Jadavpur University, has successfully completed his ability and research survey on "comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial parameters". He examined Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.

[Signature]
15/11/2018
Headmaster / P.T. (H.S.)
P.O. Rampurhat - I Dist. Birbhum

Mobile No.- 9679212719 Index No.- 12-095
UDAYNAGAR HIGH SCHOOL (H.S.)
(Higher Secondary Co-Education)
BSTD.- 1964 ♦ ILS. Code No.- 115115 ♦ Govt. Sponsord
P.O. - HARIDASPUR ♦ DIST - BIRBHUM ♦ PIN - 731243
email - udaynagarhighschool@gmail.com

Ref. No. _____ Date: 15/11/2018

From: HEADMASTER / T.C. SECRETARY

To whom it may concern

This is to certify that Mr. Mrityunjay Biswas, senior Research Scholar, Dept. of Physical Education, Jadavpur University, has shown his ability and expertise with the students of this institution, through gathering some information. In this regard, he has collected some necessary data. He engaged in our institution on 15.11.2018 for above mentioned Practical Work.

I wish him for bright and successful academic development.

With regards
[Signature]
15/11/2018
Headmaster / T.C. Secretary
Udaynagar High School
P.O. Haridaspur, Dist. Birbhum

MOZEPUR BHARATI VIDYAMANDIR
(Govt. Sponsord) Index No.- 12-129
ESTD: 1958
BLOCK- TARAKASITWAR, P.O.-MOZEPUR, DIST.-HOOGHLY

Memo No. _____ Date: 21.11.2018

From: Secretary / Headmaster / President

To Whom It May Concern

This is certified that Mr. Mrityunjay Biswas, son of Dwijen Biswas, Sr. Research school from Jadavpur University, has successfully completed his ability and research survey on "comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial parameters". He examined Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.

[Signature]
15/11/2018
Headmaster / P.T. (H.S.)
P.O. Mozepur, Dist. Hooghly

☎ 09212 - 277703
BALIGORI ADHARMOINI DUTTA BIDYAMONDIR (H.S.)
(Govt. Sponsored High School)
Index No.- G4-004 ♦ H.S. Code-17350
P.O. - Baligori, P.S.- Tarakeswar, Sub-Division- Chandernagar, PIN-712410, Dist.- Hooghly

Ref. No. _____ Date: 15/11/2018

To Whom It May Concern

This is certified that Mr. Mrityunjay Biswas, son of Dwijen Biswas, Sr. Research scholar from Jadavpur University, has successfully completed his ability and research survey on "comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial parameters". He examined Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.

[Signature]
15.11.2018
Headmaster
Baligori Adharmoini Dutt Bidyamondir
Baligori, Hooghly

APPENDIX -B

Data Collection Certificates in Presidency Division

GURDAH RISHI AUROVINDA VIDYANIKETAN
HIGHER SECONDARY
(Govt. Sponsored)

P.O. Shyamnagar
Pin - 743127
North 24 Parganas
Phone : 99032-21802
62900-74080
Email : grevhs1984@yahoo.in

ESTD-1984

Index No. B-1074
H. S. Code 103237

Ref. No. Dated 4.10.18

From: PRESIDENT/SECRETARY
HEADMASTER

To Whom it may concern.

This is to certify that Mr. Mrityunjay Biswas, Sr. Research Scholar, Dept. of Physical Education Jadavpur University. He has shared his ability and expertise with the students of Captained institution through gathering some information. In this regard he is collect some necessary data. He engaged in our institution on 4.10.18 for above mentioned practical work.

I wish him for bright and successful academic development.

With regards
mechima
Teacher-in-Charge
Gurdah Rishi Aurovinda
Vidyaniketan (H.S.)
P.O. - Shyamnagar
North 24 Parganas

Shyamnagar Rishi Aurobindo Balika Vidyalaya
HIGHER SECONDARY
GOVT. AIDED & RECOGNISED
(ESTD. 1984)

H. S. Code No. 103241
INDEX NO. B-1-321
Gurdah, P.O. Shyamnagar
North 24 Parganas
Phone : 2589-2173
E-mail : rabv110@gmail.com

Date

Ref. No.

Headmistress/Teacher-in-charge
Secretary

To Whom It May concern

This is to certify that Mr. Mrityunjay Biswas, Son of Dwijen Biswas, Sr. Research Scholar from Jadavpur University, has successfully completed his ability and research survey on "comparative study between Tribal and Non-Tribal Adolescents and Psychosocial parameters". He examined Tribal Students for his research purpose from our school.

During this period of research programme we found him very sincere, hard working and cooperative.

BIRSIDHU KANUNAGAR HIGH SCHOOL
(SANTALI MEDIUM)
Estd. 2013
Birsidhu Kanunagar, A/5 17 No. Ward, Kalyani, Dist. Nadia.
Email Id. 19102301705.npo@gmail.com

Ref. No. Date 12.10.18

From: Secretary / President

TO WHOM IT MAY CONCERN

This is to Certify that Sr. Research Scholar Mr. Mrityunjay Biswas, Dept. of Physical Education, Jadavpur University has shared his ability and expertise with the students in this institution through various experiments on 11.10.2018.

I wish him the very best in all his future endeavours.

With regards
12-10-18
Teacher-in-Charge
Birsidhu Kanunagar High School
A-5, Birsidhu Nagar, Kalyani
Nadia, Ward No. 17

Index No. D2-045 H.S. Code - 12028 Vocational Code - 6253
RMSA Code - 19102400604 Phone : 2589-6898 / 1801

Gayeshpur Netaji Vidyamandir (H. S.)
(HIGHER SECONDARY)
GENERAL & VOCATIONAL
P.O. - GAYESHPUR, Sub-Div. - KALYANI, Dist. - NADIA, PIN 741234, W.B.

Memo No. Date 16.8.19

President
Headmaster / T.T.C. (Secretary)

To Whome it may Concern

This is to Certify that Sr. Research scholar Mr. Mrityunjay Biswas, Dept. of Physical Education, Jadavpur University has done research information and data Collection from the students in this institution.

16.8.19
Headmaster & Secretary
Gayeshpur Netaji Vidyamandir (H.S.)
P.O. - Gayeshpur, P.S. - Kalyani, Dist. - Nadia

APPENDIX -B

Data Collection Certificates in Medinipur Division

H.S. Code : 113205 Index No. : K1 - 052

CHANDITALA SIKSHA NIKETAN
(CO-EDUCATIONAL) HIGH SCHOOL (H.S.)
Vill = Patidih
P.O. :- Tentlow, P.S. :- Balarampur, Dist.- Purulia (W.B.)

Ref. No. : Date : 18.9.19

To whom it may concern.

Certified that Mr. Mrityunjay Biswas, son of Dwijen Biswas, Sr. Research scholar from Jadavpur University, has successfully completed his ability and research survey on "Comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial parameters". He examined Tribal students for his research purpose from our school.

During this period of research programme we found him sincere, curious, analytical and hard working. I wish him all success in life.

18.9.19
CHANDITALA SIKSHA NIKETAN
(CO-ED) H.S. SCHOOL,
Vill - Patidih, P.O. - Tentlow
Dist. - Purulia (W.B.)

Mobile: 9633812747

RANGADIH SHRI BHAJANASHRAM HIGH SCHOOL
With 10+2 Class Higher Secondary Course
BALARAMPUR
P.O. : Rangadih, Dist. : Purulia : 723143 (W.B.)
(Hindi & Bengali Medium Co-Educational Institution)
Index No. : KI-157, H.S. Code No. : 113045

From : Secretary / Headmaster / Administrator
Ref. No. : Date : 18.09.2019

To whom it may concern

This is to certify that Mr. Mrityunjay Biswas, Sr. Research Scholar from Jadavpur University, has successfully completed his ability and research survey on "Comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness Health Status Anthropometric and Psychosocial Parameters". He examined both Tribal and Non-Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.

Teacher-In-Charge
Rangadih S.B.H.S. School
Balarampur, Purulia

Photo : Secretary/Principal

Raghunathchak Gunadhar Vidyamandir (High School)
[Recognized & ADEB High School]
ESTD.-2001
P.O. G.P.S. - Bhupatnagar, Sub-Div.-Contal, Dist. - Purba Medinipur, Pin - 727425
Index No. : V2- 308 Mobile: 9332753066

Ref. No. : Date :

Certificate

This is to certify that sr. Research Scholar Mr. Mrityunjay Biswas, Dept. of Physical Education, Jadavpur University has done research information and data collection from the students in this institution.

18.9.19
Raghunathchak G. Vidyamandir
(High School)
Bhupatnagar, Purba Medinipur

Photo : Secretary/Principal

BARABARI SRI KRISHNA HIGH SCHOOL
Estd.- 1924
P.O. : Barabari, P.S. : Bhupatnagar, Sub Division: Contal, Dist : Purba Medinipur.

Ref. No. : Date :

To Whom It May Concern

This is certified that Mr. Mrityunjay Biswas, son of Dwijen Biswas, Sr. Research scholar from Jadavpur University, has successfully completed his ability and research survey on "comparative study between Tribal and Non-Tribal Adolescents in respect to Motor fitness, Health status, Anthropometric and psychosocial parameters". He examined Tribal students for his research purpose from our school.

During this period of research programme we found him very sincere, curious, analytical and hard working. I wish him all the best in his future.

18.9.19
Headmaster
(Sri Krishna) High School
Bhupatnagar, Purba Medinipur