### APPENDIX -1

**QUESTIONNAIRE FOR RESPONDENTS**

1. Identification number:  
2. Name:  
3. Class:  
   a. VIII  
   b. IX  
4. School:  
   a. Government  
   b. Private  

### A. PERSONAL AND SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

5. Age:  
   a. 13-14 years  
   b. 14-15 years  
6. Place of residence:  
   a. Rural  
   b. Urban  
7. Religion:  
   a. Hindu  
   b. Muslim  
   c. Christian  
8. Type of family  
   a. Nuclear  
   b. Joint  
9. Ordinal position  
   a. No sibling  
   b. Eldest  
   c. Middle  
   d. Youngest  
10. Mother’s Education  
    a. Illiterate  
    b. Primary  
    c. Hr.sec  
    d. College  
    e. Professional or technical  
11. Family income per month  
    a. < or Rs. 5000  
    b. Rs.5001-Rs. 10000  
    c. Rs. 10001-Rs. 15000  
    d. >Rs. 15000  

### B. Exposure to information on Adolescent Reproductive and Nutritional health

(i) Any opportunity to know about  
    ARH  
    a. Yes  
    b. No  
    ANH  
    a. Yes  
    b. No  

Sources of information on  

<table>
<thead>
<tr>
<th>ARH</th>
<th>ANH</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Mother</td>
<td>a. Mother</td>
</tr>
<tr>
<td>c. Relatives</td>
<td>c. Relatives</td>
</tr>
<tr>
<td>e. Health personnel</td>
<td>e. Health personnel</td>
</tr>
<tr>
<td>g. Films</td>
<td>? Films</td>
</tr>
<tr>
<td>b. Teacher</td>
<td>b. Teacher</td>
</tr>
<tr>
<td>d. Friends</td>
<td>d. Friends</td>
</tr>
</tbody>
</table>
A. Knowledge on growth and development of adolescents
   (i) The period of adolescent starts at the end of
      a. Adulthood  b. Babyhood  c. Childhood
   (ii) Growth spurt takes place during
      a. Adolescence  b. Adult  c. Childhood
   (iii) Puberty is the period
      a. Maturity of reproductive organs  b. Onset of menses  c. All round development
   (iv) Puberty starts at the
   (v) Name two physical changes during puberty in girls
      a. .......................................  b. .................................
   (vi) Name two physical changes during puberty in boys
      a. .......................................  b. .................................

B. Knowledge on Reproductive system and Menstruation
   (i) Name of male reproductive cell
      a. Sperm  b. Scrotum  c. Ovum
   (ii) Sperms are produced by
      a. Testicles  b. Penis  c. Prostate gland
   (iii) Number of ovaries in a female
      a. Four  b. Three  c. Two
   (iv) Number of eggs a normal girl releases every month
      a. Two  b. Four  c. One
   (v) P.M.S is
      a. Pre-menstrual syndromes  b. Post-menstrual syndrome  c. Para-medical science

C. Knowledge on Conception and Sex determination
   (i) The phenomenon of egg release from ovary is known as
      a. Ovulation  b. Fertilization  c. Menstruation
   (ii) Ovulation occurs
      a. In the middle of the menstrual cycle  b. During menstruation  c. Before the onset of next menstruation
   (iii) Nourishment for foetus is supplied through
      a. Fallopian tube  b. Placenta  c. Amniotic sac
   (iv) Normal gestation period is
      a. 280 days  b. 250 days  c. 200 days
   (v) Signs and symptoms of pregnancy
      a. No menstrual period  b. Irregular menstruation
   (vi) Adolescent pregnancy can lead to
      a. low birth weight  b. prolonged labor  c. maternal and infant mortality  d. all of the above
(vii) Sex is determined by  
   a. Father b. Mother c. both

D. Knowledge on RTI/STD/HIV/AIDS

(i) Causes of reproductive tract infections  
   a. nutritional deficiency b. unhygienic genital practices c. body heat
(ii) What is STD  
   a. seriously transmitted disease b. sex related disease c. sexually transmitted disease
(iii) Two most common STD are  
   a. ........................................ b. ........................................
(iv) What is AIDS  
   a. Active infection disease b. Acquired immuno deficiency syndrome c. Acute infectious disease
(v) What is the causative agent for AIDS  
   a. Clostridium bacilli b. Tuberculosis bacilli c. Human immuno deficiency virus
(vi) Symptoms of AIDS are  
   a. Weight loss b. Fever c. Diarrhea d. All the above
(vii) What test is used for diagnosing AIDS  
   a. Pap smear test b. Elisa test c. ECG

Knowledge scale on Adolescent Nutritional Health

A. Balanced diet

(i) Balanced diet includes  
   a. all food groups b. fruits and vegetables only c. cereals and pulses only
(ii) Cereals are rich source of  
   a. carbohydrate b. proteins c. fat
(iii) Pulses are rich source of  
   a. carbohydrate b. proteins c. fat
(iv) Vegetables are rich source of  
   a. carbohydrate b. proteins c. minerals and vitamins
(v) Food guide pyramid helps us to know  
   a. Food groups b. Nutrient of the food c. Nutrient required
(vi) Inadequate nutrition during adolescence can significantly retard  
   a. Physical growth b. Sexual maturation c. Both

B. Knowledge on Adolescents’ nutritional requirement

Adolescent girl aged 13-14 years require

(i) Calorie  
   a. 2000-3700 calories b. 1500-3000 calories c. 1000-1500 calories
(ii) Proteins  
   a. 1 gm per kg body weight b. 0.5 gm per kg body weight c. 0.1 gm per kg body weight
(iii) Calcium a. 600 mg  b. 400 mg  c. 200 mg
(iv) Iron  a. 10 mg  b. 15 mg  c. 28 mg
(v) Two sources of iron rich food
    a. ..........................  b. ..........................
(vi) Two sources of calcium containing food
    a. ..........................  b. ..........................
(vii) One rich source of vitamin C
(viii) Water intake per day for adolescent should be
    a. 7-8 glasses  b. 5-6 glasses  c. 3-4 glasses  d. 2-3 glasses

C Knowledge on Adolescents’ eating habits and food fads
(i) Which motives are most likely to influence adolescent food choices
    a. desire to be accepted by peers  b. food availability
    c. desire to attain certain body shape  d. all of the above
(ii) Anorexia nervosa is a
    a. self starvation  b. eating more  c. getting nervous
(iii) Bulmia nervosa
    a. eating disorder  b. mental disorder  c. physical disorder
(iv) A vegetarian diet
    a. provide adequate nutrient  b. provide inadequate nutrient  c. none
(v) Acne vulgaris can be cured by
    a. balanced diet  b. applying cosmetics  c. none

D Knowledge on major nutritional deficiencies during adolescence
(i) Malnutrition is characterized by
    a. Imbalance between intake of nutrients and demand of energy
    b. Balance between intake of nutrients and demand of energy
    c. No intake of nutrients
(ii) Inadequate amount of calcium leads to ..............................
(iii) Inadequate amount of iron leads to ..............................
(iv) Iodine deficiency leads to ..............................
(v) Body mass index is
    a. predictive for adult obesity  b. weight of body  c. height of body
(vi) Obesity is indicator of
    a. good health  b. malnutrition  c. none
### ATTITUDE SCALE ON ADOLESCENT REPRODUCTIVE HEALTH

<table>
<thead>
<tr>
<th>S.No</th>
<th>ATTITUDE</th>
<th>AGREE</th>
<th>DISAGREE</th>
<th>UNDECIDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Adolescent should be given more freedom to take decisions.</td>
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<tr>
<td>2.</td>
<td>Attraction towards opposite sex is a part of development.</td>
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<td>3.</td>
<td>Rapid changes in the physical development makes the Adolescent more self conscious.</td>
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<td>4.</td>
<td>A girl should be married immediately after her puberty.</td>
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<tr>
<td>5.</td>
<td>Reproductive system and Menstruation A girl should not work in the kitchen during menstruation.</td>
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<tr>
<td>6.</td>
<td>One should not take bath during menstruation.</td>
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<tr>
<td>7.</td>
<td>During menstruation a girl becomes unclean or impure.</td>
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<td>8.</td>
<td>A girl should be isolated during her menstruation.</td>
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<tr>
<td>9.</td>
<td>Girls should sleep on mats during menses.</td>
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<tr>
<td>10.</td>
<td>Conception and Sex determination Pregnant mother should be given emotional care.</td>
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<tr>
<td>11.</td>
<td>Adolescent pregnancy is dangerous.</td>
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<tr>
<td>12.</td>
<td>Pregnant mother should not eat more food.</td>
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<tr>
<td>13.</td>
<td>Mother is responsible for the sex of her child.</td>
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<tr>
<td>14.</td>
<td>RTI/STD,HIV,AIDS People with HIV should stay in hospital all the time.</td>
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<tr>
<td>15.</td>
<td>Most of the women who have HIV/AIDS are prostitutes.</td>
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<tr>
<td>16.</td>
<td>STD/STI can only be transmitted via the genitals.</td>
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<tr>
<td>17.</td>
<td>Blood of even close relatives of patients should be tested before it is given for transfusion.</td>
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<tr>
<td>18.</td>
<td>AIDS person should live in isolation</td>
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<tr>
<td>19.</td>
<td>It is unsafe to share bed clothes and dishes with HIV infected person.</td>
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<tr>
<td>20.</td>
<td>To avoid STD,HIV,AIDS sex education should be given in schools</td>
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</tbody>
</table>
# Attitude Scale on Adolescent Nutritional Health

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Attitude</th>
<th>Agree</th>
<th>Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Balanced Diet</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Compared to girls, nutrition of boys is more important as they should have better body built.</td>
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<tr>
<td>2.</td>
<td>Under nutrition for girls is all right as girls should maintain slim figure.</td>
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<tr>
<td>3.</td>
<td>Teenagers who eat breakfast tend to do better in academic performance than those who regularly skip breakfast.</td>
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<tr>
<td>4.</td>
<td>Idly-sambhar alone is enough for a balanced diet.</td>
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<tr>
<td></td>
<td><strong>Adolescents’ Nutritional Requirement</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Adolescent need for energy and protein is lower than what is needed by children.</td>
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<tr>
<td>6.</td>
<td>Adolescent girls should avoid milk as milk is fattening.</td>
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<tr>
<td>7.</td>
<td>Taking more iron rich food will lead to more bleeding for adolescent girls.</td>
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<tr>
<td>8.</td>
<td>For intake of dairy products ice cream is better option than curd.</td>
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<tr>
<td>9.</td>
<td>Vitamins and minerals tablets are better substitute for fruits and vegetables.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>Adolescents’ Eating Habits and Food Fads</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10.</td>
<td>Noodles are more nutritious than fruit chat.</td>
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<tr>
<td>11.</td>
<td>Cold drinks is more refreshing than fruit juices.</td>
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</tr>
<tr>
<td>12.</td>
<td>Potato chips should be taken as snacks frequently as it is good source of energy.</td>
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<tr>
<td>13.</td>
<td>Eating advertised food items in T.V make us more glamorous.</td>
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<tr>
<td>14.</td>
<td>Eating and sharing chocolates gives more peer acceptance than sharing fruits.</td>
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</tr>
<tr>
<td>15.</td>
<td>Teenage females who are concerned about their figures should go for dieting.</td>
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</tr>
</tbody>
</table>
16. Saints should avoid onion and garlic as it stimulates sexual desire.

**Major Nutritional deficiencies during Adolescence**

17. Calcium deficiency occurs only in old age.

18. Adolescent girls who are from low socioeconomic background are only prone to anemia.

19. Iodine deficiency occurs only for tribal woman.

20. Malnutrition is prevalent only due to poverty.

### PRACTICE SCALE ON ADOLESCENT REPRODUCTIVE HEALTH

1. During menstruation how many times you should take bath
   a. Daily twice   b. Daily once   c. Once within two days

2. During menstruation you use
   a. Old reused cloth b. Sanitary pad c. Only undergarments

3. How many times you change your cloth used during menstruation
   a. Once a day b. Twice a day c. Thrice a day d. Four time a day

4. What material undergarments do you use
   a. Cotton b. Nylon c. No idea regarding material

5. If you get local itching in private parts what do you do
   a. Itch the area and ignore it b. Try to clean the area with dettol water

6. How do you dry your undergarments
   a. Dry under sun b. Dry in rooms c. Dry by hiding under other clothes

7. After passing urine, what do you do
   a. Clean the genitals with water b. No special care

8. For passing urine, do you
   a. Always search for clean toilets b. Not particular regarding cleanliness of toilets c. Often use open space

9. Points you will consider, before taking injection
   a. Syringe is disposable or not b. Not particular regarding syringe as health workers know it better

10. If you discover an AIDS patient beside you, what will you do
    a. Avoid him and do not try to touch him b. Guide him for medical care and maintain cordial relation c. Inform others and try to discard him from the society
PRACTICE SCALE ON ADOLESCENT NUTRITIONAL HEALTH

1. For your breakfast you have
   a. Cereals only  b. Cereals and pulses only  c. Cereals, pulses, vegetables
   d. Cereals, pulses, vegetables, fruits  e. Cereals, pulses, vegetables, fruits, milk or milk products
2. As snacks you will have
3. How many times do you eat daily
   a. 2 times  b. 3 times  c. 4 times  d. 5 times
4. For your packed lunch you bring
   a. Cereals  b. Cereals, pulses  c. Cereals, pulses, vegetables
   d. Cereals, pulses, vegetables, fruits  e. Cereals, pulses, vegetables, fruits, milk and milk products
5. Do you take greens daily  a. yes  b. no
6. Do you take egg daily  a. Yes  b. no
7. How many glass of milk do you take
   a. no milk  b. $\frac{1}{2}$ glass per day  c. a glass per day  d. 2 glass per day
8. Fast food taken frequently
   a. maggi  b. pizza  c. fruit chat
9. Beverages you consume frequently
   a. cold drinks  b. milk  c. tea
10. Due to lack of time and due to high pressure of studies do you
    a. skip breakfast/lunch  b. eat but amount is not adequate
    c. take proper food

Questionnaire for Teachers

1. Have you undergone any teachers’ training programme previously to teach students on adolescent reproductive and nutritional health?
2. Do you consider teachers’ training programme necessary, if yes, state your reason.
3. Do you think teachers are better person to teach school children on adolescent reproductive and nutritional health?
4. Are you willing to teach adolescent reproductive and nutritional health to your students?

Knowledge scale on Adolescent Reproductive Health

1. List any four of changes taking place in girls during adolescence
2. Name any two reproductive organs in girls
3. Name three essential needs during pregnancy
4. Name two common sexually transmitted infection
5. Name two ways by which HIV spreads
Knowledge scale on Adolescent Nutritional Health
1. Balanced diet includes..............
2. Energy requirements for adolescent girl is.
3. Two common eating habits among adolescent girls
4. Iron deficiency leads to..............
5. Iodine deficiency leads to............

### Attitude scale on Adolescent Reproductive Health

<table>
<thead>
<tr>
<th>S.No.</th>
<th>ATTITUDE</th>
<th>AGREE</th>
<th>DISAGREE</th>
<th>UNDECIDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sexual education should be imparted in schools by teachers.</td>
<td></td>
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<tr>
<td>2</td>
<td>Adolescents should feel free to talk about sexuality with teachers.</td>
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<tr>
<td>3</td>
<td>Learning about sex issues increase sexual urge.</td>
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<tr>
<td>4</td>
<td>Teaching about sex related matters in the classroom adversely affect the image of the teacher.</td>
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<tr>
<td>5</td>
<td>Sex workers are responsible for the spread of HIV.</td>
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</tbody>
</table>

### Attitude scale on Adolescent Nutritional Health

<table>
<thead>
<tr>
<th>S.No.</th>
<th>ATTITUDE</th>
<th>AGREE</th>
<th>DISAGREE</th>
<th>UNDECIDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nutrition education should be imparted in schools by teachers.</td>
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<tr>
<td>2</td>
<td>Nutritious diet is expensive.</td>
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<tr>
<td>3</td>
<td>Snacking among adolescents should be discouraged.</td>
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<tr>
<td>4</td>
<td>Weekly iron tablets should be provided to adolescent girls in schools free of cost.</td>
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<tr>
<td>5</td>
<td>Apart from studies matter teacher should council students regarding their health matters.</td>
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</tbody>
</table>

Among the following topics list out the topic in which you are not comfortable:

- growth and development of adolescents,
- reproductive system and menstruation,
- conception and sex determination,
- RTI/STD/HIV/AIDS,
- balanced diet,
- Adolescents’ nutritional requirements,
- Adolescents’ eating habits and food fads,
- major nutritional deficiencies during adolescence.
Situational assessment of adolescent girls

1] List out your problems related to your reproductive health.

2] List out your problems related to your nutritional health.

3] List out your needs related to your reproductive health on which you desire to require information.

4] List out your needs related to your nutritional health on which you desire to require information.

5] Your preferred mode of educational intervention on adolescent reproductive and nutritional health:
   1. Educational program from local health professionals
   2. School based training programme by Teachers within school system
   3. Educational programs by Experts
   4. Peer Group learning programs
APPENDIX-2

EDUCATIONAL INTERVENTION PROGRAMME
FOR ADOLESCENTS - NEED

There is an urgent need to provide adolescents with a set of ways and knowledge to deal with the demands and challenges of life. Since the ‘individual’ rather than the ‘system’ is recognized as the basic unit of the society, it is essential and a must to help the adolescents to acquire knowledge to handle challenges and stresses in their lives and work towards better health.

The researcher has made an attempt to introduce the present module with the following objectives:

- To help the students to understand the changes that takes place during adolescents and the process of growing up.
- To provide essential information to adopt health and risk-free reproductive health behavior as they enter into adolescent, adulthood and marriage.
- To understand the importance of good nutrition during adolescents.
- To describe the major nutritional problems affecting adolescents.
SESSION-I

GROWTH AND DEVELOPMENT OF ADOLESCENTS

<table>
<thead>
<tr>
<th>Objective</th>
<th>To know about growth patterns</th>
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<tbody>
<tr>
<td></td>
<td>To develop awareness on the sequence of changes during puberty</td>
</tr>
<tr>
<td></td>
<td>To identify emotional changes during adolescence</td>
</tr>
<tr>
<td></td>
<td>To clarify common features of Adolescence</td>
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<table>
<thead>
<tr>
<th>Time</th>
<th>120 minutes</th>
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<table>
<thead>
<tr>
<th>Materials</th>
<th>Information sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Related exercises</td>
</tr>
<tr>
<td></td>
<td>Work sheet - Growth Sequence</td>
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<tr>
<td></td>
<td>I.E.C. materials</td>
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</table>

<table>
<thead>
<tr>
<th>Technique used</th>
<th>Dissemination of information with students interaction and involvement</th>
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<table>
<thead>
<tr>
<th>Key points</th>
<th>Adolescence</th>
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<tbody>
<tr>
<td></td>
<td>Growth pattern</td>
</tr>
<tr>
<td></td>
<td>Puberty</td>
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<td></td>
<td>Sequence of Changes</td>
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</table>
Growth and development are natural process in every human being. The various developmental stages of a human being are - Infancy, childhood, adolescence, adulthood and old age.

W.H.O. defines adolescence as the period of life between 10-19 years.

**Adolescence**
- is the bridge between childhood and adulthood.
- is a period of transition when the individual changes physically and psychologically from a child to an adult.
- is a period when the individual attains sexual maturity.

Growth Patterns
Velocity of growth is different in different periods of life. It is high during the first years of life, then slows down and again reaches its peak.
Puberty

Puberty overlaps the end of childhood and the beginning of adolescence. It is a period in the development of the individual that is characterized by the beginning of the functioning of sexual organs. It refers to the physiological changes that the adolescent undergoes in order to reach sexual maturity.

Changes at puberty

*Growth spurt:* During the adolescent years with the onset of puberty there is growth spurt. Important physical changes occur which transform the child’s body into that of an adult.

- Changes in body size in terms of height and weight.
- Changes in body shape. In girls, the region below the waist becomes wider and in boys, the muscles of the body grow more prominently than in girls.

*Voice changes:* At puberty stage the voice box or the larynx begins to grow. Generally girls have high pitched voice, whereas boys have deep voice.

*Primary Sex Characteristics:* Physical features that involve the reproductive organs such as ovaries, uterus, and vagina in females; penis, scrotum and testes in males.
Secondary Sex Characteristics: In girls breast begins to develop and in boys facial hair [moustaches and beard], breasts knots develops. In both, boys and girls, hair grows under the arms and in the region above the thighs or in the pubic region.

SEQUENCE OF CHANGES

<table>
<thead>
<tr>
<th>The Female body clock</th>
<th>The Male body clock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast budding</td>
<td>Growth of testis and scrotum</td>
</tr>
<tr>
<td>Growth of bony pelvis</td>
<td>Straight pubic hair</td>
</tr>
<tr>
<td>Growth spurt arms and legs</td>
<td>First ejaculation</td>
</tr>
<tr>
<td>Pubic hair</td>
<td>Growth spurt – arms, legs, and penis.</td>
</tr>
<tr>
<td>First menstruation</td>
<td>Voice changes – growth of larynx.</td>
</tr>
<tr>
<td>Underarm hair and coarser body hair</td>
<td>Underarm hair</td>
</tr>
<tr>
<td>Oil and sweat producing glands</td>
<td>Oil and sweat gland activated.</td>
</tr>
<tr>
<td>Completion of the growth of the uterus and vagina</td>
<td>Facial hair – beard</td>
</tr>
</tbody>
</table>

Reaching Mental, Intellectual and Emotional maturity

Intellectual development takes place and they tend to spend considerable time in thinking. Increased production of hormones prompts sexual thoughts and day dreams in most young people; there is a heightened awareness of sexual attraction. There are frequent shifts of moods and increased feelings of independence and self conscious.

Common Features of Adolescence

- Adolescence tends to be a time of seeking status as an individual.
- It is a time when peer group relations become of major importance. The adolescent is usually most anxious to attain recognition by his or her age mates.
- It is a time when physical maturity is attained.
- It is a time of intellectual and of academic experience.
- It tends to be a time of development and of evaluation of values.
- It is a time of conflict between youthful idealism and reality.
Related Exercises

1. List all the physical changes which the adolescent boys and girls encounter

BOYS

GIRLS

2. Say true or false

a. The onset of puberty can vary widely.

b. The sequence in which the physiological changes take place during puberty is the same in all individuals.

3. Create discussions on the following topics.

1. Risk taking behaviors among adolescents
2. Demands privacy and tries for autonomy
3. Problems related to physical appearance, psychological (Problems in interpersonal relationship, family related issues) problems related to studies.
THE BODY CLOCK

Many changes happen during puberty, place a number from 1 to 8 in each circle to show the order
SESSION – 2

REPRODUCTIVE SYSTEM AND MENSTRUATION

Objective : To introduce the concept of reproductive health

To learn about male and female reproductive organs

To acquaint students with the process of menstruation and menstrual cycle

To enable the students to acquire knowledge on management of menstrual discomfort and on menstrual hygiene

Time : 120 minutes

Materials used : Information sheet

Related exercises

Work Sheet

I.E.C. materials

Technique Used : Dissemination of information with students’ interaction

Key Points : Adolescent reproductive health

Reproductive organs in girls and boys

Menstruation

Premenstrual syndrome

Menstrual hygiene,
INFORMATION SHEET

Reproductive health is defined by WHO as a state of physical, mental and social well-being in all matters relating to the reproductive system at all stages of life. Reproductive health implies that people are able to have a satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so.

The importance of reproductive health

Reproductive health is a crucial part of general health and a central feature of human development. It sets stage for health beyond the reproductive years for both women and men, and affects the health of the next generation. The health of the newborn is largely a function of the mother’s health and nutritional status and of her access to health care.

- Young people may have little information about reproductive health.
- There is a high prevalence of reproductive tract infection and gynecological morbidity among young women.

Female Reproductive Organs

The reproductive organs in a female are situated internally as well as externally.

FEMALE REPRODUCTIVE ORGANS

- **Uterus** or womb is a muscular peg shaped organ with a soft muscle lining called the endometrium. It is about 7.5 cm long and cm wide. It expands to accommodate the growing fetus during pregnancy.

- **Fallopian tubes** are narrow tubes which carry the mature ovum or egg cell from the ovary to the uterus. The ends of the tubes are funnel-shaped with finger-like processes which can easily trap the ovum released by the ovary.

- **Cervix** is the muscle that forms the lower end of the uterus. It has a small opening into the vagina.

- **Ovary** is an almond-size gland on either side of the uterus. Each ovary contains thousands of immature egg cells or ova, one of which matures every month. It also produces the female hormones.

- **Vagina** is an elastic, muscular, tube-shaped passage leading from the uterus to the outside of the body. The baby is delivered through it. The menstrual flow also passes out of the body through the vagina.
THE OVARIES produce the eggs which are fertilized by the sperm; fertilized eggs grow to become babies. The ovaries also produce hormones that influence the development of the female body.

THE FALLOPIAN TUBES connects the ovaries to the womb. When the egg is released from the ovary, it moves through the fallopian tube, where it can be fertilized by the sperms.

THE UTERUS (WOMB) is a small organ in which the fertilized egg attaches itself after passing through the fallopian tubes. The womb protects and nourishes the egg until it develops into a baby.

THE CERVIX is also called neck of the womb; it connects womb to the vagina.

THE VAGINA is the channel between the womb and the outside of the body.

Male Reproductive Organs

The reproductive organ in a male are situated internally as well as externally.

**MALE REPRODUCTIVE ORGANS**

- **Urethra**: The tube carrying urine and sperm through the penis and outside the body.
- **Bladder organ**: Where urine is stored.
- **Vas deferens**: The tubes carrying sperm from testicle to the urethra.
- **Seminal Vesicles**: A pair of organs which add fluid to semen.
- **Prostate gland**: The organ which adds fluid to sperm.
- **Testicles**: The two oval shaped glands that hang inside the scrotum. They begin to produce the male sperm cells during puberty. They also produce the male hormone sperms and are very tiny cells that can unite with the egg cell in a woman’s body to start a pregnancy.
- **Penis**: The male reproductive organ. Both urine and sperm pass out of the body through penis, but never at the same time. The size of the penis varies from person to person. The size is not related to sexual function.
- **Scrotum**: The sack of loose skin which holds and protects both the testicles.
THE TESTES are two egg-shaped organs in front of and between the thighs, inside a sac of skin called the Scrotum. The testes produce the sperm which fertilizes the egg to begin reproduction.

THE PENIS is the organ that places the sperm in the woman’s vagina. The sperms are carried in liquid called semen produced by seminal vesicles.

Menstruation

Menarche is the onset of first menstruation among girls. This is often recognized as the onset of maturity in girls. There are variations in the age at which menarche occurs. Good nutritional status will lower the age of menarche while in malnourished girls, attainment of menarche will be late.

The ovum produced by the ovaries when unites with the sperm, fertilization occurs and leads to pregnancy. If fertilization does not take place, the thickened spongy lining in the uterus to house the fertilized egg safely, is not required and is shed along with blood. That is called menstruation.

Menstruation occurs once a month as a regular rhythmic period. Menstrual cycle is a continuous process. It remains as a normal physiology phenomenon throughout the childbearing years of the young women except during pregnancy and lactation and stops permanently at menopause approximately between the ages of 45-55 years.

CHANGES DURING THE MENSTRUAL CYCLE

The menstrual cycle recurs regularly from puberty to menopause except when pregnancy intervenes. The standard cycle length is 28 days (23-35) days.

<table>
<thead>
<tr>
<th>Days</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Menstruation (the period)</td>
</tr>
<tr>
<td>5-7</td>
<td>Egg begins to grow in the ovary</td>
</tr>
<tr>
<td>7-11</td>
<td>Lining of the womb starts to build up to receive a fertilized egg</td>
</tr>
<tr>
<td>11-14</td>
<td>Release of the egg (ovulation)</td>
</tr>
<tr>
<td>14-21</td>
<td>Egg moves through the fallopian tube</td>
</tr>
<tr>
<td>21-28</td>
<td>If not fertilized reaches the womb, lining begins to break down</td>
</tr>
</tbody>
</table>

Pre-Menstrual Syndrome (P.M.S)

A combination of distressing, physical, psychological or behavioral changes which result prior to the onset of menstruation is known as pre-Menstrual Syndrome (PMS).
Common menstrual problems are - headache, bloating, weight gain, skin problems, fatigue, breast tenderness, poor concentration etc.

Some common menstrual disorders are - Pain during menstruation, absence of menstruation, scanty bleeding or excessive bleeding

**Menstrual hygiene**

Menstrual hygiene is very important to prevent Reproductive Tract Infections (RTI), local itching and bad odor.

> Take bath twice daily & always wear neat sun dried cotton clothes and under garments.
> After attending toilet, the inner thighs and labial folds should be cleaned properly with soap and water.
> Using of cloth or sanitary napkin is your personal choice, but make sure to change them frequently depending on the quantity of flow.
> Used clothes should be washed well and sun dried before reuse and do not use them for more then three months.
> Clothes used should not be too thick for it may cause irritation and itching.
> Before onset of flow it is comfortable to trim hair around the genitalia.
> Should drink at least 8 glasses of water daily and pass urine as and when desired.

**Certain suggestions for the pain and cramps during menstruation.**

> Hot water bag can be placed on abdomen or the lower back to reduce pain.
> If the cramps are very severe, physician should be consulted and proper medication should be taken.
> Should exercise regularly for strengthening the abdomen muscles and to minimize menstrual cramps.
> Seasame seeds are useful in menstrual disorder. Half a teaspoonful of powder of these seeds taken with hot water twice daily reduces spasmodic pain during menstruation.
> A teaspoon of fenugreek seeds soaked overnight can be taken in the empty stomach in the morning to reduce pain during menstruation.
> Adequate rest is necessary especially during heavy bleeding.
2.2 Mark the **statements** which are True/False.

a. During menstruation dirty blood comes from the body,

b. Once a girl attains menarche she is ready for marriage

c. Once a girl attains menarche only the reproductive organs have started functioning but not the girl ready to become a mother

d. A girl can become pregnant only after her menarche.

e. A girl can become pregnant before attains her menarche as the ovary releases the egg two weeks before the period.

3. a. List out the best practices for menstrual hygiene,

b. List out the problems due to poor menstrual hygiene practices.

**Work Sheet:** write the changes in the menstrual cycle corresponding to the days

<table>
<thead>
<tr>
<th>Days</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td>5-7</td>
<td></td>
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<tr>
<td>7-11</td>
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<tr>
<td>11-14</td>
<td></td>
</tr>
<tr>
<td>14-21</td>
<td></td>
</tr>
<tr>
<td>21-28</td>
<td></td>
</tr>
</tbody>
</table>
SESSION - 3

CONCEPTION AND SEX-DETERMINATION

Objective : To acquaint students with the process of ovulation and fertilization

To familiarize them about pregnancy signs and symptoms and essential needs during pregnancy

To enable them know the risks of adolescent pregnancy.

To make them know about sex determination

Time required : 120 Minutes

Material : Information sheet

Related exercises

I.E.C. materials

Technique Used : Dissemination of information with students interaction and receiving feedback

Key terms : Conception,

Ovulation,

Fertilization

Implantation,

Adolescent Pregnancy

Sex-determination.

xiv
CONCEPTION is the process of an egg being FERTILIZED by a sperm cell inside a women’s body so that she becomes pregnant. Conception occurs after ovulation and is followed by implantation.

OVULATION is the process of escape of one mature ovum during the menstrual cycle
- It occurs in the middle of the menstrual cycle, with the average on the 14th day.
- After being released from one of the follicle the ovum finds its way into the fallopian tube.

Multiple birth results when two or more mature ova are released from the ovaries.

FERTILIZATION

The semen contains millions of sperms. The sperms, once deposited in the vagina, make their way at a very rapid rate to the uterus and the fallopian tubes. As sperms reach the ovum in fallopian tube, fertilization takes place.

PROCESS OF FERTILIZATION:

Penetration occurs when the outer layer of the sperm unites with the membrane surrounding the ovum.
- The sperm as a whole enters the ovum. The ovum develops a reaction which prevents others sperms from gaining entry to it.
- The fusion of nuclear materials from the two sex cells occurs. After fertilization the fertilized ovum which has become a zygote travels from the fallopian tube to the uterus.
Implantation
Embedding or implantation is the process by which the fertilized ovum penetrates the uterine mucosa and continues to grow within it. The zygote takes 4 or 5 days to reach the uterine cavity.

Pregnancy
- The human foetus lives inside the mother for 9 months. This is called the gestation period.
- About one week after conception, the cells begin to specialize; some will form skin, other nerve, bone, blood or glands.
- Some cells develop into the placenta which is the organ that supplies the foetus with oxygen and nutrition. It also carries off the foetus waste products.
- The placenta is attached to the foetus by the umbilical cord.
- The foetus lives in the amniotic sac. This sac is filled with fluid which acts as a cushion to protect the foetus.
- Although the gestation period usually lasts about 280 days, some babies are born sooner.
- Babies born before they have completed the gestation period are called premature and need special care.

As the gestation period ends, the completely developed foetus [usually turned to a head-down position] waits for birth.

Signs and symptoms of pregnancy:
- A missed menstrual period
- General tiredness and loss of energy
• Breast feel tender and swollen
• Frequent urination
• Morning sickness

**Essential needs during pregnancy:**
• Regular attendance at antenatal care
• Balanced diet
• Exercise
• Rest, relaxation and sleep
• Emotional support

**Age for marriage:** In our country, the legal age for marriage is 18 years for girls and 21 years for boys. This because teenage mothers are not prepared physically or mentally for motherhood.

**Risks involved in adolescent pregnancies**
- Adolescent pregnant mothers are more likely to suffer form anemia and have low birth weight children.
- There is a greater likelihood of prolonged labor that multiplies the hazards for both, the mother and the child.
- Pregnancy at an early age can lead to severe damage of the reproductive tract.
- Adolescent pregnancy increases the risk of maternal and child mortality.
- Adolescent pregnancy curtails educational and employment opportunities for the girls and is likely to have long term adverse impact on the quality of family life.

**Sex determination**
- Sex determination depends entirely upon the male. The woman has absolutely no role in the determination of sex of the child before birth.
- All human beings have 46 chromosomes. 22 pairs are known as autosomes and they determine various factors such eye colour, hair colour etc. One pair is known as sex chromosomes and is responsible for the sex of the child. The mother has xx chromosomes and the father has xy chromosomes. It would be a girl if the ‘x’ chromosome from the male sperm fertilizes the ‘x’ chromosome of the woman. It would be a boy if the ‘y’ chromosomes of the male sperm fertilizes the ‘x’ of the female.
### Mother Ovum

<table>
<thead>
<tr>
<th>Father Spermetozoa</th>
<th>22 autosomes +X</th>
<th>22 autosomes +X</th>
<th>22 autosomes +X</th>
<th>22 autosomes +Y</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Girl</strong></td>
<td>22 autosomes +X</td>
<td>22 autosomes +X</td>
<td>22 autosomes +X</td>
<td>22 autosomes +Y</td>
</tr>
<tr>
<td><strong>Boy</strong></td>
<td>22 autosomes +X</td>
<td>22 autosomes +X</td>
<td>22 autosomes +X</td>
<td>22 autosomes +Y</td>
</tr>
</tbody>
</table>

### Related Exercises

I. Arrange the following statements describing the process of fertilization in order from 1 to 4.

A. The fertilized ovum travels from the fallopian tube to uterus.

b. The semen of the male is deposited in the Vagina.

c. The sperms make their way to the uterus and fallopian tube.

d. When the sperm reaches an ovum fertilization occurs.

SAY true or false

a. Mother has no role in the sex determination of the child.

b. ‘xx’ combination determines female child

c. ‘xy’ combination determines male child.
SESSION- 4

RTI/STD/HIV/AIDS

**Objective**
To raise an awareness of RTI
STD
HIV / AIDS

**Time**
120 minutes

**Materials used**
Information sheet,
Related exercises
I.E.C. materials

**Technique used**
Dissemination of information with students’ interaction and receiving feed back

**Key terms**
Reproductive tract infections [RTI]
Sexually transmitted infections HIV/AIDS
Reproductive tract infections [RTI]

Reproductive tract infections [RTI] are emerging as a major health concern among the adolescents. Generally RTI refers to the infections, which affect the reproductive tract. Infections result from an overgrowth of organisms normally present in the vagina.

Why adolescents are prone to infections

> Poor toilet training and wrong method of cleaning the perineum from back to front.
> Hygiene measures during menstruation may be insufficient
> General hygiene like changing of under garments may be insufficient.
> Early marriages and teenage pregnancies cause added problems and complications.
> Poor nutrition
> Lack of drinking water and not passing urine frequently. Girls often do not drink water nor may pass urine at school because of dirty toilets and this results in urinary tract infection.

Causes of RTI

Iatrogenic infections

> Occurs when the cause of infection a bacterium or other micro-organisms is introduced into the reproductive tract through introduction of foreign body e.g.-insertion of the IUD

Sexually transmitted infections

> Are caused by viruses, bacteria or parasitic micro-organisms that are transmitted through sexual activity with an infected partner. STI can also be transmitted from mothers to new born during pregnancy and childbirth.

Urinary tract infections

> Urinary tract infections are caused by bacteria in the urinary tract.

Sexually transmitted diseases

Sexually transmitted diseases are diseases which usually are contracted through sexual relations. Some common STD are Gonorrhoea, syphilis, ChANCroid, Herpes, Chlamydia.
Symptoms

All STD do not have same symptoms. Many men and women can have an STI, without any sign or symptom. The following complaints could indicate presence of STI in a sexually active person.

> Sores, bumps, blisters, painful ulcers on or next to sex organs.
> Burning or pain while urinating.
> Swelling in the area around the sex organs.
> Pain in the pelvic area between naval and sex organs
> Unusual vaginal discharge
> Bleeding between periods.

Prevention of RTI / STD

> Using safely measures regarding sex.
> Maintaining personal hygiene.
> Early diagnosis of and treatment of any infection if at all found.

AIDS stands for acquired immune deficiency syndrome. The causative agent of AIDS is a virus called HIV [Human immuno deficiency virus]. HIV damages the body’s immune system, leaving it unable to fight off infections and cancers.

Mode of transmission

- Sexual intercourse
- Infected blood/blood products
- Contaminated needless
- Mother to child- In uterus, at birth, breast milk
- Organ/tissue Donation- semen, kidney, skin, bone marrow, heart valves, tendons etc.

Clinical signs of AIDS

Major signs

- Weight loss greater than 10% of body weight
- Fever for longer than one month
- Diarrhea for longer than one month
- Persistent severe fatigue
Minor signs
• Cough for more than one month
• Itchy skin rashes
• Cold sores all over the body
• Shingles
• Swollen glands of two or more sites for more than 3 months
• Thrush in the mouth and throat

How HIV Spreads
• Parentally - from infected mother to unborn child
• Intravenous injecting drug use.
• Parenterally - from injected blood, blood products, infected syringes and needles.
• Sexually from infected partner.
How HIV does not spread

- Kissing, hugging, shaking hands
- Coughing, sneezing
- Using common toilets
- Sharing meals, utensils, drinks, cloths
- Swimming with infected person
- Mosquito bites.

IMMUNOPATHOLOGY OF AIDS

Immune deficiency because the virus destroys body’s system, and as a result the person is more likely to get illness which the body would normally is able to fight off easily. And syndrome describes the different signs and symptoms of the illness that results from the HIV infection.

Diagnosis:

ELISA TEST

In ELISA TEST blood and other body fluids are tested with indicator solutions that detect the presence of antibodies directed against HIV.

WESTERN BLOT TEST

The ELISA test can indicate whether antibodies against HIV are present or not. If antibodies are found to be present, then it is usually all the more necessary to find whether the antibodies are caused by infection with HIV or the test has found antibodies that are cross reactive with HIV antibodies without the presence of HIV. This is possible only by using a more sophisticated, namely the western BLOT test.
Prevention

• Having single mutual faithful sexual relationships
• Avoid sharing razors
• Avoid sharing tooth brushes
• Providing sterile needles to intravenous drug uses
• Always use condoms when having sex, if you are unsure of the HIV status of the partner.
• Do not have sex with persons who inject drugs
• Do not inject illegal drugs.
• Avoid sexual practices that can damage body tissue
• Limit the number of sex partners.
• Know your sex partners and ask them about their health.
• Screening all donated blood for HIV antibodies and discarding any seropositive blood.

Related Exercises

I. Say myth or fact

1. STD can spread through dirty toilet seats.
2. A person will not get STD a second time, if the infection is properly treated in the first time.
3. A person can have STD and not have symptoms
4. Like other STD, HIV is transmitted through sexual intercourse or through infected blood.
5. Mosquitoes do not transmit HIV infection.
6. All of us are vulnerable to HIV infection.
7. Safe sex helps to avoid AIDS

II. Answer the following question:

1. The virus that causes AIDS is
2. Two major signs of AIDS are
   A
   B
3. Write down three important ways of preventing people from getting STD
   A
   B
   C
SESSION - 5

BALANCED DIET

<table>
<thead>
<tr>
<th>Objective</th>
<th>Importance of nutrition during adolescence</th>
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<tbody>
<tr>
<td></td>
<td>Food and its function</td>
</tr>
<tr>
<td></td>
<td>Constituents of balanced diet</td>
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</table>

<table>
<thead>
<tr>
<th>Time Required</th>
<th>120 minutes</th>
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<table>
<thead>
<tr>
<th>Material</th>
<th>Information Sheet</th>
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<tbody>
<tr>
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<td>Related exercises</td>
</tr>
<tr>
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<td>I.E.C. materials</td>
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</table>

<table>
<thead>
<tr>
<th>Technique Used</th>
<th>Sharing of information</th>
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<tr>
<td></td>
<td>Group Discussion</td>
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<table>
<thead>
<tr>
<th>Key Terms</th>
<th>Balanced diet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food guide pyramid</td>
</tr>
</tbody>
</table>
Importance of Nutrition during Adolescence

The adolescent period represents a time of extremely rapid growth and development accompanied by an increased need for energy and nutrients. If an adequate diet is not consumed during the adolescent years, the body will not have the required building materials which will help to reach its full potential for growth and development. Growth deficiencies caused by an inadequate diet in adolescence cannot be reversed later in adult life. In addition, an adequate diet may prevent an adolescent from participating and succeeding in school, athletic, and social activities to the fullest extent.

Food and its functions

In order to understand growth deficiencies, it is important to have basic knowledge about food and functions. Our body needs different kinds of foods which perform different functions. The food can be divided into

1. Energy giving foods (carbohydrates & fats)
2. Body building foods (proteins)
3. Immunity developing and protective foods (minerals & salts)

Energy giving foods

All cereals like jowar, bajra, maize, wheat and rice, sweet foodstuffs like jaggery and sugar, all oils, and fats like groundnut oil, mustard seed oil, ghee, and starchy roots and tubers like potatoes, sweet potatoes, colocaisia, yam, etc. provide energy to perform our day to day activities.

Body building foods

Food plays an important role in the formation of new cells and in the replacement of dead cells. Body building foods include pulses like bengal gram, red gram, green gram, black gram etc., milk and milk products, Non vegetarian foods such as eggs, meat, chicken and fish, etc.

Immunity raising and protective foods

Foods rich in vitamins and minerals are included in this group. These foods can be subdivided into

(a) protection from illness
(b) keeping eyes healthy and
(c) keeping blood healthy
(a) **Foods** which **protect from** illness
Green leafy vegetables, fruits, milk and milk products like yoghurt and buttermilk protect our body from illness diseases. These nutrients are also found in non-vegetarian foods, sprouted pluses and grains.

(b) **Foods which keep our eyes** healthy
Vitamin A rich foods keep our eyes healthy. They are found in milk and milk products, green leafy vegetables like fenugreek, spinach, mustard leaves, etc. There are also found in abundance in yellow and orange foods like papaya, mango, carrots etc. and non-vegetarian foods like egg and liver.

(c) **Foods which keep** blood **healthy**
Iron, vitamin C and proteins rich foods are required to keep our blood healthy. Iron is found in jaggery and green leafy vegetables like spinach, fenugreek, and finger beans.

It is necessary to eat sour foods like amla, guava, and lemon along with above mentioned foods so that iron is absorbed effectively into the body. Eating germinated pulses and milk and milk products along with rich sources of iron is also beneficial for blood.
The food guide gives a guideline to the choice of food groups in day to day practice. Cereals and pulses should be consumed in 5-10 servings a day. Vegetables should be consumed in 3-5 servings, fruits, milk and milk products and non-vegetarian items like fish, poultry, meat in 2-3 servings and fats, oils and sugars sparingly.

**BALANCED DIET**

It is clear from the above description that balanced nutrition is necessary for proper functioning of our body. To get a balanced diet it is important to use all food groups in adequate amount everyday. So every adults should use

- 1 glass milk
- 1/2 cup green leafy vegetable
- 1/2 cup other vegetables
- One root or tuber
- One seasonal fruit
- Adequate amount of cereals
- 2 cup of cooked pulses
- * 5-6 teaspoons of fat
- One egg or 100 g. of non-vegetarian food.

**Better Nutrition - No extra Cost**

1. Make chapattis mixing 2 to 3 different types of flours, for example, chana flour, bajara and wheat flour.
2. Cook 2 or 3 pulses together or a pulse and cereal so as to improve the protein quality. A pulse and vegetable can also be cooked together, for example, chana dal and gourd.
3. Seasonal and locally available vegetables and fruits should be consumed as much as possible.
4. Sprouted pulses should be consumed regularly as they are rich in vitamins and proteins.
5. Make recipes from fermented foods, like idli, dhokla, etc., as they are high in proteins and vitamins. Also it is easily digestible.
6. Use more jaggery in place of sugar as it is a good source of energy and iron.
7. Vegetable oil provides the same amount of nutrition as ghee and are easy to digest and lower in cost.
8. Vegetarians should consume more groundnuts, seasame seeds and soybeans as they are rich in protein.
9. Eat more fresh vegetables and fruits. These can be prepared in the form of salads.
10. Milk and curds should be taken in adequate amounts. Buttermilk can be used in place of curds.

RELATED EXCERCISES

I. Answer the following question:

1. Give 2 reasons why nutrition during adolescence is important.
   A
   B

IV. Say true or false

1. Carbohydrates give us energy.
2. Minerals and vitamins develop immunity.
3. Balanced diet is must for growing adolescents.
4. Vitamin c rich food helps in better absorption of iron.
5. Green leafy vegetables contain iron.
SESSION -6

ADOLESCENTS’ NUTRITIONAL REQUIREMENTS

Objective
To familiarize students with the nutritional requirement of adolescent
To enable them learn about components of a healthy diet food items for an adolescent.

Time required
120 minutes

Material
Information sheet
Related exercises
I.E.C. materials

Technique used
Dissemination of information with students’ interaction and involvement.

Key terms
Calorie
Protein
Minerals
Vitamins
Cereals
Pulses
Fruits and Vegetables
Fats and Oils
As a result of the tremendous growth that occurs during adolescence, the requirements for protein and energy are greatly increased above childhood requirements. The increased need for nutrients and energy in adolescence closely parallels the rates of growth, with the greatest need occurring during the period of Adolescence.

**Energy needs**
There is great variability among adolescents in their growth rates and nutrient requirements. The greatest variability is in the requirement for energy. Energy is measured in terms of kilocalories, commonly called calories.

The recommended range of energy intake in the recommended dietary allowance for adolescence is as follows

<table>
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<tr>
<th></th>
<th>11-14</th>
<th></th>
<th>15-18</th>
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<td>2200-3900</td>
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<td>girls</td>
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<td></td>
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</table>

[Reference: from food and nutrition board, national research council, recommended dietary allowance]

**Protein**
Proteins are required for the growth and development of the body in growing age and for maintenance and repair of tissues in adults. Deficiency of protein causes under nutrition. The recommended dietary allowance for adolescent is 1 gm per Kg body weight.

**Micronutrients**
Vitamins and minerals are the protective foods and are also called functional foods. These form the micronutrients that are required in small quantities i.e., mg/day.

**Vitamins**
Adolescents require high amounts of thiamine, riboflavin and niacin because of their high-energy requirements. Vitamin D is especially needed for rapid skeletal growth. Mild inadequacies in vitamin intake have been reported to occur among adolescents due to poor dietary habits coupled with increased body needs. The vitamins most often consumed in short supply are vitamins A and vitamin C, due to low intake of fruits and vegetables.
Calcium

The nutrient is important in adolescence since the requirement is based on the amount of the mineral needed for skeletal growth. Forty - five percent of the total bone growth occurs during this period. A well-balanced diet that includes 5 servings of dairy product will supply enough calcium for growth of teens, especially girls, think that milk is “fattening” and so they avoid it. For these, skim or low fat milk, yogurt, cottage cheese is alternatives.

Iron

Iron is the most important mineral essential for synthesis of hemoglobin and for oxygen transport. Low iron intake is a problem for female adolescents. To meet their iron needs they should take more greens, dates, rice flakes etc.

The increased requirement for iron in adolescence is the direct result of the rapid expansion of iron-containing tissue, primarily the blood and muscles. The female’s requirement for iron remains high due to menstrual blood losses.

<table>
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<td>Iron [mg]</td>
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Reference from Food and Nutrients Board, National Research Council, RDA

Zinc

Zinc affects protein synthesis and is essential for growth and sexual maturation. Zinc requirements also are high during adolescence. The retention of zinc increases especially during the growth spurt, leading to more efficient use of the nutrient.

Iodine

It is essential for the synthesis of thyroid hormone [thyroxin]. Deficiency leads to hypothyroidism, endemic goiter and growth retardation. Intrauterine deficiency may lead to mental retardation. About 2\3 of the requirement is met from the drinking water and 1\3 from diet.

Components of healthy diet-food items:

*Cereals:* Cereals form the staple diet in India e.g. Rice, wheat, maize. Cereals generally lack lysine. Polished rice has low levels of vitamin B complex. Ragi is rich in minerals like calcium; iodine etc. Cereals contain 7-11 g% of protein and 2-5g% of fat.
**Legumes [pulses]:** Pulses are rich sources of protein. Pulses meet the protein requirements of vegetarians. Pulses lack vitamin A and vitamin C; but germinated legumes contain vitamin C. Cereal - pulse combination lead to supplementary effect of protein.

**Roots and tubers:** They are rich in carbohydrates and are good sources of energy and calcium. Carrots contain carotene and potatoes contain vitamin C.

**Vegetables:** Vegetables add variety to diet, provide minerals, vitamins and fiber. Green, yellow, orange, red vegetables are sources of carotene and other micronutrients.

**Green leafy vegetables:** These are rich sources of calcium, iron, beta-carotene, antioxidants and vitamin C and B complex. Antioxidants are important in protecting against a number of conditions including heart disease and stroke.

**Fruits:** They are rich source of vitamins and fiber; green, yellow, orange, red fruits contain beta carotene. Amla, citrus fruits and guava are rich in vitamin C. Dried fruits like dates supply iron. Plantains, jack fruit etc. supply energy.

**Milk and milk products:** Milk is a good source of protein, calcium and vitamins. It is deficient in iron and vitamin C.

**Non vegetarian foods:** Egg, fish, meat etc are included in this group. Eggs supplies good quality protein, vitamin and fat. It is deficient in carbohydrate and vitamin C. Fish, meat and chicken are good sources of proteins and vitamins. Fish is a good source of calcium. Omega 3-PUFA in fish is protective against cardiovascular diseases.

**Fats, oils, nuts and oil seeds:** Nuts and oil seeds are good sources of protein, vitamins and fat visible fat includes oils, butter, ghee etc. Fats are rich concentrates of energy. They improve palatability and supply fat soluble vitamins.

**Sugars:** Sugar, honey, jaggery etc are energy concentrates. Jaggery is rich in iron. Excessive intake of sugar is not desirable due to wide fluctuations in blood sugar and also high incidence of caries among children.

**Condiments and spices:** These include asafetida, cardamom, chillies, cloves, etc. Some of them supply carotenes, vitamins and minerals. Turmeric contains high levels of iron, but also contains tannin that interferes with iron.

**Water:** Water intake should be optimum, 8-10 glasses / day in older children.
RELATED EXERCISES

I. True / false
   1. The dietary requirement for energy and protein in adolescence is greatest.
   2. Nutritional requirement of adolescents should be met to ensure proper growth and development.
   3. Most adolescents should take a protein supplement.
   4. Consuming an inadequate supply of calories results in protein being used for energy, possibly leaving an inadequate supply to support optimal growth.
   5. Iron needs during adolescence are high because of the rapid expansion of iron containing tissues, such as blood and muscle.

II. Circle the correct answer:
   1. Which of the following individuals would most likely consume an adequate amount of calcium in their diet:
      a. Adolescents who consume no dairy products.
      b. Adolescents who consume at least 5 servings of dairy products per day.
      c. Female adolescents who restrict their food intake out of concern for their figures.

III. Name 3 food which are good sources of calcium

IV. Name 3 food which are good sources of iron
SESSION-7

ADOLESCENTS’ EATING HABITS AND FOOD FADS

Objective
To know different patterns eating behavior among adolescence.
To identify help eating disorders among adolescence
To enable them to learn about healthy eating habits
To acquaint students with different myths regarding foods.
To understand benefits of vegetarian diet.
To explore factors affecting food choices.

Time required 120 minutes

Material Information sheet
Related exercises
I.E.C. materials

Technique used Dissemination of information with students interaction and sharing of experience on food habits.

Key terms Skipping meals
Snacking
Fast food
Anorexia nervosa
Bulimia
Healthy campaign
INFORMATION SHEET

Eating behaviors

Skipping meals

Teenagers may influence their nutrient intake by skipping meals. It has been shown that teenagers who regularly eat breakfast tend to have more adequate diets than those who miss breakfast once a week or more. Busy schedules, dieting, or a lack of food resources may lead to meal skipping. It should be emphasized that meal skipping is not a successful way to lose weight. Breakfast is brain’s food and missing breakfast can even affect classroom performance.

Snacking

Adolescents like to eat snacks and confectionery. These provide mostly empty calories, lead to micronutrient deficiencies and caries tooth. Some adolescents skip their major meals and eat only snacks. Snacks are synonymous with “junk foods” that will spoil the appetite for meals. Many foods commonly eaten as snacks, such as potato chips, candy etc are low -nutrient foods and should be eaten with less frequency. Nutritious snacks like fresh fruits, salads, fruits and vegetable juices can be included.

Fast food

These provide some nutrition, but are not a balanced diet. Deep frying and refrying in the same oil are potentially injurious to health. Food additives like ajinomoto and certain coloring agents and dyes are antinutrients.

Soft drinks and other fun drinks

These supply only empty calories and may also contain antinutrients. Moreover, these kill the appetite and promote skipping of meals. These act as ‘preload’ that lead to skipping of meals.

Eating disorders

Disordered eating behaviors are common among adolescent females eg. Anorexia nervosa and bulimia nervosa.
**Anorexia nervosa**

Anorexia nervosa is typifies by self-starvation. Extreme weight loss, an extreme fear of weight gain, leads them to avoid food. Anorexia nervosa can be life threatening. It can delay in puberty, development, and heart and kidney problems. It can cause decreases in bone mass and increased risk of fractures.

**Bulimia**

Bulimia is a eating disorder in which adolescents tend to eat lot because of boredom or some other reasons. Bulimia is associated with fluid and electrolyte imbalance.

**Acnei**

The appearance of skin problems, black heads, and pimples is a dreaded occurrence experienced by many adolescents. Good skin care, regular exercise, and consumption of a well balanced diet will help lessen the severity of skin problems. Avoiding fatty foods, chocolates, soft drinks and supplementation of polyunsaturated fats, vitamin A and zinc are to be beneficial.

**Factors affecting food choices:**

**Availability**

Adolescence brings increased independence and freedom for teenagers to make their own decisions about what they will eat. Unfortunately, teenagers tend to be motivated in their food choices not by nutritional or health concerns but by factors of availability, sociability, and status.

**Mass media**

Mass media and advertising also exert a tremendous influence on the teen’s diet. Advertising creates the image that certain foods are “fun,” “glamorous,” or “sexy,” and unfortunately, these foods are generally not highly nutritious. Advertising and mass media also help to create certain standards for appearance, in attempting to conform to these standards of appearance; the adolescent may make inappropriate food choices and compromise optimal growth.

**Figure conscious**

A further motivating factor for food choices is the teenage tendency to have slim figure. Female adolescent often diet to lose weight even when they are within or below the average range for body weight.
Peer influence

Adolescents are undergoing not only physical maturation, but are experiencing tremendous social and psychological changes as well. This age group is extremely sensitive to peer acceptance. This desire to “fit” or be accepted influence dietary habits. Adolescents may readily adopt altered eating patterns, such as a weight-reducing diet or a muscle-building diet, if these diets, or their desired outcome, are favored by peers.

Healthy eating habits

Based upon above problems, the following principles are recommended to promote healthy eating habits among adolescents

> Moderation in all things

Ensure a balanced diet by including all food groups every day. The intake of fats, oils and sugars should be kept to the minimum. The food guide pyramid will help in the choice of balanced diet. Include cereals pulse combinations, roots and tubers in adequate quantities, vegetables and fruits liberally, milk and milk products and meat group in moderation and oils, fats and sugars in less quantity.

> Variety is the spice of life

Ensure variety within each food group e.g. not always the same vegetable. Food fads should be avoided as it may evolve as a social handicap.

> Eat enough micro nutrients and anti oxidants

The adolescent should eat enough food so that nutritional requirement can be met. Intake of Beta carotene, vitamin A, vitamin C, folic acid, iron, iodine, zinc are essential. Weekly iron during adolescence is a useful intervention.

Myths regarding foods

> Papaya produce heat, causes abortion, makes women bleed heavily
> Banana produces phlegm as it makes one’s body cold
> Coconut water causes cold
> Potatoes and cabbage gives gas
> Egg gives heat and therefore gives loose motions
> Onion and garlic increase sexual desire, hence saints should avoid them
> Mango causes boils as it gives heat to the body
> Orange causes cold
> Jaggery causes worm infestation
> Ghee and butter cool the body
> Consume more fruits and vegetables
> Have higher intakes of fiber
> Generally have lower intakes of total fat.

**Vegetarianism:**

The vegetarian diet, including its many variations, is becoming increasingly popular among young people. The reasons for adopting vegetarianism are varied and include such factors as concern for health, popularity of the diet among peers, animal rights, ecological concerns, religious beliefs, and economic concerns.

A vegetarian diet can provide adequate nutrients. All of the essential vitamin and minerals are present in adequate amounts in a well-balanced and varied vegetarian diet. The major forms of vegetarianism are the lacto-ovo vegetarian (eats eggs, dairy and plant foods) and the vegan vegetarians eats only plant foods.

**RELATED EXCERCISES**

1. **True / false**
   a. A vegetarian diet that is varied and well planned cannot be nutritionally adequate for adolescents
   b. Teenagers who regularly eat breakfast tend to have a more adequate diet than those who miss breakfast one or more times per week.
   c. Snacks can supply a significant amount of essential nutrients in the teenage diet.
   d. A significant portion of the calories in fast food comes from the beverages like coca-cola and it would be wise to substitute milk or water as a drink.
   e. Many entrees from fast food restaurants are good sources of protein.
   f. Mass media affects food choices of adolescents.

2. List 3 foods that may be included in the diet to compensate for the nutrient inadequacies of fast food meals.

3. List 3 food that are appropriate snack items for teenagers.

V. Which motives are most likely to influence adolescent’s food choices:
   a. desire to be accepted by peers
   b. food availability
   c. concern for optimal health
   d. desire to attain a certain body type
   e. taste

xxxix
SESSION-8

MAJOR NUTRITIONAL DEFICIENCIES DURING ADOLESCENCE

Objective To acquaint students with the malnutrition its
causes and consequences.
To make them understand major nutritional deficiencies

Time required 120 minutes

Material Information sheet
Related exercises
I.E.C. materials

Technique used Dissemination of information with students’ interaction
and involvement.

Key terms Malnutrition
Obesity
Anemia
Iodine deficiency disorder
Folate deficiency
Calcium deficiency
Malnutrition

Malnutrition is characterized by an imbalance between the supply of nutrients and energy on one hand and the body’s demand for them to be used for growth, maintenance, and specific bodily functions on the other.

- Malnutrition affects all age groups across the entire life course
- Malnutrition has significant implications on growth and development.
  Malnutrition during adolescence can significantly retard growth and sexual maturation

MALNUTRITION ACROSS ADOLESCENT

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<tr>
<th>Life Stage</th>
<th>Common Nutritional Disorders</th>
<th>Main Consequences</th>
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<tbody>
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<td>• PEM, IDD, IDA</td>
<td>• Delayed growth spurt; Stunted height</td>
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<td></td>
<td>• Floate deficiency</td>
<td>• Delayed/retarded intellectual development</td>
</tr>
<tr>
<td></td>
<td>• Calcium deficiency</td>
<td>• Goitre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased risk of infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blindness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Anaemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inadequate bone mineralization</td>
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</table>

CAUSES OF MALNUTRITION DURING ADOLESCENCE

- Adolescents are prone to malnutrition because of their increased nutrient requirements and their nutritional problems are often unrecognized.
- Adolescence is the time when they change their eating patterns and lifestyle. Young people become susceptible to environmental influences and peer pressure and often take junk food. Adolescents usually have unhealthy lifestyle behaviors
- When an adolescent girl becomes pregnant, the condition exposes both mother and child to negative health, especially if the mother is stunted or undernourished.
- Hard physical work may also impose additional physiological stress and nutritional requirements in adolescence.
**Iron deficiency anemia**

Anemia is generally recognized as the main nutritional problem in adolescents. Factors contributing to anemia are - inadequate diets to achieve weight loss, infections such as malaria etc, heavy menstrual loss etc. Strenuous exercise combined with endurance events. Consequences of anemia can be poorer pregnancy outcome, reduction in physical work capacity, alteration in mental function, depressed physical growth. Iron rich food should be consumed to prevent anemia. Iron rich foods are greens, dates, jaggery, rice flakes, etc.

**Iodine Deficiency**

In adolescent Iodine deficiency leads to retarded psychomotor development, low IQ, lower performance in school and impaired work capacity. The main WHO intervention strategy for IDD control is universal salt iodization. Among school children, iodine deficiency is assessed by goiter and urinary iodine levels.

**Folate Deficiency**

Folate deficiency causes widespread megaloblastic anemia of pregnancy and often compounds already existing iron deficiency anemia. Folate deficiency is recognized as an independent risk factor for coronary heart disease and stroke. Low folate status is also linked with cancer, especially of the colon.

**Calcium Deficiency:** Effects of Calcium deficiency are decreased rate of growth, Negative calcium balance, Lose of calcium from bone leading to the development of osteoporosis, Hyperirritability and tetany leading to death

While adolescence is a time of increased calcium requirements, surveys suggest that adolescent diets are often inadequate in calcium.

**Obesity and overweight**

Obesity in adolescence may have serious health and psychological consequence which continues to adulthood. Body mass index is predictive for adult obesity. Body mass index is weight [kg] per height [m2]. Body mass index more than 25 is overweight and body mass index more than 30 is obese. Obesity is also a type of malnutrition.

**Key Messages**

- Good nutrition during adolescence is required due to rapid growth.
- Adolescents are a diverse group who are simultaneously exposed to nutritional problems associated with both affluence and poverty
• Five nutritional issues applicable to adolescents in low and middle-income countries have been identified: (a) under nutrition, (b) Micronutrient deficiencies, (c) eating disorders, (d) early pregnancy and (e) inadequate or unhealthy diets and lifestyles.
• Because their nutrition is a major determinant of the future health of our societies, adolescents require special attention.
• The cycle of poor nutrition can continue across generations.
• Nutritional activities need to be in line with the physiological, psychological and social needs of the adolescents.
• Addressing adolescents’ nutritional issues is an essential part of building public health policy.
• Adolescence is a good time to promote healthy lifestyle and eating practices because these provide the foundation of adult life.

RELATED EXERCISES

I. List 3 nutritional deficiency of adolescent
   a.
   b.
   c.
II. List eating disorder of adolescent.
III. Name one ways that will help lessen the severity of skin problems.

II. List the consequence of malnutrition.
   a.
   b.
III. List 2 Causes of malnutrition.
IV. True/False.
   1. Milk is good source of iron
   2. Calcium content is high in milk
   3. Greens are good source of iron
   4.d. Iron deficiency leads to goiter.
### APPENDIX 3

#### ANOVA TABLE ON ARH BY AGE

<table>
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<th>Knowledge on ARH * Age</th>
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#### ANOVA TABLE ON ARH BY RESIDENCE

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### ANOVA TABLE ON ANH BY RELIGION

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