ADOLESCENCE

What is adolescence?

The term youth encompasses ages 10 to 24 years, adolescents as defined by WHO (1986) includes persons aged 10-19.

Adolescence may be divided into three developmental stages based on physical, psychological and social changes (WHO/UNICEF 1995):

- Early adolescence, 10/13-14/15 years;
- Mid adolescence, 14/15-17;
- Late adolescence, 17-21 (variable).

What changes are seen during adolescence?

Adolescence is a period of gradual transition from childhood to adulthood that normally begins with the onset of signs of puberty, is characterized by important psychological and social changes, not only physiological change.

Adolescents are far from being a homogeneous group, in terms of development, maturity and lifestyle.

Even for a given place and age, there is a great deal of diversity depending on personal and environmental factors.

Adolescence is a period of rapid growth: up to 45% of skeletal growth takes place and 15 to 25% of adult height is achieved during adolescence. During the growth spurt of adolescence, up to 37% of total bone mass may be accumulated. Nutrition influences growth and development throughout infancy, childhood and adolescence; it is, however, during the period of adolescence that nutrient needs are the greatest.

Why is there an increased need for importance of adolescent health?

There is an increased importance of adolescent health owing to sheer number and demographic weight of youth (or adolescents) in the country. The future economic development of the country rests in large part on the prospect of having increasing proportions of the future adults who are educated, healthy and economically productive. There is an important interaction between economic opportunity and attitudes of the youth.

Why is Adolescence considered as a period for timely adoption and consolidation of sound dietary habits?

Adolescents are usually open to new ideas; they show curiosity and interest. Many habits acquired during adolescence will last a lifetime. Furthermore, with increasing age, adolescents' personal choices and preferences gain priority over eating habits acquired in the family, and they have progressively more control over what they eat, when and where.

Adolescents' search to establish themselves as autonomous members of society is through a change in eating habits. For these reasons, adolescents are an ideal target for nutrition education.

In younger children, parents are in charge and need to be influenced. In adults, it may be more difficult to modify well-established patterns. Furthermore, adolescents may not only adopt healthy eating patterns and lifestyles for themselves, but also influence their peers, family and other community members. Changes in lifestyle, including food habits, are often

more obvious among urban adolescents, as they are typically the 'early adopters' owing, among other things to their attraction for novelty and high exposure to commercial marketing in cities. Indeed, looking into adolescents' living and eating patterns may give an idea of the changes taking place in a society. They may act as role models for others in the community, in particular if they are from higher socioeconomic status groups.
In this sense, the patterns seen in urban well-off adolescents anticipate the patterns of the future. Since these privileged youth are a reference group for other adolescents, they should also be targeted by health and nutrition promotion activities.

Why Nutrition intervention in adolescent girls important to break the vicious cycle of intergenerational malnutrition, poverty and chronic disease?

One major reason for focusing on adolescents is that this period of a child's life is a unique opportunity to break a range of vicious cycles of structural problems that are passed from one generation to the next, such as poverty, gender discrimination, violence, poor health and nutrition.

Preparing for the demands of childbearing and breastfeeding is timely in adolescent girls and, above all, preventing premature pregnancy and its associated risk for both mother and child. Early intervention is particularly critical in adolescent girls whose nutritional status is marginal to begin with, so that they enter their first pregnancy in a better nutritional state. Improving adolescent girls' nutrition has the following reproduction-related benefits (Gillespie 1997):

• increased pre-pregnancy weight and body stores of nutrients, thus contributing to improved future pregnancy and lactation outcome, while preserving the mother's nutritional status and well-being;
• improved iron status with reduced risk of anaemia in pregnancy, low birth weight, maternal morbidity and mortality, and with enhanced work productivity and perhaps linear growth;
• improved folate status, with reduced risk of neural tube defects in the newborn and megaloblastic anaemia in pregnancy.

Small girls are likely to become small women who are more likely to have small babies, particularly if at a young age. Improving adolescent girls' nutrition and delaying their first pregnancy may be a promising intervention point to break this intergenerational cycle of malnutrition (ACC/SCN 1992; UNICEF 1998).

There is growing evidence that foetal (and early infancy) malnutrition may be involved as a risk factor for chronic diseases in later life, in particular coronary heart disease, type-2 diabetes, and metabolic disease (Barker 1994). Thus, improving adolescent girls' nutrition before pregnancy (and during, but it is a second choice) may also contribute to break the vicious cycle of malnutrition, poverty and chronic disease.

Improving adolescent girls' nutrition has benefits other than for reproduction. The well-being and long term nutritional health of women are legitimate goals in themselves. Women are also the key to household food safety and nutrition (Quisumbing et al, 1998).

Improving their nutritional status and enhancing their nutrition-related skills is therefore likely to have long-range benefits for themselves and their families.

How to reach communities and households through adolescents effectively for nutrition intervention?

Many adolescents are in school, which provides an effective and efficient opportunity for reaching large portions of the population beyond students themselves: school personnel, families, community members (WHO 1996).

Reaching the communities through adolescents can be done in the following ways:

- Initiating School Nutrition Programmes, so that children can act as agents of change at the household level.
- Peer approach to health education, it allows nutrition education to reach not only to peers of the adolescents involved, but also other youth in the environment. It may use school or any other community based institution as an entry point.

Also, the participation of youth in health education allows them to develop relations with adults outside their family and to acquire a sense of responsibility and belonging within a social group (Pommier et al, 1997).

- **Why do adolescents require more food?**

  Adolescence is a period of continuous growth and development.
  - During the pre-adolescent period the child grows, on an average, 6-7 cm in height and 1.5 to 3 kg in weight every year and simultaneously development and maturation of various tissues and organs take place.
  - Adolescent period (teenage) is spread almost over a decade. It is characterized by rapid increase in height and weight, hormonal changes, sexual maturation and wide swings in emotion.
  - Adolescent growth spurt starts at about 10-12 years in girls and two years later in boys.
  - The annual peak rates for height and weight are 9-10 cm and 8-10 kg.
  - Development of critical bone mass is essential during this period as this forms the ground for maintaining mineral integrity of the bone in later life.
  - The pattern and proportion of various body components like body water, muscle mass, bone and fat increase during the entire childhood and adolescence to reach adult values by about 18 years.
  - Adolescent girls are at greater physiological stress than boys because of menstruation. Their nutritional needs are of particular importance as they have to prepare for motherhood. All these rapid anabolic changes require more nutrients per unit body weight.

Why adolescence is regarded as a period of nutritional vulnerability?

Adolescents are a nutritionally vulnerable group for a number of specific reasons, including their high requirements for growth, their eating patterns and lifestyles, their risk-taking behaviours and their susceptibility to environmental influences. Inadequate nutrition in adolescence can potentially retard growth and sexual maturation, although these are likely consequences of chronic malnutrition in early infancy and childhood. It can affect

adolescents' current health and put them at high risk of chronic disease as well, particularly if combined with other adverse lifestyle patterns, even if the detrimental effects may take long to show.

Compounded with growth, adolescent pregnancy exposes both mother and child to adverse health and socioeconomic consequences, particularly if the mother is stunted or undernourished. Hard physical work, as commonly observed in low-income countries, may impose additional physiological stress and nutritional requirements in adolescence. In certain cultures, from infancy onwards including adolescence, girls are at particularly high risk because of gender discrimination.

Adolescents, particularly girls, are increasingly conscious of their body and this has a bearing on their diet. Teenage girls may excessively restrict their energy intake out of a desire to be thin, which is an additional factor of health risk. In addition to this, adolescent girls as a group may be at risk for inadequate intake of iron and calcium. Athletics may also increase physiologic stress in adolescents and therefore increase nutritional risk

What are the major nutritional issues of adolescents in our country?

- Undernutrition and associated deficiencies, often originating earlier in life;
- Iron deficiency anaemia and other micronutrient deficiencies;
- Obesity and associated cardiovascular disease risk markers;
- Early pregnancy;
- Inadequate or unhealthy diets and lifestyles.

How does iron deficiency affect adolescents?

Iron deficiency and anaemia has been identified as one of the major health and social problems affecting the youth. Anaemia whether or not the primary cause iron deficiency is generally recognised the main nutritional problem in adolescents. Iron deficiency anaemia in India as high as 55%.

Young boys and girls are at equal risk. Boys have high demand of iron because of muscle mass development. As the growth of the adolescents slow down, boys' iron status improve.

Girls usually have a higher anaemia rates due to onset of menarche. Heavy menstrual blood loss may be an important factor of iron deficiency anaemia and may be related to a vitamin A deficiency.

Low iron intakes alone do not fully account for the high prevalence of anaemia. Other factors such as low vitamin C intakes and some aspects of lifestyle such as dieting for weight loss and untutored adoption of vegetarian diets were associated with increased risk.

What are the complications associated with adolescents who are obese?

Obesity is increasing in most high-income countries, in developing countries undergoing nutrition transition, and even in poor countries with current food insecurity and undernutrition problems. The health consequences of overweight and obesity in adolescence have been thoroughly reviewed (WHO 1998). Obesity-related symptoms in adolescents include psychosocial problems, increased cardiovascular risk factors, abnormal glucose metabolism, hepatic gastrointestinal disturbances, sleep apnoea (in children) and orthopedic complications.

Obesity in adolescence may have serious health and psychosocial consequences. For some, the greatest hazards of adolescent obesity are the social and psychological difficulties that also may persist into the adult years, although for others, obesity in adolescence may have limited emotional implications. Adolescents are sensitive about body image and obese teenagers are especially vulnerable to social discrimination. Poor self-esteem and body image are consistently associated with obesity in adolescents. In women, obesity at adolescence may even affect future socioeconomic and marital status.
The major long-term health problems associated with adolescent obesity are its persistence in adult life and its association with cardiovascular disease risk in later life. While a genetic component in the aetiology is acknowledged, environmental factors play a central role. High-fat diets and sedentary lifestyles are considered major causes (WHO 1998).

What are the dietary tips for adolescents who are obese?
Maintaining healthy weight for good health is important. Adolescents should keep in mind:

- Incorporate physical activity and healthy eating habits to facilitate weight loss.
- Eat small frequent meals.
- Eat small portions of foods.
- Eat healthy food at home and avoid processed food items.
- Eat meal in one place without distractions.
- Avoid canned juices and sugar containing beverages.
- Avoid fried foods and excess intake of butter, ghee.
- Increase fibre in diet; consume good quantities of fruits and vegetables along with whole grains.
- Do not diet or restrict certain food groups because it will deprive the body of important nutrients needed for growth and development.

- **Why calcium requirement of adolescents is high?**
  Calcium is required for growth and bone development. Calcium also prevents osteoporosis (thinning of bones). Adolescents particularly require more calcium. Though recommended dietary allowances for calcium are about 600-800 mg/d only, it is desirable to give higher quantities of calcium for adolescents to achieve high peak bone mass.

- **What measures should be taken to ensure adequate calcium levels in body of children and adolescents?**
  Calcium is extremely important for proper growth and development of adolescents. To maintain adequate calcium levels in the body:
  - Calcium rich diet should be consumed;
    - Milk, curds and nuts are rich source of bio-available calcium.
    - Ragi and GLV's are also good dietary sources of calcium.
  - Regular exercise reduces calcium loss from bones
  - Exposure to sunlight maintains Vit-D status which helps in calcium absorption.

- **How can the nutritional requirement of children and adolescents be met?**
  To meet the nutritional requirements of children and adolescents, emphasis should be on the following:
    - Young children below the age of 5 years should be given less bulky foods, rich in energy and protein such as legumes, pulses, nuts, edible oil/ghee, sugar, milk and eggs.
    - Vegetables including green leafy vegetables and locally available seasonal fruits should be part of their daily menu.
    - Snacks make a useful contribution to the nutrient requirements, particularly in older children and adolescents.
    - Frequent changes in the menu are often liked by children.
    - Older children and adolescents should consume plenty of milk to fulfil the high calcium requirements.
    - Cooking oils/ghee (25-50g) should be consumed.
    - Overindulgence in fats may be avoided.
    - Excessive salt intake should be avoided particularly by children having a family history of hypertension.

- **Why is Adolescence considered as a vulnerable stage?**
  Adolescence is the vulnerable stage for developing wrong food habits as well as bad habits like smoking, chewing tobacco or drinking alcohol. These should be avoided. In addition to consumption of a nutritious well balanced diet, appropriate lifestyle practices and involvement in physical activity such as games/sports should be encouraged among adolescents.

- **Why early pregnancy is considered a risk factor of health and nutritional risk in adolescence?**

Early pregnancy exposes mother and child to risk owing to potential competition for dietary energy and nutrients, and also because of physiological immaturity of the young mother. Furthermore, the more undernourished or stunted the young mother is, the more immature she may be for her age, and consequently the higher the level of risk. Physical growth, mental and sexual development of girls during adolescence may have a critical effect on their capacity to carry successful pregnancies, and the health and nutritional status of today's adolescent girls will largely determine the quality of the next generation.

Total nutritional requirements of pregnant adolescents who are at least two-year post-menarche are reportedly similar to those of pregnant adults. However, the problem is that they often enter pregnancy with reduced nutritional stores and hence at increased risk of nutritional deficiencies. This may be due to unsatisfactory eating habits, or inadequate intake as a result of poor access to food, particularly in developing countries.

Outcomes to consider are maternal mortality and morbidity, birth weights and prematurity and lactational performance according to age, maturity and environmental factors. Socioeconomic consequences of early pregnancy also have to be addressed.

What is body image?

The concept of 'body image' has become nearly synonymous with the physical appearance-related aspect of the notion, and it is currently defined as made of three components: perception of body size and its accuracy; a subjective component of feeling satisfied or not with one's body; and a behavioural aspect. Body image is important in adolescence, and disturbances are in relation with obesity, dietary disorders and psychological discontent. Based on available evidence, concerns with body image exist across gender, BMI and ethnic groups.

These issues need to be addressed by all those who work with youth. Many theories have been proposed to explain body image disturbances and their link with eating disorders, but most researchers appear to agree that the strongest influence in western societies is the sociocultural factor.

Historically, and until societies no longer have food availability problems, fatness has been the ideal, and a sign of health and prosperity. With economic development and affluence, there is a progressive shift towards thinness as the ideal body habitus and even the social norm, while obesity becomes more widespread as a result of increased access to high-fat processed foods and to motorized transportation and hence a sedentary lifestyle.

How body image affects adolescents?

Dissatisfaction with weight is highly prevalent even among the non-overweight girls (and some boys). It is of major concern, since body dissatisfaction is the strongest predictor of disordered eating behaviours. Some of the risk factors for intake inadequacies and unhealthy weight-control practices included low SES, minority status, poor school achievement, low family connectedness and weight dissatisfaction.

These behaviours are highly prevalent, which indicates the strong concerns about body weight, size or shape. The most frequently reported behaviour for weight control was, encouragingly, exercise, and followed by dieting.

Older age and lower SES are additional risk factors. For instance, girls are more concerned than boys with their weight, and felt guilt about eating; while girls showed more health concerns in choosing their food, there were more girls than boys who would sometimes eat out of boredom. It has been found that body image, body weight, and food-associated beliefs and behaviours of 12 to 15-year-old students who had attempted weight loss were significantly different from those of students who had not. Interestingly, it was observed adolescents who were satisfied with their body exercised more frequently than the dissatisfied ones, whether it was a cause or an effect.

What are the eating disorders in adolescents?

Eating disorders and disturbances have become leading chronic illness among adolescent females. Anorexia nervosa or bulimia represents only one extreme of a broad spectrum. Anorexia nervosa is less common than bulimia and tends to start in somewhat younger adolescent. Binge eating and night eating syndrome are eating disorders that are primarily found among obese persons. Although there is no clear evidence that these psychological conditions are the primary cause of people becoming obese, they are connected with the

obese condition, since these and other eating disorders are as yet rare in cultures where obesity is not a social stigma.

In modern societies where thinness is rather consistently emphasised, concerns about body weight are increasing and becoming evident at increasingly young age, particularly among girls. Many emotionally healthy adolescents exhibit some signs associated with pathological eating disorders. The unique and striking characteristic of eating disorders is the adolescent's unrealistic and relentless pursuit of thinness. Among girls, concern and preoccupation with thinness is related to SES, race and ethnicity.

Athletes who need to maintain a certain weight for competition may resort to extreme weight-loss measures that can impair both performance and health (diet pills, laxatives, starvation, etc). Weight and dieting concerns of adolescent athletes place them at greater risk of eating disorders and low-energy diets are more likely to be inadequate in micronutrients such as calcium, iron, magnesium, zinc and vitamin B6.

There may be in adolescents' extreme commitment to diet and exercise. Examining the relationship between obligatory exercise and eating disorders among adolescents, it was reported that obligatory adolescent exercisers (those for whom exercise is the central focus of their lives), who may be compulsive exercisers, displayed more disordered eating attitudes and traits than non-obligatory exercisers. However, unlike in eating disorders, obligatory exercisers did not show more dissatisfaction with their body shape than the non-obligatory exercisers; BMIs were not different either.

Also, sports that emphasize appearance, competitiveness, and lean body mass may be conducive to the development of both eating disorders and compulsive exercise.

How to manage eating disorders in adolescents?

Immediate help needs to be given to the adolescents with eating disorders.

- They need to be educated on the requirement and functions of various food groups in the body.
- An interdisciplinary approach that includes nutrition and psychiatry is needed.
- Involve the young person in food selection and preparation.
- Don't force feed or ignore behaviour because feeding too much too fast may result in refeeding syndrome.
- Don't allow over exercise.

Source: Nutrition in Adolescence –Issues and Challenges for the Health Sector
WHO DISCUSSION PAPERS ON ADOLESCENCE, World Health Organization 2005