

1.1 Introductory Statement

The term adolescence comes from the Latin word ‘adolescere’ meaning to grow or to maturity. Primitive peoples, as was true also in earlier civilization do not consider puberty and adolescence to be distinct period in the life span as it is today. In present context the term adolescence has a broader meaning. The term adolescence is commonly used to describe the transition stage between childhood and adulthood. **LeBourgeois (2005)** stated that adolescence is a period characterized by important changes in cognitive, behavioral, social, and emotional functioning attributable to biological development (ie, puberty) and to new roles and demands in the family and social relations (eg, decreased parental involvement, increased academic requirements). Adolescence is also equated to both the terms “teenage years” and “puberty.” However adolescence is not exclusive to either of these terms. Puberty refers to the hormonal changes that occur in early youth; and the period of adolescence can extend well beyond the teenage years. In fact, there is no one scientific definition of adolescence or set age boundary. There are key development changes that nearly all adolescents experience during their transition from childhood to adulthood. As per the World Health Organization (WHO) guideline adolescence is the period of transition from childhood to adulthood, which has been characterized i) by efforts to achieve goals related to the expectations of the mainstream culture and ii) by spurts of physical, emotional and social development. The onset of adolescence is usually associated with the commencement of puberty and the appearance of secondary sex characters, while the end of adolescence is less clearly defined. The transition is

characterized by i) onset of puberty and full development of sexual and reproductive maturity ii) cognitive development from childhood to those of adulthood, and iii) emergence of childhood state of total socioeconomic dependence to relative independence.

WHO earlier guidelines considered age group of 10 to 19 as adolescence, while now it has been considered from age 10 to 24 (WHO, 1986). Also, the dividing line of adolescence varies from culture to culture and usually recognized by their parents. Boys mature on an average later than girls, they have shorter period of early adolescence although they are regarded as adults when they reach eighteen just as girls. As a result they frequently seem more immature for their age than girls. Early adolescence extends roughly from their 10 to 16 or 17 years and late adolescence covers the period from then until 24 years or the age of legal maturity.

1.2 Characteristics of Adolescence

While all period in life span are important, adolescence has unique and important place in life because of its immediate effects on the emotional attitudes and cognitive behaviour. Adolescence is one of the periods when both the immediate effects and long-term effects are important for future life. Some phase of adolescence is important for their physical development while some for their psychological effects. Adolescence is important for both. For the majority of young boys and girls the years from 12 to 16 are the most eventful, so far as their growth and development is concerned. Adolescence is a transition period, however it does not mean a break with or change from what has gone before but rather a passage from one stage of development to another. When children go from childhood to adulthood, they set aside

childish things and learn new patterns of behavior and attitudes. The adolescence at this time is neither a child nor an adult. If adolescents behave like children, they are told to 'act their age'. If they try to act like adults, they are often accused of being 'too big for their britches' and reproved for their attempt to act like adult. Adolescence is marked with period of changes in physical features which are rapid, added with changes in attitude and behavior. There are five almost universally concomitant of the changes that occur during adolescence. The first is heightened emotional ability, the intensity of which depends on the rate at which the physical and physiological changes are taking place. Second the rapid changes accompanying sexual maturity make young adolescents unsure of themselves of their capacity and of interests. A third change is in their interest and in role the social group expects them to play, creates new problems. To young adolescents these may seem more numerous and less easily solved than they have had face before. Fourth is in interest and behaviors pattern change, so do values. What was important to them as children seems less important or not important when they are near adult. For example most adolescent no longer think that a large number of friends is more important indications of popularity than friends of the types that are admired and respected by their peers.

While every age has its problem, those of adolescence are of especially difficult for boys and girls to cope with. There are two reasons for this, first that throughout childhood the problems of children's are met and solved in part at least by parents or/ and teachers. Secondly adolescents want to feel that they are independent, they demand the right of coping with their own problems. In the early years of adolescence conformity to the groups is still important to boys and girls. Gradually they begin to crave for identity and are

no longer satisfied to be like their peers in every respect as they were earlier. It has been also established that many popular beliefs about adolescence have definite evaluative consolation and unfortunately many of them are negative. Acceptance of the cultural stereotype of teenagers as sloppy, unreliable individuals who are inclined toward destructiveness and antisocial behavior has led many adults who must guide and supervise the lives of young adolescents to dread this responsibility and to be unsympathetic in their attitudes towards and treatment of normal adolescent's behavior. Adolescents have a tendency to look at life through rose tinted glasses. They see themselves and others as they would like them to be rather than as they are. This is especially true of adolescent's aspirations.

1.3 Stages of Adolescence:

- Early adolescence begins approximately between 11 to 13 years of age.
- Middle adolescence age begins between 14 to 17 years of age.
- Late adolescence age begins between 18 to 24 years of age.

The period of transition from childhood to adulthood is called adolescence with accelerated physical, biochemical and emotional development. It is during this period that the final growth spurt occurs. There are many body changes which result due to the influence of hormones. The dimensional changes and changes in maturational timing over the generation are called secular changes. And to attain these changes it is very important to attain all the nutritional need. Keeping it in mind, it is necessary to understand their nutritional requirements and nutritional related problems.

1.4 Nutritional needs of adolescents

Calories/Energy

Caloric needs increase with the metabolic demands of growth and energy expenditure. Although individual needs vary, girls consume fewer kilo calories than boys. In general, adolescence girls need about 2,300 calories per day, and adolescence boys need about 3,100. It is important to make these calories count by eating the recommended servings from each of the food groups, which ensures that adolescence is getting enough of the nutrients he/she needs to support overall health.

Carbohydrates

Carbohydrates are adolescence main source of energy. There are two types of carbohydrates, simple and complex. Adolescence should focus on complex carbohydrates because they are usually found in healthier foods, such as whole grains, and they provide longer-lasting energy than those in simple carbohydrates, like soda and candy. An adolescence daily calorie intake should be 50 to 60 percent complex carbohydrates such as whole grains, fruits, vegetables and beans.

Protein

For most adolescents, eating to satisfy appetite offers a reasonably sensitive indicator of energy needs. Protein needs represent 12-14 percent of energy intake. The protein intake usually exceeds 1gm/kg body weight. This meets growth needs and for the pubertal changes in both sexes and for the developing muscle mass in boys. Adolescence girls need about 46g of protein each day, and adolescence boys need about 52g. Getting enough protein supplies energy and plays a role in healthy bones, muscles, blood and

hormones. Healthy sources of protein include lean meats, fish, chicken, eggs, beans, nuts and seeds.

Fat

Adolescence body needs some fat to function, but too much may result in weight gain, which increases the risk of other health complications, including diabetes and depression. Choosing the right kinds of fats is also important. Opting for monounsaturated, polyunsaturated and omega-3 fatty acids supports brain and heart health. They are found in fish, avocado, olive and canola oils, nuts and seeds. Limit saturated fat and trans fats, which are found in many types of fast food, frozen dinners and packaged snacks. Adolescence calorie intake should be limited to 30 percent fat.

Vitamins and Minerals

Adolescence who follows the recommendations is likely getting plenty of the vitamins and minerals that he/she needs for growth, development and overall health from whole grains, fruits, vegetables, lean protein and low-fat dairy foods. Getting enough servings of each ensures adequate intakes of calcium, vitamins A, C, E, D and K, potassium, iron, magnesium, B vitamins, zinc and selenium. These vitamins and minerals support immunity, strong bones and teeth, wound healing, healthy blood, energy and many other aspects of a teen's health.

1.5 Food Habits and Nutritional Problems in Adolescents

Physical and psychological pressures influence adolescents eating habits. The boy fares better than girls in that his large appetite and sheer volume of food leads him to consume adequate nutrient but the adolescent girl is less fortunate because her physiological sex differences associated with fat deposits during this period and comparative lack of physical activity she

may gain weight easily, social pressures and personal tensions concerning figure control will cause them to follow unwise, self-imposed crash diets for weight loss. Self-starvation may result in complex and far-reaching eating disorders like anorexia nervosa and bulimia. Adolescents have the reputation of having the worst eating habits. They may skip a meal or they may eat fast foods which are generally inadequate in calcium and vitamin A but high in calories, saturated fat and sodium. Unhealthy eating is largely caused by bad eating habits. Eating a bag of potato chips while watching TV once in a while or bingeing on food during a party will probably not cause adolescent any harm. However, when these actions become repetitive, they develop into habits. If they wish to break unhealthy eating habits, they need to determine what they are first. The below all habits contribute more in nutritional related problems in adolescents.

1. Skipping Breakfast

Breakfast is believed to be the most important meal of the day, but many people still seem to make a habit out of skipping it. Skipping breakfast not only drains energy, but also makes it more likely that we will snack throughout the day. Skipping breakfast also disrupts metabolism, causing to burn fewer calories. Therefore skipping breakfast is not a good habit.

2. Food Binging

Binging or eating large amounts of food in one sitting is another unhealthy eating habit that should be avoided.

3. Emotional Eating

Emotional eating, or stress eating, is another common unhealthy habit that should be avoided. This occurs when adolescents are driven by certain emotions though not hungry.

4. Eating during other Activities

Eating during watching TV, while working, while reading or even while cooking is also developing an unhealthy eating behavior. When adolescents eat while doing other activities, they become unable to measure how much they eat. As a result, they tend to overeat without knowing it.

5. Eating Late at Night

Eating late night is not a good habit because it causes weight gain tendency and causes sleeping difficulties since body will be busy in digesting food.

1.6 Nutritional Problems in Adolescents

Due to faulty habits in day to day life, adolescents suffer through many nutrition related problems as discussed below.

Obesity

Studies have shown people who eat out more number of times are susceptible for obesity. Skipping meals at home and consuming foods that are junks (very salty, high sugar and fat) also contribute to overweight. Fat diets may be tastier than non fat diets. An excessive intake of calories is less often the cause than lack of exercise. Concern about personal appearance may make the adolescent more reluctant to participate in activities like dance or sports that control weight. Other causes of obesity may be family habits, emotional stress and hormonal imbalance.

Eating Disorders

Adolescent girls perceived their diets in the light of appearance and body shape while boys are more concerned by fitness and general well being.

There are three recognized eating disorders namely - anorexia nervosa, bulimia nervosa and binge eating disorder.

Anorexia Nervosa

Physical Signs :

- Onset in early to middle adolescence
- Extremely thin or (less than 85% of normal or ideal body weight)
- Rapid loss of weight
- Loss of menstrual periods
- Development of downy hair on arms, legs and sometimes cheeks
- Complaints of nausea, bloating or constipation after eating normal amounts of food

Food and exercise habits

- Cooking for others or obsessing about food but not eating
- Rigidly avoiding specific foods or whole categories of food (dairy, meats, fats etc)
- Refusing to eat, denying hunger, eating tiny portions of food
- Exercising excessively
- Possessing in depth knowledge of calories and fat in foods
- Consuming odd food combinations or large amounts of low- calorie condiments (eg mustard, vinegars)
- Exhibiting ritualistic eating behaviors, such as cutting foods into tiny bits or using special utensils or plates each time when eating
- Avoiding social invitations because of food that might be served

Psychological Signs

- Feeling “Fat” even when emaciated, intense fear of gaining weight, distorted body image
- Excessive preoccupation with weight, food, exercise, and dieting
- Social withdraw, depression, moodiness
- Emotional withdraw
- Perfectionism
- Refusal to admit eating patterns is abnormal
- Low self-esteem
- Fatigue or weakness due to malnutrition

Bulimia Nervosa

Physical Signs

- Onset in late adolescent or in early twenties, often after weight loss or dieting attempts
- Usually near ideal body weight, but often with weight fluctuations
- Eats very large meals, but without gaining weight
- Dental enamel erosion, cavities
- Fatigue or weakness due to malnutrition
- Irregular menstrual periods

Food and Exercise Habits

- Frequent binge eating
- Strict dieting followed by bingeing
- leaving room after eating, often to bathroom
- Purging via diuretics, laxatives, emetics such as syrup or over exercising, fasting or vomiting

- Hiding eating from others
- Avoiding social invitations because of food that might be served

Psychological Signs

- Excessive preoccupation with weight, food, exercise and dieting
- Feeling uncomfortable eating in front of others
- Feeling out of control when eating and unable to stop binges
- Depression, loneliness, shame, and feeling of emptiness
- Alcohol or drug use, personal problems
- Realization that eating patterns are abnormal

Binge Eating disorders

Physical Signs

- Onset at any age, often not recognized until adulthood
- Usually overweight or obese
- May have obesity-related diseases, such as type II diabetes, high blood pressure, high cholesterol

Food and Exercise Habits

- Frequent dieting
- Losing and regaining weight or chronically dieting without losing weight
- Frequent binge eating or eating when not hungry
- Eating to point of extreme discomfort
- Frequently eating large amount in short time
- Hiding eating or eating only small amounts when with others
- Avoiding social invitations because of food that might be served
- Having difficulty exercising because of excess weight

- Trying to avoid physical activity or anything that might call attention to or increase own awareness of one's body

Psychological Signs

- Depression, loneliness, shame, guilt, and emotional emptiness
- Feeling out of control when eating and unable to stop binges
- Eating to escape from emotions (anxiety, worry, or emotional pain)
- Feeling uncomfortable eating in front of others
- Being preoccupied with food, dieting, body weight
- Feeling irritable when withdrawing from binge or trying to diet, and depressed and sleepy immediately after overeating
- Realizing that eating patterns are abnormal
- Having low self esteem

The incidence of eating disorders among adolescents Indians is less compared to adolescents in developed countries-though not free from it. Eating disorders are complex problems that are best treated by a team of health care specialist including medical, psychological and nutrition professionals.

Predisposition to osteoporosis

Excessive exercise, high fiber, low fat intake lead to low circulating estrogen levels, irregularly menses and low bone mass. Predisposition to osteoporosis is in part at least the result of dietary deficiency and exercise patterns during the developmental years. Low dietary intake of calcium rich foods such as milk in adolescents could be because of the misunderstanding about the amount of fat provided by milk and substitution of milk with soft drinks. Bone density can be increased by including in the diet calcium rich foods.

Anaemia

There does seem to be a trend towards a decrease in the age at menarche over the decades both in the rural and urban situations, not only in the affluent upper classes but also among the poor classes of urban and rural communities and making adolescent's girl susceptible to anemia.

Anaemia is most common in all the groups of adolescent girls to the tune of 20-25 per cent irrespective of the social class. Angular stomatitis and glossitis are more common in poor classes because of the poor quality of diet.

Anaemia is common in poor class since intake is poor mainly due to the non availability of healthy foods. In higher classes personal likes and dislikes and food taboos lead to anemia.

Under nutrition

Results of the studies conducted at national institute of nutrition Hyderabad (1990) showed a higher percentage of upper middle class girls (36%) had deficit in BMI indicating that the weight deficit is a major factor, possibly related to the poor energy intake of this group of population. While among the urban poor and rural girls, this is mainly due to their getting lower priority for the food over the boys in the family.

In the upper class, the weight deficit is related to the personal likes and dislikes and also a conscious attempt towards maintaining a low weight in the fear of becoming overweight. Avoiding milk, peer influence, eating outside the home with poor selections, skipping meals, food faddism and emotional disturbance may all contribute to under nutrition in adolescence.

Premenstrual Syndrome

This is not so uncommon in adolescence and is characterized by physical and psychological symptoms which occur 7-10 days prior to the onset of periods and disappear within the first day or two of menstrual flow. These include weight gain, abdominal bloating, breast engorgement and pain, constipation, peripheral edema, headache, irritability, anxiety, depression, tension, fatigue, lack of concentration, increased appetite, craving for sweet and salty foods. The etiology and path physiology have not been identified. Management includes reassurance, exercise and dietary modifications to meet all the nutritional requirements.

1.7 To reach the nutritional demands of Adolescents:

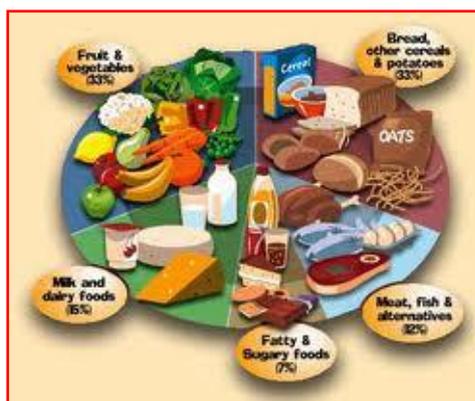
Eating healthy is an important part of a healthy lifestyle and is something that should be taught at a young age. Adolescents require a wide range of nutrients to keep them self healthy and active. Extensive diet survey carried out in different parts of our country both in the rural and urban areas indicate that diets are predominately based on availability. Life cannot be sustained without adequate nourishment. Adolescents need adequate food for growth, development and to lead an active and healthy life. Dietary habits of populations in different regions of the world have been determined mainly by the availability of foods locally and local practices. Man has evolved his habitual dietary pattern to maintain good health, perhaps after a good deal of trial and error. Satisfaction of hunger is usually the primary criteria for adequate food intake. But satisfaction of hunger itself is not a safe guide for the selection of proper foods. For sustaining healthy and active life, diets should be planned on sound nutritional principles.

It is well known and documented that diet and nutrition plays an important role in maintaining health and preventing diseases. Decrease in

morbidity and mortality associated with lifestyle diseases may be achievable if satisfactory nutritional habits are adopted in early life and maintained in the long term. During adolescence, young people are assuming responsibility for their own eating habits, health attitudes and behaviors. In fact, attitudes play an important role in the adoption and maintenance of a variety of health and nutritional habits.

It is found that dietary habits appear to be established in the mid-teens, by the age of 15 years, and are closely associated with lifestyle. It can be said that if habits acquired in adolescence persist into adult life, behaviors established in young people may have important long-term consequences for health. Knowledge about healthy food choices and food safety can be predisposing factors for improving eating habits and adopting a healthy diet, although it is insufficient to motivate healthy eating. Factors influencing eating behaviors need to be better understood to develop effective nutrition. Therefore, habits, attitudes, self-efficacy, barriers to change and the meaning of “healthy” and “unhealthy” diet and food must be considered.

As a teen, body is constantly changing and growing. The foods adolescents eat will directly reflect how they feel, focus and the ability for our body to function. Understanding what types of nutrients is needed will make it easier to fit these foods into diet on a regular basis. A balanced diet is the best kind of diet.



Man needs a wide range of nutrients to perform various functions in the body and to lead a healthy life. The nutrients include protein, fat, carbohydrate, vitamins, minerals and water. These nutrients are the substances present in the food we eat daily. The foods containing these nutrients which we consume daily are classified as cereals, legumes(pulses), nuts and oilseeds, vegetables, fruits, milk and milk products and flesh foods(fish, poultry and meat). Most foods contain almost all nutrients in various proportions, some foods being rich in certain nutrients. Depending on the relative concentration of these nutrients foods are classified as protein rich foods, carbohydrate rich foods and fat rich foods etc. Some foods provide only a single nutrient as in the case of sugars which are sources of only carbohydrate while oils and ghee provide only fats.

Man needs all the above nutrients, i.e. Energy, protein, vitamins, and minerals in different amounts to grow, live and thrive. Since man derives all the nutrients he needs through the diet he eats, his diet must be well balanced to provide all the nutrients in proper proportions. The type and quantity of various foods he includes in his diet is based on socio-cultural and economic considerations. It may vary from country to country and within a large country like India, it may vary from one region to another region. However, in India the habitual diet pattern is similar although the type and amount of

foods included in the diet may depend upon the region and socioeconomic level of the individual.

Eating healthy is an important part of a healthy lifestyle and is something that should be taught at a young age. The period of adolescence is a time of very rapid growth and high demands for nutrients and energy. The rapid growth period starts at the age of 10 or 11 for girls and at the age of 12 or 13 for boys and continues for about 20 to 21 years. Adolescents need high intakes of calories, vitamins and minerals, especially iron, calcium, vitamins A, C and D. During this time, boys and girls begin to reach puberty (gaining sex characteristics to mature into men and women) and nutritional needs start to differ, although good nutrition is essential for both sexes to grow into healthy adults. It is important for adolescents to select their foods carefully to ensure that their nutrient and calorie needs are met. Sometimes the workload of adolescent girls and boys increases, as they begin to have greater responsibilities for carrying out household tasks and additional jobs to help the family. When this is the case, their needs for energy (calories) for the additional work they are doing, along with their needs for growth, will have to be met. Some adolescents, however, become less physically active and have to meet their nutrient needs without eating more calories than they need to maintain a healthy bodyweight.

Adolescence is a time to reinforce good food habits and establish regular meal patterns. Dietary habits and food preferences are developed in childhood and particularly in adolescence. As they become more independent, many adolescents begin to have more meals away from the family, often resulting in poor food choices, skipped meals, increased snacking instead of regular, balanced meals and lower vitamin and mineral intake at a time when good nutrition is especially important. Adolescents also tend to follow food fads and slimming diets which do not meet all of their

nutritional needs. It is important at this age to eat a variety of foods, including carbohydrates, plentiful fruits and vegetables, daily protein and dairy foods or other foods containing calcium and to avoid excess fat and sugar.

Adolescent Girls

Special attention should be given to adolescent girls, who need to be well-nourished for their own immediate development and for the future nutritional demands of childbearing. Adolescence is a critical time for young women, building the foundation for successful reproduction and a healthy adulthood and later life. Young women must enter adulthood with good nutritional stores to remain strong and healthy throughout their child-bearing years and into old age. Good nutrition is especially important for adolescent girls to meet future needs of pregnancy and breastfeeding. Adolescence is also the time that the skeletal system builds its strong foundation of calcium stores. If the calcium stores in the bones are not sufficient entering into the reproductive years, bones can become weak with successive pregnancies, leading to broken bones and disability in later years (a condition called osteoporosis). Increasing calcium consumption by eating a diet rich in dairy foods and leafy green vegetables will help meet the increased needs of adolescents for calcium. Because of the demands of growth, as well as blood loss with menstruation, the requirement for iron among adolescent girls is very high. It is important for girls to increase their consumption of iron-rich foods, such as red meats, fish, poultry and legumes, to help prevent anemia resulting from iron deficiency. Adolescent girls who are anemic and may not be eating sufficient quantity of iron-rich foods to meet their needs may be advised, under the guidance of a doctor or other health professional, to take iron supplements.

Early pregnancies can be harmful to the health of girls who, themselves, are still growing. Young girls' bodies are still developing and usually are not ready to support the extra burden of pregnancy and child birth. Special care must be taken during adolescent pregnancy to ensure that the young mother receives sufficient food for her own increased needs, as well as for the needs of the unborn baby.

Adolescent Boys

Adolescent boys have different needs than adolescent girls because their bodies are maturing differently, and at a different rate. A growth spurt happens for both sexes during adolescence, but typically boys' rates of growth are more rapid. Much of the adult height and muscle mass is gained during adolescence. Increased growth and activity increases the need for certain nutrients and energy. Boys may need even more calories during this period to support this growth, especially if their physical activity level increases. Protein foods, such as meat, fish, poultry, eggs, dairy products, nuts or seeds and legumes are all foods that supply high protein needed for additional growth in height and muscle mass during adolescence. While boys do not have the very high need for iron that adolescent girls have, the tissue growth and increased blood volume for boys does increase their need for iron which can be met by increased meat and other iron-rich foods. Calcium needs are also increased because of the rapid bone growth during adolescence and additional dairy products and green leafy vegetables can help meet these needs.

Physical Activity:

Regular physical activity in adolescence improves strength and endurance, helps build healthy bones and muscles, helps control weight, reduces anxiety and stress, increases self-esteem, and may improve blood pressure and cholesterol levels. The U.S. Department of Health and Human Services recommends that young people aged 6–17 years should participate in at least 60 minutes of physical activity daily.

Regular Physical Activity

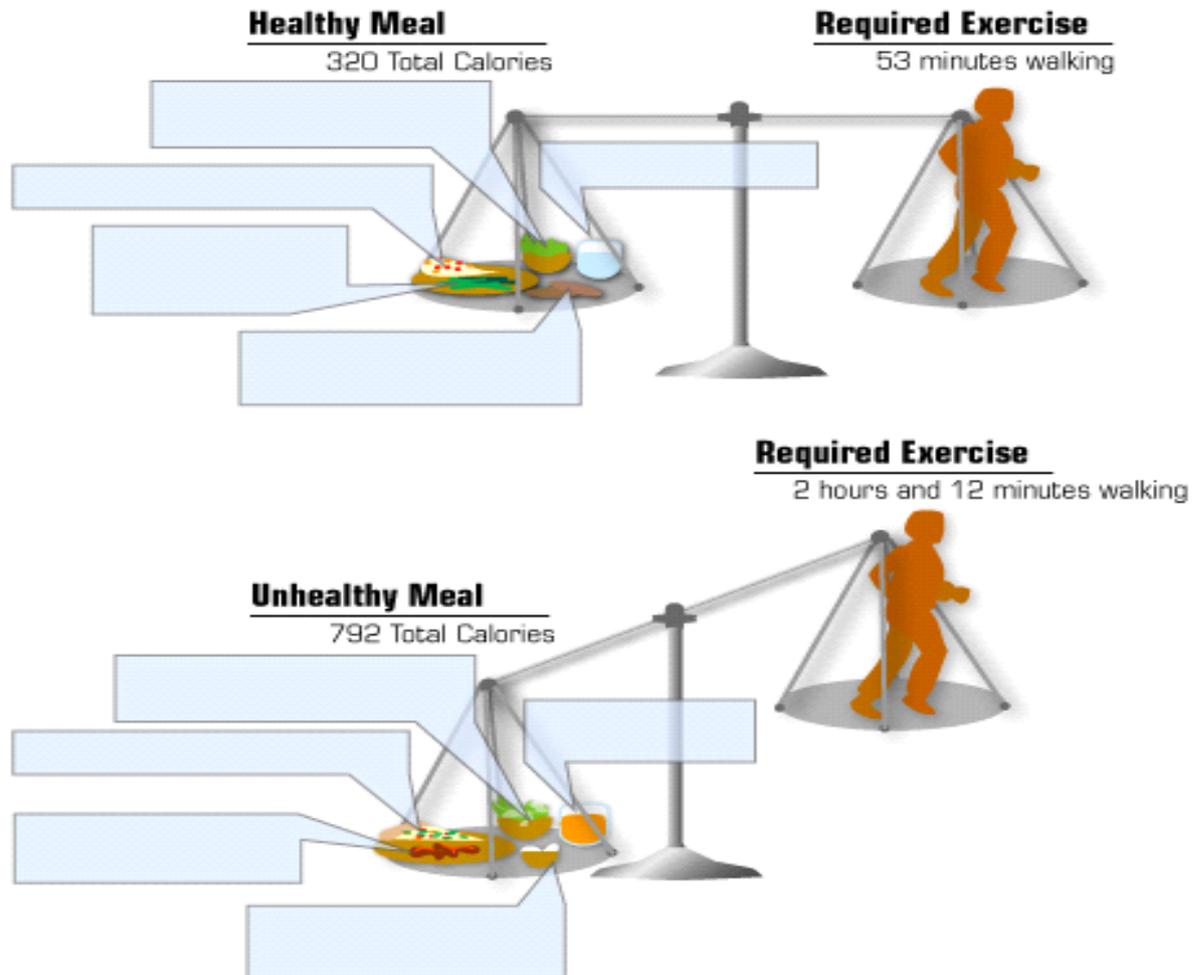
- Helps build and maintain healthy bones and muscles.¹

- Helps reduce the risk of developing obesity and chronic diseases, such as diabetes, cardiovascular disease, and colon cancer.
- Reduces feelings of depression and anxiety and promotes psychological well-being.
- May help improve students' academic performance, including "Academic achievement and grades, Academic behavior, such as time on task".
- Factors that influence academic achievement, such as concentration and attentiveness in the classroom.

Long-Term Consequences of Physical Inactivity

- Overweight and obesity, which are influenced by physical inactivity and poor diet, can increase one's risk for diabetes, high blood pressure, high cholesterol, asthma, arthritis, and poor health status.
- Physical inactivity increases one's risk for dying prematurely, dying of heart disease, and developing diabetes, colon cancer, and high blood pressure.

Correlation of Consumed calories and exercise required to burn those calories.



Objectives

- To assess the anthropometric measurements of adolescent girls and boys.
- To study the various health problems of adolescent girls and boys.
- To study the dietary intake of adolescent girls and boys, according to their socio-economic status and religion.
- To assess the hemoglobin level of adolescent girls and boys.

Rationale

What are the hindrances our adolescent is facing in achieving the nutritional goal and why malnutrition is deteriorating their health status and what are their faulty dietary practices which are the main reason for developing malnutrition will be observed through this study. The findings of present study will certainly give appropriate support for older as well as newer findings.