CHAPTER - I

INTRODUCTION
1.1 **General Introduction**

The menarche is a natural phenomenon and the most easily ascertained beginning of puberty in girl's life. Generally girls just after crossing their childhood reach their puberty and menarche begins. The onset of menstruation or the menarche is one of the most dramatic events in the life of a woman.

Menarche, which refers to the first menstrual period, had been reported to be delay in some young athletes involved in certain sports and activity. Malina (1983) postulated that late matures such as those with later menarche, are more likely to be successfully in a sports such as gymnastics. This implies that those who naturally experience a later menarche have an advantage in, and thus are likely to be involved in, certain sports other than that their sports involvement delays menarche.

Menstrual dysfunction, or abnormal menstruation, is widely recognized in female athletes. High prevalence's of oligomenorrhea

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(infrequent or scant menstrual flow), amenorrhea (cessation of menstrual flow), and delayed menarche (the onset of menstruation; the first menses) have been associated with sports.

The onset of menstrual cycle is an important indicator of physiological maturity and physical development in the case of women. For a girl apart from the physical changes, menstruation onset is a very important milestone in sexual maturity. It is extremely important for all parents and teachers who are concerned with the girls to understand and help her from the emotional disturbances during this period.

It is well known that the age, at which the first menstrual period or menarche occurs, varies widely from population to population. This is largely influenced by hereditary and environmental factors. A worldwide decrease in the age of menarche has become apparent during the last generation because of high standard of hygiene and diet, which induce better growth and development. Some investigators reported that climate plays

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no part; race a little, however socio-economic circumstances and nutrition are most important  

The onset of menarche is a useful index of sexual maturation of girls, appearing after the adolescent growth spurt. The age of its onset varies widely even within the same population and is influenced by many factors, like racial variation, climatic and geographical conditions, socio-economic groups, rural and urban, physique and many more factors of genetic and non-genetic nature. Socio economic status has some effects on the menarcheal age. It has been shown that the children of higher socio-economic state tend to attend puberty earlier than those from the lower socio-economic group. The nutritional status of girls, which is related to socio-economic factor has been claimed to play a part in determining the age of the onset of maturation. One of the reasons for which the age of menarche is late in the tropics may be the poor nutrition. It appears that secondary level students

because of their richer protein diet resemble those attending private institution in experiencing menarche earlier. The effect of the consumption of animal protein in early childhood upon the age at menarche has also been demonstrated. Girls belonging to higher group of society, experience their menarche earlier than their counterparts of lower socio-economic status.

Early maturing girls usually have more weight compared to height, both before and through out the adolescent spurt, including the year of menarche. During the period of puberty the growth in height and weight are also very important phenomena and are closely related to the degree of sexual development. It has been observed that girls who have not started to menstruate are considerably shorter and lighter than those of the same age in whom periods have started. The early maturing girls are heavier, taller and have broader skeletal diameters than late maturing girls at adult age, but not to the level of significance. A steady fall in menarcheal age has been observed in many countries during this

century. Evidence of steady fall of menarcheal age has been confirmed in West Bengal. Age at menarche is not fixed but varies from population to population and changes with time. The trend of menarcheal age in Bengali girls is not unequivocally clear. There is a steady fall of average menarcheal age in West Bengal as evidenced from the reports of various studies carried out by different investigators from time to time\textsuperscript{17}.

So far we have discussed the opinions of some of the authors regarding the various factors, which influence the age at menarche and found that, there are definitely some controversies. Menarcheal studies influencing physical activities in western countries have been conducted and are being conducted at many places. We have also seen some works regarding the influence of physical activity or sports and games, whatever we say, on age at menarche among the various regions of Indian girls but it remains lacking among the Bengali girls and for that reason the necessity of menarcheal study on sports women in West Bengal is strongly felt. It is also seen that there are many talented girls in West Bengal in sports and games trying to prove themselves in the National and International level but some efforts are going to be nipped in the bud. Some of them could not reach up to the mark after menarche and many of them

left sports at that stage. Poverty, of course, is there. Still some of them are getting help from different angles. There are also well-nourished and under-nourished groups of girls. As the age at menarche differs from population to population, studies on menarche with a view to economic background, diet, family size, and practice hours are to be considered.

Nowadays, Bengali people are very much interested to put their girls into the sports and games and feel proud of their successes. It increases obviously if their sports performances satisfy them into the National and International arena.

Now, it is a question whether sporting activity plays an important role on a girl’s menarcheal age or some other balancing factors are there.

Keeping this in mind the present study has been mainly carried out among athlete and non athlete girls of West Bengal with an aim to find out whether there is any i) difference in menarcheal ages of athlete and non-athlete girls; ii) if there is any relationship between rigorous practice and menarche and iii) whether proper nutrition, socio economic condition and menarche could be rationalized.

In order to ascertain the above, 597 Bengali school going girls of age group 9 to 19 years were interviewed, of them 249 were athlete girls engaged in sports and games under some coaching
centres maintaining regular coaching schedule given to them by the coaches have a definite aim to be renowned athletes followed by some job and 348 were non-athlete girls are simply school going girls and don't have any assigned regular physical activity to be treated as sports or games.

In order to find out the causes affecting in menarche of Bengali playing girls the following parameters were considered:

1.1.1 **Height and Weight:** At puberty, girls become stronger and taller. At this time the athletes also try to reach the peak of their sporting performances. According to Tanner (1962), early maturers gain more weight for height at the time of onset of menarche. It has also to be pointed out that how long the menarche is being affected by the height and weight due to participation in sports.

1.1.2 **Practice hour:** Some authors like Stager et al. (1984), indicated that continuous athletic performance and hour of practice to enhance performance causes later menarche. Bloomberg (1977), Erdelyi (1976) and Redwine (1980) mentioned that heavy practice or harder training might make the menstrual period irregular. As a portion of data of this study are mainly
involved in sports and games and the remaining are keeping themselves far from playing arena, there can be a difference in age at menarche and its periodical interval between them due to the hour of practice in different sports participations.

1.1.3 Level of competition: For the betterment of results of various competitions it needs rigorous practice. Moka and Sidhu (1989) pointed out that higher level of competition makes menarche delay than the lower level of competition. Physical labour as well as psychological pressure can affect the age of menarche and menstrual cycle in different levels of competitions. This study has earmarked some levels of sports participation i.e., national, state, district, sub-division and below subdivision (zonal) level. The practice hour and anxiety may differ among the various levels and the menarche can be affected up to that level.

1.1.4 Socio-economic factor: Many authors like Bhatnagar (1987), indicated that the socio-economic background is one of the influential factors on the age at menarche. According to him the higher socio-economic status makes the menarche earlier than the lower socio-economic status.
1.1.5 *Parents’ educational level:* Parents with better education is likely to provide a more favourable environment.

1.1.6 *Monthly Income:* Economical condition of the parents is one of the criteria. It is expected that the athlete girls coming from well-to-do families should have good health and nutrition status in relation to sports and games. They may get all sorts of financial assistance from their parents.

1.1.7 *Family size:* In this study an attempt has been made whether family size can affect and lead to delay the age of menarche.

1.1.8 *Diet:* Protein and calorie intake are another criteria in this study. Many authors expressed their views that the richer protein diet makes menarche earlier and malnutrition during the pre-menarcheal period delays the onset of menarche.

1.1.9 *Food:* Food may be defined as anything eaten or drunk, which can be absorbed by the body to be used as an energy source, building, regulating or protective materials. It is the raw material from which our bodies are made. Intake of the right kinds and amounts of food
can ensure good health, which may be evident in our appearance, emotional well-being and efficiency.

Food has been a basic part of our existence. It is a prerequisite of nutrition. Adequate, optimum and good nutrition are used to indicate that the supply of the essential nutrients is correct in amount and proportion. It also implies that the utilisation of such nutrients in the body is such that the highest level of physical and mental health is maintained throughout the life cycle. Most foods contain more than one nutrient.

The foods we eat become a part of us. Thus of the most important function of food is that of building the body. The food eaten each day helps to maintain the structure of the body and to replace worn-out cells of the body.

The second function of the food is to provide energy. The body needs energy to sustain the involuntary processes essential for continuance of life, to carry out professional, household and recreational activities, to convert food ingested into usable nutrients in the body to grow and to keep warm. The energy needed is supplied by the oxidation of the food consumed.
The third function of food is to regulate the activities of the body. It includes regulation of such varied activities: beating of the heart, maintenance of the body temperature, muscle contraction, control of water balance, clotting of blood and removal of waste products from the body.

The food we use daily include rice, wheat, dal, vegetables, fruits, milk, eggs, fish, meat, sugar, butter oils etc. These different foods are made up of a number of chemical components called nutrients. These are classified according to their chemical composition.

Each nutrient class has its own function to perform, but the different nutrients that perform the function must act in unison for effective action. The nutrients found in foods are – carbohydrates, proteins, fat, minerals, vitamins and water.

1.1.10 Nutrition: Nutrition has been defined as food at work in the body. It includes everything that happens to food from the time it is eaten until it is used for various functions in the body. Adequate, optimum and good nutrition are used to indicate that the supply of the essential nutrients is correct in amount and proportion.
It also implies that the utilisation of such nutrients in the body is such that the highest level of physical and mental health is maintained throughout the life cycle.

1.1.11 **Nutrients:** Nutrients are components of food that are needed by the body in adequate amounts in order to grow, reproduce and lead a normal and healthy life. It includes water, proteins, fat, carbohydrates, minerals and vitamins.

1.2 **Statement of the problem:**

It has been observed (Burrel et al., 1961; Tanner 1962; Bai & Vijayalakshmi 1973) that the age of onset of menarche varies widely not only in individuals of different populations but also within the same population and is influenced by many factors like racial variation, climates & geographical conditions, socio-economics groups, rural & urban, nutrition, cultural background, physique, physical performance and many more factors of genetic & non-genetic in nature.

It has also been reported (Wilson & Sutherland 1973, Foll 1961) that socio-economic circumstances and nutrition are most important than climatic or racial factors on the age of onset of menarche. In India a few studies (Srivastava & Goswami 1969; Chattopadhyay & Khuller 1976) have been
conducted and observed that higher income group have their mean menarcheal age earlier than the girls belonging to lower income group.

It has further observed that there are very few study on the age at menarche among Indian girls in general but hardly there is any comparative study on the age at menarche between athlete and non-athlete school going girls of West Bengal.

As I am a Physical Education teacher and since my joining in service I have been teaching in some co-educational Institutions and besides that I render my voluntary service in some voluntary organisations to coach the boys as well as girl students. I have been interested to know the effect of exercise and sports activity on the age at menarche and menstrual cycle among Bengali athlete girls. I have considered all those above-mentioned parameters in my study and tried to arise at some conclusion.

All these have inspired the investigator and made interested to under take a comparative study on the age of menarche of athlete and non-athlete schoolgirls of West Bengal. Therefore, the investigator formulated this study to make on attempt for a comparative study of age at menarche
between athlete and non-athlete schoolgirls of West Bengal in relation to socio-economic status.

1.3 **Purpose:** Following are the purposes of this study:

i) To observe the difference in Age, Height & Weight between Athlete girls and Non-athlete girls.

ii) To observe the difference in Menarcheal Age between Athlete and Non-athlete girls.

iii) To observe the difference in Height and Weight of Athlete girls in relation to Activity and menarche.

iv) To observe Menarcheal Age of Athlete girls of different districts of West Bengal.

v) To determine the Menarcheal Age of Athlete girls in relation to Participation Level.

vi) To observe the Menarcheal Age of Non-athlete girls of different districts of West Bengal.

vii) To find out the percentage of parents of both the groups belonging to different education level and income level.
viii) To compare the Menarcheal Age, Monthly Family Income, Calorie and Protein Consumption between Athlete girls and Non-athlete girls.

ix) To observe the differences in Menarcheal Age, Irregular Menstruation Cycle and Duration of period of menstruation cycle between Athlete and Non-athlete girls.

x) To observe the Irregular Menstruation of Athlete girls in relation to different Activities.

xi) To observe the Calorie and Protein Consumption and Practice Load of Athlete girls.

xii) To compare the per capita Monthly Income of Athlete and Non-athlete girls.

xiii) To observe the Duration of Period of Menstruation Cycle of Athlete girls in relation to Activity.

xiv) To find out the duration of period of Menstruation Cycle of Athlete girls among different Menarcheal Age & Activity.
xv) To find out the Practice Hours of Athlete girls in relation to Activity & Menarcheal Age.

xvi) To assess the influence of Menarche on Participation Level of Athlete girls.

1.4 \textit{Delimitation of the study}:

i) The study is delimited to a population of girl students of West Bengal numbering 249 Athletes and 348 Non-Athletes.

ii) The subject for the study is delimited to the age group 9 through 19 years.

iii) It is also delimited to 6 disciplines viz, Athletics, Badminton, Basketball, Gymnastics, Swimming and Volleyball.

iv) It is further delimited to 11 districts for Athlete girls and 2 districts for Non-athlete girls of West Bengal.

1.5 \textit{Limitation of the study}:

i) The study is conducted in areas distinctly diverse, specified on the basis of topographical
characteristics and climatic conditions, which is beyond the control of the investigator.

ii) The subjects belong to different ethnic community having heterogeneous groups, religious belief, caste etc., leading to diverse ways of living, interest, attitude and customs reflecting diversified regional culture over which the investigator has no control.

iii) Such diverse culture might naturally have caste influence on the population resulting in possible difference in the development of physical performance amongst the population of this study.

iv) The subjects selected for the study have been both residential and non-residential day scholars, so influence of residence, if any, could not be controlled.

1.6 **Significance of the Study:**

i) This study might help the Physical Educators to select the activity suitable to the individual athlete girls.
ii) This study may guide Physical Education teachers and Coaches to prepare coaching schedule for Athlete girls during their Menarche.

iii) This study might help the Physical Educator and Coaches to select the practice load of Athlete girls during Menarche.

iv) This study would also help to evaluate the performance in sports and games in relation to Menarche.

v) This study may help the future investigators in investigating the effect of performance in Sports and Games among athlete girls during the Menarche.

1.7 Definition of the terms:

1.7.1. Activity: Activity means physical movements involving big muscles activity, which is made up of skills of the fundamental movements and fine motor components. These are combined with a set of rules to limit boundaries and behaviour distinctive to that particular activity. Such
activities have become a part of our fundamental ways of expression.

1.7.2. **Athletes**: Athletes have been defined here as those who have participated regularly in sports and games and gained recognition at least in the zonal level inter schools or club level competition.

1.7.3 **Calorie (Cal)**: A unit of work or energy equal to the amount of heat required to raise the temperature of one gram of water 1°c.

1.7.4 **Family Income**: Family income (in Rupees) means total monthly income earned by the members belonging to a family.

1.7.5 **Irregular Menstruation**: In hypogonadism or when the gonads are secreting small quantities of estrogens as a result of other factors, such as hypothyroidism, the ovarian cycle does not occur normally.

1.7.6 **Kilocalorie (Kcal)**: A unit of work or energy equals to the amount of heat-required to raise the
temperature of one Kilogram of water $1^\circ$ C. One thousand calorie equals to 1 Kcal.

1.7.7 **Menarche:** Menarche means the beginning of the cycles of menstruation that indicates the age at which menstruation begins. It is the sign of the sexual puberty.

1.7.8 **Menstruation:** The process or an instance of discharging the menses. During normal menstruations, approximately 40 milliliters of blood and additional 35 milliliters of serous fluid are lost. The menstrual fluid is normally non-clotting.

1.7.9 **Non-athletes:** Non-athletes are defined as those who have been either chosen not to participate in sports activities or who do not achieve any recognition at any level of competition.

1.7.10 **Nutritional status:** Study of individual’s health from the view of the science of food and nutrients in food and their relation to health and physical performance.
1.7.11 **Participation level:** Participation level indicates the level of competition i.e. National, State, District, Sub-division and Zonal—an athlete takes part.

1.7.12 **Protein:** A compound containing Amino Acids is one of the basic foodstuffs. Proteins are more complex and larger molecules than either carbohydrates or fats. Basic structural units of Proteins are Amino Acids. In Proteins, the Amino Acids are chemically bonded in the long change.

1.7.13 **Practice Hour:** Practice hour means a period for which sportsperson is engaged daily in vigorous and strenuous activity for preparing herself for the highest level of performance in a competition.

1.7.14 **Socio-economic status:** Status of individual's family from the economic and social point of view, which plays an important role in performing the physical performance. It is also an indicator of nurturing process of an individual.