



Sri Lakshmi Narayana Institute of Medical Sciences

Date:05.06.2017

From

Dr. Raghavendran
Professor and Head,
Department of Paediatrics,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

To

The Dean,
Sri Lakshmi Narayana Institute of Medical College
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: All About Adolescents (Adolescent Paediatrics) Module for Undergraduate students.

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: All About Adolescents (Adolescent Paediatrics) Module for Undergraduate students for IV year Undergraduate students from July 2017- Oct 2017. Requesting your kind permission for the same.

Kind Regards

Dr. Raghavendran

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:

The Dean: **Dr. Jayalakshmi**

The HOD: **Dr. Raghavendran**

The Expert: **Dr. Satyamanasa Gayatri Vinay**

The committee has discussed about the course and is approved.

Dean

Dr. G. JAYALAKSHMI, BSC., MBBS., DYCD., M. DEAN
Sri Lakshmi Narayana Institute of Medical Sciences
Osudu, Agaram, Kudapakkam Post,
Villanur Commune, Puducherry - 605502.

(Sign & Seal)

Subject Expert

(Sign & Seal)

HOD

(Sign & Seal)

PAEDIATRICS HEAD
DEPT. OF PAEDIATRICS
SRI LAKSHMI NARAYANA INSTITUTE OF
MEDICAL SCIENCES
OSUDU, PUDUCHERRY



OFFICE OF THE DEAN

Sri Lakshmi Narayana Institute of Medical Sciences

OSUDU, AGARAM VILLAGE, VILLIANUR COMMUNE, KUDAPAKKAM POST,
PUDUCHERRY - 605 502.

[Recognised by Medical Council of India, Ministry of Health letter No. U/12012/249/2005-ME (P-II) dt. 11/07/2011]
[Affiliated to Bharath University, Chennai - TN]

Circular

15.06.2017

Sub: Organising Value-added Course: All About Adolescents(Adolescent Paediatrics) Module for Undergraduate students reg.,

With reference to the above mentioned subject, it is to bring to your notice that Sri Lakshmi Narayana Institute of Medical Sciences, **Bharath Institute of Higher Education and Research** is organizing **All About Adolescents (Adolescent Paediatrics) Module** for Undergraduate students from July 2017 – Oct 2017 (3 months)

The application must reach the institution along with all the necessary documents as mentioned. The hard copy of the application should be sent to the institution by registered/ speed post only so as to reach on or before 30 June 2017. Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

Dr. G. JAYALAKSHMI, BSc., MBBS., DTCO., M.D.,
DEAN
Sri Lakshmi Narayana Institute of Medical Sciences
Osudu, Agaram, Kudapakkam Post,
Villianur Commune, Puducherry - 605502.

Course Proposal

Course Title: All About Adolescents (Adolescent Paediatric Module) for Undergraduates

Course Objective: Understand adolescent physiology and their problems

Course Outcome: On successful completion of the course, the students will have skill in understanding the needs and in managing Adolescent Health issues and protection of adolescents.

Course Audience: Final Year MBBS students of 2016

Course Coordinator: Dr Raghavendran

Course Faculties with Qualification and Designation:

1. Dr. Raghavendran – MD Paediatrics – Head of Department

2. Dr. Satya Manasa Gayatri Vinay – DNB Paediatrics – Assistant professor

Course Curriculum/Topics with schedule (Min of 30 hours)

SlNo	Date	Topic	Resource Person	Time	Hours
1.	20/07/2017	Definition of Adolescent population, Physical Development (Puberty) changes in Adolescents.	Dr. Raghavendran	4.00-6.00pm	2 hours
2	21/07/2017	Physical Growth and Nutritional Requirements in Adolescents	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
3	22/07/2017	Cognitive and Psychosocial changes in Development	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
4	23/07/2017	Nutritional Problems in Adolescents	Dr. Raghavendran	4.00-6.00pm	2 hours
5	24/07/2017	Eating Disorders in Adolescents	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
6	25/07/2017	Mental Health Problems and Sleep Disorders	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
7	26/07/2017	Infections in Adolescents	Dr. Raghavendran	4.00-5.00pm	1 hours
8	27/07/2017	Female related problems, Vulnerable groups and their problems	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
9	28/07/2017	Substance Abuse in Adolescents	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
10	29/07/2017	Environment and Social Challenges faced by adolescents.	Dr. Raghavendran	4.00-6.00pm	2 hours

11	30/07/2017	Role of health Care provider – Approach to an adolescent child, adolescent friendly health clinic.	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
12	31/07/2017	Management Sexual Abuse and POSCO act, OSCs	Dr. Raghavendran	4.00-6.00pm	2 hours
13	01/08/2017	Management of Eating Disorders and Substance Abuse	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
14	02/08/2017	Adolescent Immunization	Dr. Satya Manasa Gayatri Vinay	4.00-6.00pm	2 hours
15	03/08/2017	Government Interventions in Adolescent health care. Family/ school and community level protection of adolescent health.	Dr. Raghavendran	4.00-5.00pm	1 hours
				Total Hours	30

REFERENCE BOOKS: (Minimum 2)

1. Nelson Textbook Of Paediatrics, 20 E

2. OP Ghai Essential Paediatrics, 8th Edition.

VALUE ADDED COURSE

1. Name of the programme & Code

All About Adolescents (Module on Adolescent Paediatrics), PECO5

2. Duration & Period

30 hrs, July 2017– October 2017

3. Information Brochure and Course Content of Value Added Courses

Enclosed as Annexure- I

4. List of students enrolled

Enclosed as Annexure- II

5. Assessment procedures:

Multiple choice questions- *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

7. No. of times offered during the same year:

One, July 2017– October 2017

8. Year of discontinuation: 2018

9. Summary report of each program year-wise

Value Added Course- July 2017- Oct 2017					
Sl. No	Course Code	Course Name	Resource Persons	Target Students	Strength & Year
1	PECO5	All About Adolescents(Module on Adolescent Paediatrics)	Dr. Satyamanasa Gayatri Vinay	Final year MBBS	20 (July 2017- Oct 2017)

10. Course Feed Back

Enclosed as Annexure- V



Dr. Satyamanasa Gayatri Vinay

RESOURCE PERSON

ASSISTANT PROFESSOR
DEPARTMENT OF PAEDIATRICS
SRI LAKSHMI NARAYANA INSTITUTE OF
MEDICAL SCIENCES



Dr. Raghavendran

COORDINATOR

PAEDIATRICS HEAD
DEPT OF PAEDIATRICS
SRI LAKSHMI NARAYANA INSTITUTE OF
MEDICAL SCIENCES
OSUDU, PUDUCHERRY



ALL ABOUT ADOLESCENTS
(Module on Adolescent Paediatrics)

PARTICIPANT HAND BOOK

Particulars	Description
Course Title	All about Adolescents (Module on Adolescent Pediatrics)
Course Code	PECO5
Objective	<ol style="list-style-type: none"> 1. Definition of Adolescent population, Physical Development (Puberty) changes in Adolescents. 2. Physical Growth and Nutritional Requirements in Adolescents 3. Cognitive and Psychosocial changes in Development 4. Nutritional Problems in Adolescents 5. Eating Disorders in Adolescents 6. Mental Health Problems and Sleep Disorders 7. Infections in Adolescents 9. Female related problems, Vulnerable groups and their problems. 10. Substance Abuse in Adolescents 11. Environment and Social Challenges faced by adolescents. 12. Role of health Care provider – Approach to an adolescent child, adolescent friendly health clinic. 13. Management Sexual Abuse and POSCO act, OSCs 14. Management of Eating Disorders and Substance Abuse 15. Adolescent Immunization 16. Government Interventions in Adolescent health care. Family/ school and community level protection of adolescent health.
Further learning opportunities	Detailed management of Individual Adolescent conditions

Key Competencies	On successful completion of the course the students will have skill in understanding adolescent problems and a holistic approach in their health care management.
Target Student	FINAL YEAR MBBS Students
Duration	30hrs July 2017– Oct 2017
Theory Session	30hrs
Practical Session	-
Assessment Procedure	Multiple choice questions

ALL ABOUT ADOLESCENTS (Adolescent Paediatrics Module)

INTRODUCTION:

Adolescence marks the transition from childhood into adulthood. It is characterized by physical cognitive, psychosocial, and emotional development. According to World Health Organization, adolescence is a phase which involves – Progression from appearance of secondary sexual characteristics to sexual and reproductive maturity (puberty) – Development of adult mental processing and identity – Transition from total social-economic dependence to relative independence.

Though it is a continuous process, for convenience sake, adolescence is generally divided into three phases: early (10-13 yr), mid (14-16 yr) and late (17- 19 yr) puberty.

PHYSICAL DEVELOPMENT

PUBERTY TRIGGERS

- Controversial
- Genetic and environmental influence (nutrition, stress, exercise, climate)

Possibilities: – Central Nervous System maturation – Critical body weight – Body fat to total body weight – Adrenal maturation.

ONSET AND SEQUENCE OF PUBERTY

Major changes in genital system (primary and secondary sex characteristics).

Gain 25% of final height (distal growth may precede that of proximal parts by three to four months)

- Doubling of lean and non-lean body mass (gain 50% of the ideal body weight)
- Doubling of the weight of the major organs; central nervous system maturation (without increase in size)
- Maturation of facial bones

- Marked decrease in lymphoid tissue

HORMONAL CHANGES IN PUBERTY

Increase in: • Gonadotropins (FSH & LH) • Sex hormones • Adrenal Gland sex steroids • Growth Hormone and Insulin-like Growth factors • Thyroid hormone production remains

NORMAL PUBERTY • Begins at 10yrs (range 8-13yr) in Girls First sign is breast bud development 12 yrs (range 9-15yr) in Boys First sign is testicular enlargement • Duration 3-3.5 Yrs.

SEQUENTIAL CHANGES OF PUBERTY

Adolescent Male - Early testicular growth • Pubarche • Testicular and penile growth Nocturnal emissions • Height velocity peaks • Marked voice changes • Facial hair growth • Final pubertal changes

Adolescent Female - Breast bud (thelarche) • Pubic hair development (pubarche) • Peak height velocity • Menarche • Final pubertal changes

TANNER STAGING OF SMR:

Tanner staging is important as it:

- Delineates current stage of puberty
- Assesses progression
- Predicts development changes e.g. - Peak Height Velocity: SMR 2 & 3 (Females) vs SMR 3 & 4 (Males) - Menarche: SMR 3 & 4 - Gynecomastia (Males): SMR 2 & 3.

TANNERS/SMR STAGING FOR FEMALES

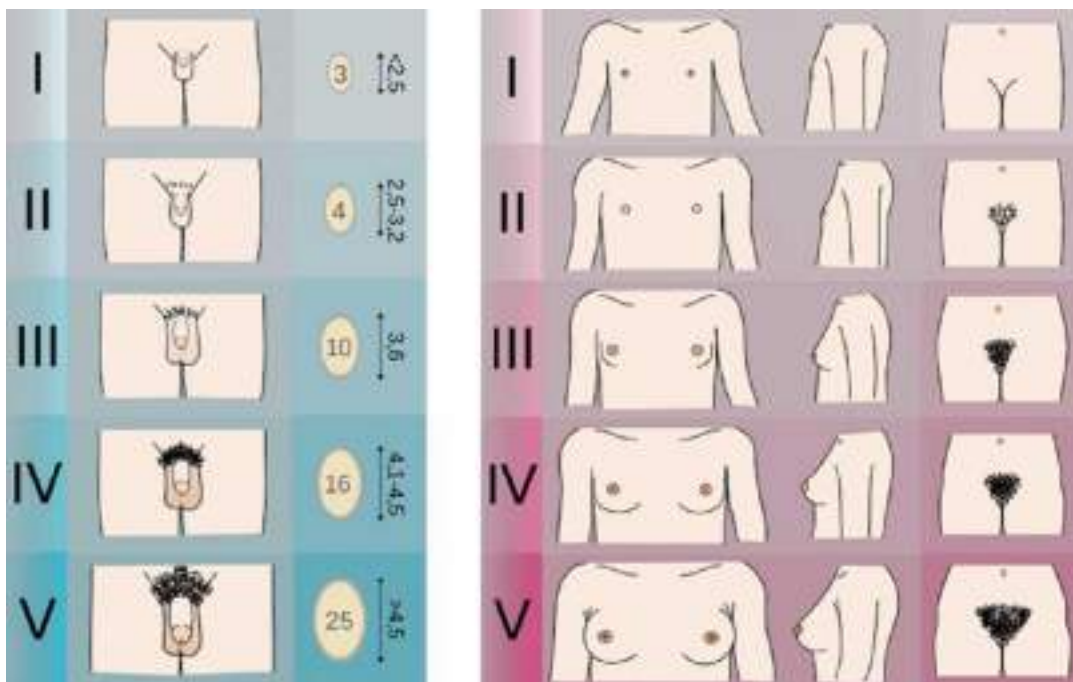
STAGE	BREAST	PUBIC HAIR	RANGE
I	None	None	Birth-15 yrs
II	Breast Bud (thelarche): Areolar hyperplasia with	Long downy pubic hair near the labia; may occur with breast budding or	6-15yrs

	small amount of breast tissue	several weeks to months later (pubarche)	
III	Further enlargement of breast tissue and areola	Increase in amount of pubic hair with more pigmentation	8-15yrs
IV	Double Contour form: Areola and nipple form secondary mound on top of breast tissue	Adult type but not distribution	9-18yrs
V	Larger breast with single contour form	Adult distribution	10-18yrs

TANNERS/SMR STAGE FOR BOYS

STAGE	TESTIS	PENIS	PUBIC HAIR	RANGE
I	No change (4ml)	Prepubertal 2.5 cm or less	None	Birth-15 yrs
II	Enlargement of testes, ↑ stippling and pigmentation of scrotal sac	Minimal or no enlargement	Long, downy hair often occurring several months after testicular growth; variable pattern noted with pubarche	10-15yrs

III	Further enlargement (6 – 8 ml)	Significant penile enlargement especially in length	Increase in amount, now curling	10-16.5yrs
IV	Further enlargement (10 – 12 ml)	Further enlargement especially in diameter	Adult type but not distribution	Variable, 12-17yrs
V	Adult size (min: 12 ml, avg 18.6 ± 4 ml)	Adult size	Adult Distribution	13-18yrs



- **PHYSICAL GROWTH AND NUTRITIONAL REQUIREMENTS OF ADOLESCENTS**

- During puberty, boys gain about 20-30 cm and girls about 16-28 cm. Peak growth velocity in girls occurs before attainment of menarche (stage 3) in girls whereas boys have their peak growth velocity during later stages of puberty (stages 4-5). The

growth spurt affects the distal skeleton first, hence enlargement of limb and extremities is followed by increase in trunk size.

- During pubertal development there is increase in muscle mass and bone diameter, particularly in boys, and total bone mass in both the sexes. Lean body mass increases during the early stages in both the sexes; fat mass increases in girls at later stages of puberty.
- Rapid calcium accretion occurs during puberty. Almost 50% of adult bone mass is achieved during the adolescent period. Estrogen and androgen enhance calcium accretion by bone but favor early fusion of epiphyses. Increase in body structure is paralleled by increase in blood volume and muscle mass. With commencement of menstruation, nutritional requirements of iron are higher.
- The recommended dietary allowance (RDA) for calcium is 800 mg/ day and an intake of 500 mL milk is recommended in order to achieve this with a cereal-based Indian diet. With minimal sun exposure, the RDA for vitamin D is 600 IU/day. Since dietary vitamin D is mainly available from fatty fish, intake as a pharmacological
- supplement may be necessary. Increase in body structure is paralleled by increase in blood volume and muscle mass; both of these tissues have high iron content. With
- commencement of menstruation, nutritional requirements of iron are further increased. With predominantly cereal based diet and poor bioavailability, an adolescent needs to have a daily intake of 25-30 mg iron in order to meet the daily requirements of 1.3 mg.

The Recommended Dietary Allowance (RDA) for Indian Adolescents is given in the tables below:

Age Group	Gender	Energy Kcal	Protein grams	Fat grams	Calcium mg	Phos mg	Iron mg	Zinc mg	Mg mg
10 -12 years	Boys	2190	39.9	35	800	800	21	9	120
	Girls	2010	40.4	35	800	800	27	9	160
13-15 years	Boys	2750	54.3	45	800	800	32	11	165
	Girls	2330	51.9	40	800	800	27	11	210
16-18 years	Boys	3020	61.5	50	800	800	28	12	195
	Girls	2440	55.5	35	800	800	26	12	235

Adapted from Nutritional requirements and RDA for Indians:
Report of expert group of ICMR [13,14].

RECOMMENDED DIETARY ALLOWANCES FOR VITAMINS

Age group	Gender	Vitamin A mcg	Thiamine mg	Riboflavin mg	Niacin mg	B6 mg	Vitamin C mg	Folate mcg	Vitamin B12 mcg
10-12 years	Boys	600	1.1	1.3	15	1.6	40	140	0.2-1
	Girls		1.0	1.2	13	1.6			
13-15 years	Boys		1.4	1.6	16	2.0	40	150	0.2-1
	Girls		1.2	1.4	14	2.0			
16-18 years	Boys		1.5	1.8	17	2.0	40	200	0.2-1
	Girls		1.0	1.2	14	2.0			

BALANCED DIET FOR ADOLESCENTS

An adolescent boy is expected to take at least one unit of calories (2400kcal) on par with the requirement of an adult sedentary male. Adolescent girl requires 2100 kcal, which is more than that of an adult female. Carbohydrates should make up 50–65% of energy intake; protein 10–30%; and fat 25–35%. Dietary fat should be from sources of polyunsaturated and

monounsaturated fatty acids, such as fish, nuts, and vegetable oils. Transfats, found in hydrogenated oils used primarily in bakery products, should be avoided altogether as these increase serum levels of low-density lipoprotein. Dietary intake of total cholesterol, found in animal products, should be limited to 300 mg/day. The importance of green yellow, orange, red (GYOR) vegetables and fruits in the diet of adolescents is important for adequacy of micronutrients and fibre. **Rainbow revolution** refers to cultivation and consumption of these coloured food items.

COGNITIVE, PSYCHOSOCIAL AND EMOTIONAL DEVELOPMENT DURING ADOLESCENCE:

COGNITIVE DEVELOPMENT

Cognitive development is the progression of thinking from the way a child does to the way an adult does. There are 3 main areas of cognitive development that occur during adolescence.

First, adolescents develop more advanced reasoning skills, including the ability to explore a full range of possibilities inherent in a situation, think hypothetically (contrary-fact situations), and use a logical thought process.

Second, adolescents develop the ability to think abstractly. Adolescents move from being concrete thinkers, who think of things that they have direct contact with or knowledge about, to abstract thinkers, who can imagine things not seen or experienced. This allows adolescents to have the capacity to love, think about spirituality, and participate in more advanced mathematics. Youth who remain at the level of a concrete thinker focus largely on physically present or real objects in problem solving and, as a result, may present with difficulty or frustration with schoolwork as they transition throughout high school. Clinicians can help parents recognize this problem to help adolescents adjust to the educational pace.

Adolescents may also experience a personal fable as a result of being able to think more abstractly. The personal fable is built on the fact that if the imaginary audience (peers) is watching and thinking about the adolescent, then the adolescent must be special or different. For decades, this adolescent egocentrism was thought to contribute to the personal fable of invincibility (eg, other adolescents will get pregnant or get sexually transmitted infections) and risk-taking behavior.

Third, the formal operational thinking characteristic of adolescence enables adolescents to think about thinking or meta-cognition. This characteristic allows youth to develop the

capacity to think about what they are feeling and how others perceive them. This thought process, combined with rapid emotional and physical changes that occur during puberty, causes most youth to think that everyone is thinking not just about what they are thinking about but about the youth themselves (imaginary audience)

SOCIAL DEVELOPMENT

Adolescent Psychosocial Development

The psychosocial development that occurs during this period can be characterized as developmental tasks that emphasize development of autonomy, the establishment of identity, and future orientation.

The first area of adolescent development—**establishment of autonomy**—occurs when the adolescent strives to become emotionally and economically independent from parents. This struggle begins during early adolescence (ages 12-14 years), which is characterized by forming same-sex peer groups, with decreasing interest in family activities and parental advice. During this time, adolescents are concerned with how they appear to others. The peer group, which is typically same-sex, is often idealized and has a strong influence on the adolescent's development. As a result, adolescents may use clothing, hairstyles, language, and other accessories to fit in with their peers. Similarly, adolescents who do not identify with any peers may have significant psychological difficulties during this period.

Pediatric health care professionals should be aware that most adolescents seek independence in a gradual fashion, and a sudden shift from parents can be a warning sign that the adolescent needs help in transitioning

The second task of adolescence is for youth to develop a sense of **identity**. Identity relates to one's sense of self. It can be divided into 2 areas: self-concept and self-esteem. Self-concept refers to an adolescent's perception of self— one's talents, goals, and life experiences. It can also relate to identity as part of ethnic, religious, and sexual identity groups. Self-esteem relates to how one evaluates selfworth.

Erikson described that an adolescent's inability to settle on an identity or career path can result in identity crisis. Although this stage likely lasts for a short period, because of the current extension of adolescence and young adulthood, with more youth obtaining advanced degrees or vocational training, it may take more time for youth to establish their identity. Adolescents with a chronic illness may have a harder time developing a positive identity or

self-image because of the impact of the illness on body image and the limited ability to achieve independence.

Pediatric health care professionals can support adolescent identity development by encouraging parents to allow adolescents to have the space and time to independently make health care decisions and to participate in and explore a range of activities that can promote this development. Inadequate development of self-identity can result in poor self-esteem in the adolescent. Poor self-image and esteem have been associated with poor adjustment (depression or suicide), school underachievement, substance use, and other risk-taking behavior.

The ability for **future orientation** is the third area of adolescent psychosocial development. This stage usually occurs during late adolescence (ages 18-21 years). Youth have gained the cognitive maturity that is necessary to develop realistic goals pertaining to future vocation or career, have developed a sense of self-identity, and are most likely refining their moral, religious, and sexual values. It is during this time that youth also expect to be treated as an adult. As autonomy increases, youth are given more responsibility. They are also provided with more access to alcohol and drugs.

EMOTIONAL AND SOCIAL DEVELOPMENT

Adolescence is also characterized by the development of emotional and social competence. Emotional competence relates to the ability to manage emotions, whereas social competence focuses on one's ability to relate effectively with others. During this process, adolescents become more aware of being able to identify and label their own feelings and the feelings of others.

The rate of emotional and cognitive development does not parallel the rate of physical maturation. Unlike in the adult brain, where both the limbic area of the brain (emotion center) and the prefrontal cortex (judgment and reasoning center) are enhanced when viewing images that expressed fear, in the adolescent brain, after seeing the same images, the limbic area is enhanced, with almost no activity in the prefrontal cortex.

Such emotional-cognitive asynchrony can result in adolescents misinterpreting other's feelings and emotions, whereas emotional-physical asynchrony can result in adolescents being treated as older than their emotional stage of development. Early rapid pubertal development in girls and boys may significantly affect body image and social performance.

Early maturing boys are often perceived as older and more responsible. In general, they perform better on team sports than boys who mature late and, as a result, may be more popular and seen as class leaders. However, timing and duration of puberty appear to matter. Early maturation may predispose girls to social disadvantage. Early maturation has been identified as a risk factor for conduct problems, depression, early substance use, poor body image, pregnancy, and early sexual initiation.

Management or self-regulation of emotions is an important process in any adolescent care.

Health care professionals can help adolescents recognize triggers and symptoms of out-of-control emotions and use reasoning skills to step back, examine emotions, and consider long-term consequences of behaviour.

ATTITUDE TOWARDS HEALTH

Adolescents are often considered to be at the peak of their health; yet, adolescence coincides with the onset of many health disorders. High-risk behavior is common in mid adolescent age group. The National Family Health Survey 3 (NFHS3) reported the median age of sexual debut in boys and girls to be 23 yr and 18 yr, respectively, but a significant proportion are sexually active much before that. Knowledge about contraception is improving among adolescents and most of them are aware of at least some method of contraception. Though awareness about HIV is increasing among Indian youth, most of them do not have comprehensive knowledge about it.

HEALTH PROBLEMS FACED BY ADOLESCENTS

- **NUTRITIONAL DISORDERS**
- Nutritional requirement of boys and girls are similar during childhood but differs after the onset of puberty. This difference in requirement is due to the difference in the growth rate between boys and girls.
- Girls mature earlier than boys, hence the protein requirement of girls of 11- 14 years is higher than boys of the same age group. At the same time protein requirement of a late adolescent girl is much lower than a boy of the same age group, as she has already attained her adult height.

- Other factors like varying body composition contribute to this difference in nutritional requirements. Boys develop more muscle mass, heavier skeleton, red cell mass than girls, whereas girls have more fat. Adequate calorie intake during adolescence is needed for the appropriate growth as around 4% of energy intake is utilized for growth. The calorie requirement of an adolescent depends on physical activity in addition to linear growth and muscle growth.
 - Energy requirements are higher for adolescent boys compared to girls. The protein requirement of adolescents is almost equal to the recommended intake for adults. Even though most of the studies show that protein intake is adequate, protein deficiency can occur due to suboptimal quality of dietary proteins due to the rate limiting amino acids and poor utilization due to recurrent infections. If the energy intake is suboptimal, proteins may be used up for energy instead of tissue building leading to short stature and suboptimal development.
- Data from the NFHS3 shows that 56% of Indian adolescent girls are anemic and the prevalence remains unchanged the last decade.

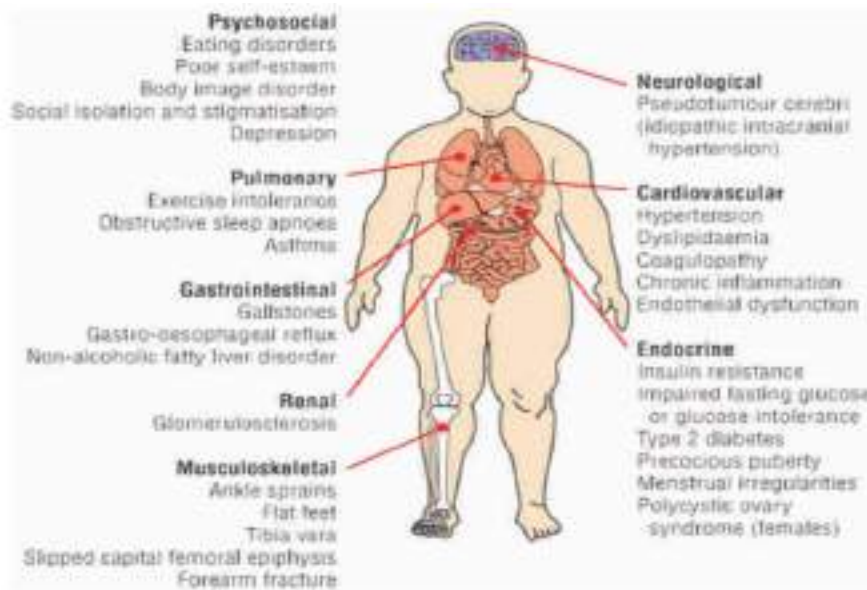
Underweight and stunting: The global prevalence of thinness (BMI <-2 SD) is 8.4% among girls and 12.4% among boys. NFHS-3 survey showed that 47% of girls and 58% of boys in the 15-19-year age group are thin. Undernutrition often delays the onset of puberty and sexual maturation, and results in stunting, poor bone mass accrual and reduced work capacity.

Overweight and obesity: The other end of the spectrum of malnutrition, i.e. obesity and overweight are increasing among Indian adolescents. Raj et al did a two year follow up of 24,000 children in the 5–16 age group years in Ernakulum district of Kerala and found that the proportion of overweight children increased from 4.94% in 2003 to 6.57% in 2005 amongst both boys and girls. The proportion of overweight was significantly higher in urban region and the rising trend was limited to private schools.

The prevalence of obesity and overweight is higher in boys than girls. Obesity has strong association with asthma, sleep disorders, reflux disease, Blount disease, slipped femoral epiphysis, gallstones, fatty liver and numerous metabolic derangements like type 2 diabetes, dyslipidemia, hypertension and polycystic ovary disease. Essential hypertension is rising among Indian youth. There is a close relationship between

obesity, hypertension and type 2 diabetes mellitus. Sedentary lifestyle, increased consumption of calorie dense food and decreased outdoor activity contribute to these disorders.

Complications of Obesity are depicted in the figure below:



Availability of food in adequate quantity and quality depends on the socioeconomic status, eating practices, cultural factors and food allocation. Factors other than unavailability of food also play a role in the undernutrition in adolescents. Lack of adequate knowledge, lack of time, food fads, peer influences, emotional stress, advertisements, fast food culture and altered perception of body image can all affect the eating habits of adolescent. Often breakfast is missed due to lack of time.

Adolescents are the major consumers of the fast food in both urban and rural parts of India. Fast foods have high amounts of calories, fat, sugar and sodium and result in restriction of micronutrients, needed during this stage. Anti-nutrients in the form of food additives, colorants and preservatives are found in processed and 'ready to eat' dietary products. Consumption of soft drinks before meals affects appetite. These contain empty calories without any other nutrients.

- The requirements of calcium, phosphorous and magnesium are highest during adolescence, as these are needed for bone mineralisation and increase in the muscle mass. 45% of skeletal mass is added during adolescence. Lack of adequate dietary calcium during adolescence can lead to low bone mineral density and osteoporosis during adulthood. Zinc is a growth nutrient and is essential for linear growth, sexual maturation and immunity. Iron requirement is high for adolescent girls to compensate for the menstrual blood loss and for boys to build up muscle mass, red cell mass and blood volume.
- Infections and parasitic infestations can lead to iron loss from the body. Non-heme iron contributes to a major source of iron in Indian diet. The absorption of non-heme iron depends on meal composition and dietary factors. Addition of fruits rich in ascorbic acid like guava and orange have been found to double the iron absorption, but intake of tea, coffee and phytates reduce absorption
- There is lack of sun-exposure due to our modest tradition of clothing coupled with dark skin pigment. Insufficient intake of dairy products results in poor intake of calcium. The resulting low bone mineral density is more pronounced in underprivileged girls as they have low protein intake in addition to calcium and vitamin D deficiency.

Vitamin A deficiency is also an important issue in economically deprived adolescents. Anorexia nervosa and bulimia are being increasingly reported among urban Indian youth.

EATING DISORDERS

Eating disorders are one of the most common chronic medical conditions among adolescents and young adults and often have their onset in this period of life. These are generally associated with a preoccupation or dissatisfaction with body shape or appearance which severely affect emotions and behaviors. Over the last two decades, the rates of children and adolescents with eating disorders have increased significantly in India. If left untreated, eating related problems can lead to severe complications and in rare cases, death.

Some of the main eating disorders are described below:

DISORDERED EATING

Some teens may start skipping meals, eliminating certain food such a carbohydrates or fat, or trying restrictive diets because it allows them to lose weight. Unfortunately, these behaviors could lead to an eating disorder and nutritional deficiencies. Adolescents should be asked about their daily meal intake and encouraged to have more regular and balanced meals to prevent significant nutritional and health related complications. They should also be screened for iron deficiency. If the disordered eating persists or worsens, referral to a therapist or counsellor should be considered.

EATING DISORDERS

Eating disorders are found across all socioeconomic levels, cultures and countries. Stressful events, such as conflicts in relationship or sexual assault can be factors in triggering an eating disorder in an at-risk youth. The various risk factors for eating disorders are as follows:

- A family history of anorexia, bulimia and/or binge eating disorder (particularly in a first degree relative like a mother or sibling)
- Poor communication and conflict resolution at home with authoritative parenting style. Children and teens learn quickly that controlling their eating habits is a way to exert control
- Low self-esteem and self-confidence
- Personality traits such as perfectionism or an extreme desire to succeed or impulsiveness
- Family values about having a specific body size, appearance and food. (teens may try to model their mother or father in | their appearance and activity level)

- Participation in sports that focus on body shape and size such as ballet dancing, gymnastics, track events or wrestling
- Being obese or overweight, especially those who may have been told to lose weight
- Early puberty
- Having a chronic illness like insulin dependent diabetes mellitus
- Abusive relations that cause emotional distress and feelings of loss of control such as physical or sexual abuse
- Specific cultural attitudes and norms about appearance

Anorexia Nervosa

Teens with anorexia will typically have an obsessive fear of gaining weight and a disordered perception of their weight along with a low body weight. The prevalence of DSM-5 anorexia nervosa is approximately 1% among female adolescents. It is more commonly diagnosed among adolescent females but can also occur among males. The new DSM 5 criteria for eating disorders include the following:

- Restriction of intake relative to needs, leading to a weight that is less than minimally normal or expected (e.g. falling off a previously followed growth curve)
- Intense fear of gaining weight or persistent behavior that interferes with weight gain, even though at a low weight
- Disturbance in the way in which one's body weight or shape is experienced or lack of recognition of the seriousness of the current low body weight.

Signs and Symptoms-

Anorexia can present with weight loss, low resting heart rate, dizziness, and amenorrhea. In addition to reviewing vitals, growth curve, weight and BMI, it is important to elicit a thorough history and conducting review of symptoms and physical examination. Teens with anorexia may lack awareness of their symptoms, so inputs from parents and other family members are useful. There are several screening questionnaires that can be used in a clinical setting, including Eating Disorders Examination (EAT-25).

Evaluation

Signs may include lanugo (fine hair), low basal temperature, severe bradycardia, hypotension and orthostatic hypotension. Patients may complain of feeling cold, having abdominal bloating or constipation. Prepubertal patients may experience delayed puberty, weight loss and poor height gain. Patients may also have deficits in concentration, ability to focus, and memory. In severe cases, they may have an abnormal bone mineral density and be at risk for stress fractures. In a case of anorexia nervosa, an initial work up should potentially include a hemoglobin, a chemistry panel for blood urea nitrogen, creatine, magnesium, phosphorous and thyroid hormones including T3, T4 and TSH. A low T3 is a marker of overall nutritional status and can be a good indication that metabolism has slowed down which can in turn affect their focus, body temperature and ability to burn calories. As caloric intake improves, the T3 increases. Serum FSH, LH and estrogen and prolactin levels should also be checked.

If the heart rate is less than 50 beats per minute, a baseline electrocardiogram should also be obtained.

Bulimia

Teens who suffer with bulimia may fear weight gain and feel severely unhappy with their body size and shape. The condition is marked by cycles of extreme overeating, known as bingeing, followed by purging or other behaviours. It is also associated with feelings of loss of control on eating. The following are DSM 5 criteria for bulimia

- Minimum of 2 binge-eating episodes/week for 3 months/recurrent binge eating
- Regular use of vomiting, laxatives, diuretics, dieting, or exercise to prevent weight gain
- Disturbance of perception of body shape
- Binge eating followed by behaviors that attempt to compensate for the overeating such as vomiting, excessive exercise or extreme use of laxatives or diuretics.

Bulimia is associated with poor self-esteem, feeling of isolation, mood changes and guilt. Parents often report food disappearance or empty wrappers. Other flag signs include frequent trips to the bathroom after meals, the sounds or smells of vomiting or sighting packages of laxatives or diuretics. Adolescents with bulimia may skip meals, avoid eating in front of others or eat very small portions. They may wear baggy clothes to hide the body or complain about being 'fat'. In addition, they may also have scarred knuckles from repeated vomiting. It is important to obtain routine labs including electrolytes. Patients who vomit may present

with metabolic alkalosis, hypochloremia, and/or hypokalemia. Laxative abuse may lead to hypokalemia and metabolic acidosis. Persistent vomiting can also lead to Mallory-Weiss esophageal tears that may present with either hematemesis or melena.

Binge Eating Disorder

Binge eating is three times more common than anorexia or bulimia. Teens who struggle with this disorder may also experience intense feelings of guilt, distress, and embarrassment.

Binge eating disorder is characterized by regular episodes of extreme overeating and feelings of loss of control on eating.

Episodes are associated with > 3 of the following:

- Eating more rapidly than normal
- Eating until feeling uncomfortably full
- Eating large amounts of food when not feeling hungry
- Eating alone because of feeling embarrassed by amount
- Feeling disgusted, depressed or very guilty after bingeing

Unlike bulimia, episodes of binge eating are not followed by purging, fasting, or excessive exercise. Because of this, many people may be obese and at an increased risk of developing other conditions, such as cardiovascular disease.

MENTAL HEALTH PROBLEMS

Adjustment disorder, anxiety disorders, depression, suicide, delinquent behavior, poor body image and low self-esteem are the psychological problems faced by adolescents. Suicide rates are increasing in adolescents, with higher number of completed suicide in boys and attempted suicides in girls. Adolescents are at higher risk of committing suicide because of their cognitive immaturity and increased impulsivity.

Anxiety Disorders

Generalized Anxiety Disorder (GAD): Excessive anxiety and worry (apprehensive expectation) about a number of events or activities. The intensity, duration, or

frequency of the anxiety and worry is out of proportion to the actual likelihood or effect of the anticipated event. The individual finds it difficult to control the worry and to keep worrisome thoughts from interfering with attention to tasks at hand. Somatic symptoms frequently are associated.

Social Anxiety Disorder: Marked and persistent fear of one or more social or performance situations, provoking symptoms of anxiety and causing extreme distress or avoidance of the situation.

Panic Disorder: Recurrent unexpected panic attacks.

Panic Attack: An abrupt surge of intense fear or intense discomfort that reaches a peak within minutes and during which time four or more of 13 physical and cognitive symptoms occur (palpitations, pounding heart, or accelerated heart rate; sweating; trembling or shaking; sensations of shortness of breath or smothering; feelings of choking; chest pain or discomfort; nausea or abdominal distress; feeling dizzy, unsteady, light-headed, or faint; chills or heat sensations; paresthesias [numbness or tingling sensations]; derealization [feelings of unreality] or depersonalization [being detached from oneself]; fear of losing control or “going crazy”; fear of dying).

Obsessive–Compulsive Disorder (OCD): Although the specific content of obsessions and compulsions varies among individuals, certain symptom dimensions are common in OCD, including those of cleaning (contamination obsessions and cleaning compulsions); symmetry (symmetry obsessions and repeating, ordering, and counting compulsions); forbidden or taboo thoughts (eg, aggressive, sexual, and religious obsessions and related compulsions); and harm (eg, fears of harm to oneself or others and related checking compulsions).

Posttraumatic Stress Disorder (PTSD): The development of characteristic symptoms (including fear-based re-experiencing, emotional and behavioral symptoms, anhedonic or dysphoric mood states, negative cognitions, arousal and reactive-externalizing symptoms, dissociative symptoms, or combinations of these symptom patterns) after exposure to actual or threatened death, serious injury, or sexual violence.

Mood Disorders

Adjustment Disorder With Depressed Mood: The development of emotional or behavioral symptoms in response to an identifiable stressor(s) that occur within 3 months of the onset of the stressor(s) in which low mood, tearfulness, or feelings of hopelessness are predominant.

Major Depressive Disorder (MDD): A period of at least 2 weeks during which there is either depressed mood or the loss of interest or pleasure in nearly all activities. In children and adolescents, the mood may be irritable rather than sad.

Bipolar Disorder: A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased activity or energy, lasting at least 4 consecutive days and present most of the day, nearly every day, or that requires hospitalization.

Premenstrual Dysphoric Disorder: The cyclic recurrence of severe, sometimes disabling, changes in affect—such as mood lability, irritability, dysphoria, and anxiety—that occur in the luteal phase of a woman's menstrual cycle and subside around, or shortly after, the onset of menses. These symptoms may be accompanied by the common physical and behavioral symptoms of premenstrual syndrome.

Attention Deficit Hyperactivity Disorder

Symptoms of inattention and hyperactivity or impulsivity present for at least 6 months to a degree that is maladaptive and inconsistent with developmental level.

Disruptive Behavior Disorders

Conduct Disorder: Repetitive and persistent pattern of behavior that violates the basic rights of others or the age-appropriate societal norms, including aggression to people and animals, destruction of property, deceitfulness or theft, or serious violation of rules (such as running away, truancy, curfew violations.)

Oppositional–Defiant Disorder: Pattern of negativistic, hostile, and defiant behavior that includes four or more of the following—often losing temper, often arguing with

adults, often refusing to follow rules, often annoying others, often blaming others, often angry or resentful, often spiteful or vindictive.

Poor Body Image:

Body image refers to how an individual sees themselves. A positive body image builds up self-esteem. Poor body image, can start early in life. It is influenced by parents, media, peer group and pubertal changes and can lead to eating disorder related issues. In general, the number of teens with poor body or distorted body image concerns is increasing globally and in India. Teens often do not disclose their concerns about body image to their friends or other adults in their life. Therefore, it is important that pediatricians recognize signs and take steps to address it early on.

Signs of poor body image in teens include obsessive self-scrutiny in mirrors, regular comments about their body, comparison of their appearance to others, and envy of a friend or celebrity's appearance. Ways to improve adolescent body image include encouraging teens to focus on their personal strengths and to spend time with friends who feel good about their bodies (and are not always criticizing themselves or others). In more severe cases, referral to a counsellor or therapist should be considered, who can help build positive body image and self-esteem.

- **SLEEP DISTURBANCES**

During the period of rapid growth, adolescents have increased sleep requirements. Many urban adolescents do not get enough sleep due to various reasons like increasing academic activity, parents working in shifts or watching television late into the night. Poor sleep habits and inadequate sleep are likely to reflect in school performance and cause daytime drowsiness, aggressive behaviour, conduct disorders, anxiety, restless leg syndrome and depression. Sleep deprived teens often have periods of subconscious bouts of sleep or 'microsleeps' during the daytime, making them prone to injuries and accidents

- **INFECTIONS**

With increased outdoor activity, teens are exposed to TB, HIV, sexually transmitted infections, skin infections and parasitic infections. Early sexual activity is not uncommon in India. Various biological (immature and incompletely estrogenized mucosa) and psychosocial factors (lack of preparedness, lack of familiarity with barrier contraceptives) make an adolescent susceptible to these infections.

Genital infections and sexually transmitted infections: Vaginal discharge is common in adolescent girls and may signify physiological leucorrhoea of puberty or endogenous or sexually transmitted infections. Gonorrhoea can cause vulvovaginitis, urethritis or proctitis. Chlamydia can cause intermenstrual or postcoital bleeds. Both may be asymptomatic in the majority and can cause vaginal discharge. Candidal infections become common with starting of menstruation and often have a cyclic nature. Pelvic inflammatory disease (PID) is a spectrum of inflammatory disorder of female genital tract. PID occurs commonly in sexually active young females and can present with abdominal pain with vaginal discharge. The illness is difficult to treat with oral antibiotics and needs hospitalization and intravenous antibiotics.

FEMALE SPECIFIC HEALTH PROBLEMS

- It is common to have anovulatory and irregular menstrual cycles during first two years after menarche. The polycystic ovary syndrome, with a combination of menstrual irregularities and ovarian cysts with androgen excess like acne or hirsutism, occurs in around 9% of Indian adolescent girls. The condition has association with other metabolic derangements like obesity, insulin resistance and type 2 diabetes.

Menstrual hygiene: There are many social taboos about menstruation in Indian families. Many adolescent girls are found to miss school during their menstruation because of lack of access to safe sanitary products or lack of privacy. Poor Menstrual hygiene may contribute to reproductive infections. With the introduction of government and private run Menstrual Hygiene Schemes, 57% young women now use hygienic methods during menses. [NHFS4]

VULNERABLE GROUPS AND THEIR PROBLEMS:

- Poverty- Poor access to health care and education, early initiation into employment
- Illiterate & School Drop Outs- Prone to high risk behavior and juvenile delinquency
- Working- Unhealthy working conditions, prone to exploitation, poor access to education & health care
- Street Adolescent- High risk behavior
- Rural Adolescent- Poor access to health care
- Institutionalised- Prone to abuse & exploitation

Abuse and violence (physical and sexual): Physical and sexual violence is common in India, with 20-30% young females suffering from domestic violence and 5-9% young females reporting sexual violence (NFHS4). Accidents are the major cause of mortality in this age group. Road traffic accidents, burns and poisoning are leading causes of traumatic mortality and disability in Indian youth. Motor vehicle and industrial accidents are common in boys whereas burns are more common in girls.

Migration: Many adolescents migrate from rural to urban settings, for labor or educational opportunities. Trafficking of youth is a serious problem in India and happens for industrial or domestic labor, forced marriages and prostitution. In states like Bihar, 70% of new HIV infections are related to outward male migration.

Adolescent Pregnancy: Unmarried adolescents are likely to resort to unsafe methods of abortions, which increase risk of septicemia and mortality. As compared to adult pregnancy, they are also at a higher risk for pre-eclampsia, preterm labor and postpartum hemorrhage. Prolonged and obstructed labor are common in adolescent pregnancies and they are 2-4 times more likely to die during childbirth as compared to adult females. Neonatal, infant and child mortality rates are higher in children

delivered to adolescent mothers. Fortunately, the prevalence of adolescent pregnancy [8%] is lower in the results of NFHS 4, due to schooling and knowledge about contraception.

Lack of sex education: The majority of Indian youth do not get formal sex education in an effective way. Peers, books and magazines are their main sources of information about sex. Parents and teachers often fail to discuss issues like masturbation, safe sex, dating, abortion, HIV and sexually transmitted diseases.

- **SUBSTANCE ABUSE IN ADOLESCENTS**

Substance use among children and adolescents is a public health concern in several parts of the world. Onset of substance abuse during the formative years interferes with academic, social and life skills development, and warrants both primary and secondary prevention. This is an issue in urban as well as rural India. Most of the tobacco and alcohol use starts during adolescence. The Global Youth Tobacco Survey 2009 showed that 14% of school youth reported using tobacco currently. Alcohol (21%), cannabis (3%) and opium (0.4%) are the most prevalent substance abuse other than tobacco in Indian youth. The incidence of drug abuse among children and adolescents is higher than the general population. In developed countries drug abuse among youth is generally associated with particular youth subcultures and lifestyles, causing an acceptance of drugs and their use by members of the subcultures. In Asia, the figures for drug abuse are not exactly known but after cannabis, Amphetamine-type Stimulants (ATS) are the most commonly used amongst children and youth.

Substance use refers to the use of any psychoactive substance or drug, including licit and illicit drugs, other than when medically indicated. According to the World Health Organization, substance abuse is persistent or sporadic drug use inconsistent with or unrelated to acceptable medical practice. Today, there is no part of the world that is free from the curse of drug trafficking and drug addiction. All over the world, millions of people with drug addiction are leading miserable lives between life and death. India

too is caught in this vicious circle of drug abuse and the numbers of drug addicts are increasing day by day.

Addicts are more prone to accidents, injuries, violence, trading sex-for-drugs, HIV, hepatitis C, sexually transmitted diseases and tuberculosis.

According to a study conducted by the National Commission for Protection of Child Rights, the common drugs of abuse among children and adolescents are tobacco and alcohol, followed by inhalants and cannabis. The mean age of onset was lowest for tobacco (12.3 years), followed by onset of inhalants (12.4 years), cannabis (13.4 years), alcohol (13.6 years), proceeding then to the use of harder substances opium, pharmaceutical opioids, heroin (14.3–14.9 years) & then substances through injecting route (15.1 year).

A brief note on the various groups of drugs follows:

1. Nicotine : Adolescents and children are the prime targets of the tobacco industry. According to WHO report adolescents in India start smoking early. The India Global Youth Tobacco Survey (GYTS) conducted on adolescents aged thirteen to fifteen years revealed that 14.6% of students used some form of tobacco and 4.4% smoked cigarettes. Though the level of cigarette use has been dropping significantly as perceptions of risk increase, nicotine use continues to be a topic of concern for teens and adolescents. A factor is the rising trend of e-cigarette use among younger teens. These are electronic nicotine delivery systems that are battery operated, which heat and then vaporize nicotine dissolved in propylene glycol, glycerine or other solvents. They come in tobacco, mint, cherry or chocolate flavours and are highly appealing to adolescents. Adverse effects include dry cough, throat irritation and lipoid pneumonia. Potentially toxic substances like diethylene glycol and carcinogens like nitrosamines have been detected in vapour.
2. Alcohol: Alcohol is commonly abused by teens. The social acceptance of drinking among people can lead many teens to view alcohol as relatively harmless. Research suggests teens are more likely to binge drink because their impulse control centre has not fully developed.

3. Marijuana(Cannabis): Marijuana refers to the dried leaves, flowers, stems and seeds from the Cannabis sativa or Cannabis indica plant. The plant contains the mind-altering chemical tetrahydrocannabinol and other similar compounds [3]. An analysis of cannabis markets shows that low prices coincide with high levels of abuse, and vice versa.
4. Opioids: Opium is a dark brown, resinous material obtained from poppy (papaver somniferum) capsule. Morphine is the principal alkaloid in opium. A wide range of painkillers are being abused by teens and adults. These include: morphine, fentanyl, codeine, tramadol. Teens abuse the tablet forms of these drugs by taking them orally or in some cases by crushing and snorting or injecting them.
5. Tranquilizers: Tranquilizers include depressants or sedatives like benzodiazepines, barbiturates and sleep medications. These substances are helpful in treating anxiety disorders, seizures and sleep problems when taken as prescribed in pill form but have a high potential for abuse and dependence.
6. Amphetamines: Amphetamines are medications prescribed primarily for attention-deficit/hyperactivity disorder (ADHD) that is comprised of two substances: amphetamine and dextroamphetamine. It is a white odourless, bitter tasting powder that is particularly popular among adolescents and young adults because of its potency and ease of absorption. When taken as prescribed, amphetamines and other stimulant medications can be safe and effective. When taken in ways other than prescribed, they can be dangerous and addictive. Abusers are generally teenagers seeking thrill or kick which is obtained on rapid intravenous injection.
7. Cocaine: Cocaine, an alkaloid extracted from leaves of Erythroxylum Coca, is supplied as the hydrochloride salt in crystalline form. Smoking the cocaine alkaloid involves inhaling the cocaine vapours in pipes or cigarettes mixed with tobacco or marijuana. To sustain the high, cocaine users repeatedly use cocaine in short period of time known as “binges”.

8. Inhalants: Inhalants are abused by sniffing, snorting or huffing fumes: directly from a bottle, from a soaked cloth, from a balloon or sprayed from an aerosol container. A number of liquid or gas items are abused for their intoxicating effects, with most of these substances being legal and available in many homes and businesses. The inhalants are one of the first substances that teens living on the streets experiment due to their availability, easy access, and ability to create a desirable “high” that is similar to alcohol intoxication.

9. Dextromethorphan: Many over-the-counter medicines for coughs and colds contain the active ingredient dextromethorphan (DXM). When used as directed, the substance treats cold symptoms, but at higher doses, it can produce an intoxicating and dissociative effect. DXM-containing cough medicine is an inexpensive, legal, and easy-to-obtain high drug, although certain states have begun to regulate its sale to minors. Teens can easily get it from their home or in pharmacies.

10. Hallucinogens: Several naturally occurring and synthetic substances are used by adolescents for their hallucinogenic properties. This group of substances contains psychoactive drugs that distort reality by triggering hallucinations, delusional thinking, and/ or skewed experiences of time and space. While hallucinogens may not be as easily available as other substances like alcohol and marijuana, their appeal lies in two main factors: their sought after ability to distort the environment of the user looking for novel recreational experiences and their lower perceived risk compared to other substances like cocaine or heroin.

Factors contributing to Substance Abuse:

The developing adolescent brain has a preponderance of the hypothalamic limbic system and a very strongly developed dopamine pathway and a less developed prefrontal cortical control. This leads to impulsive high risk taking behaviour and susceptibility to negative peer pressure in adolescents. Adolescents due to above reasons are very vulnerable to substance abuse which begins with experimentation with peers.

There are many risk factors that make some adolescents more vulnerable than others. Adolescent with various psychiatric disorders have a high risk of turning to substance abuse. Feelings of sadness and pain experienced during depression may lead adolescents to seek relief in the form of substance use. Other factors are: 1) familial-childhood maltreatment (neglect and any type of abuse physical, mental, emotional, sexual). 2) Familial substance abuse, 3) dysfunctional parent-child relationships. Social risk factors include a) association with deviant peers, b) popularity, c) bullying, d) gang affiliation e) Unsafe and drug promoting environment in school and community. Individual risk factors include problems like ADHD and depression.

There are some flag signs that should alert parents to observe their teen more carefully and try to communicate and get to the root of the problems – these may be termed as **Universal flag signs**.

TABLE 1 UNIVERSAL FLAG SIGNS	
Domain	Flag signs : these can alert parents that something is going wrong in their adolescent and needs professional assessment
Sleep disturbances	excess sleep, reduced sleep, trouble falling asleep, getting up at midnight and not able to go back to sleep again, insomnia, nightmares
Appetite changes	eating too much, loss of appetite, binge eating, emotional eating, signs of eating disorders
Weight changes	weight gain, weight loss
Academic performance	losing interest in school work, falling back on home work, worsening academic performance, fights in schools, bullying or victim of bullying, reduced memory and attention span
Change in behaviour	withdrawal, signs of depression, not communicating, irritability, anger, fighting, emotional out bursts, mood swings, excess anxiety
Change in peer group	loss of friends, a new circle of friends, new friends with undesirable behaviours, unknown persons phone calls
Frequent physical symptoms	Various aches and pains – abdominal, headache, chest pain
Regression	Thumb sucking, bed wetting, childish temper tantrums
Missing school	Frequently wanting to miss schools
Mobile phone behaviour	Need for extreme privacy, extreme anger, if phone taken away
Bathroom	Being closeted in the bathroom for prolonged hours

A single flag sign should not lead to panic but should alert parents. If there are many flag signs in adolescent, parents must – take professional help to assess what is wrong. Parents and teachers need to be educated and made aware of specific flag signs for various teenage issues like depression, risk of suicide, alcohol or tobacco consumption, substance abuse, emotional disturbance etc.

ENVIRONMENT AND SOCIAL CHALLENGES:

Pollution: The incidence of asthma is increasing. There is ongoing research into the role of electromagnetic exposure from communication devices in disorders like childhood leukemia, brain tumors and immune dysregulation.

Media: With reduction in poverty and increased availability of electronic media, adolescents are exposed to information from all across the world. This exposure is often unsupervised because of working parents and increasing use of personal electronic gadgets. Due to inability to separate fact from fantasy, adolescents succumb to the glamorous portrayal of tobacco or alcohol consumption, unrealistic expectations, physical aggression, destructive behavior and unprotected sex. In urban areas, spending much of their spare time indoors on social networking sites, teenagers are actually deprived of sunlight and physical activity and are socially isolated.

Peer pressure: Peer formation is a part of adolescent social development. Pressure for conforming to norms drives many of their actions and decisions, including risk taking behavior and initiation of substance abuse.

Poverty: Adolescents belonging to poorer families are likely to have inadequate diets. Studies have shown that children belonging to poorer families had higher chances of having depression, antisocial behavior and engaging in drugs or sexual activity at earlier ages.

Illiteracy: Though the situation is improving over the years, still 33% of Indian youth are not able to complete their primary education. Female gender belonging to rural and poor background are risk factors for illiteracy.

Academic and emotional stress: Examinations cause significant physiological and psychological stress. Apart from rapid changes in their body structures, various other factors like peer acceptance, discrimination, academic burden, parental expectations, changing social environments cause stress among youth. Switching from vernacular to English medium schools, long hours of school and tuitions are additional stress factors that are unaddressed. While most adolescents have adequate coping skills, some may have serious adjustment problems resulting in various psychological and somatic effects.

Early marriage. Though the legal age for marriage in India is 18 yr for girls, many states still have the practice of childhood and early marriage. Almost 30% of Indian

girls between the ages of 15 and 19 yr are married; the proportions are higher in rural areas.

Discrimination. Young people are often treated as second class citizens, under the control of adults and often not involved in any decision making. Adolescent girls are often asked to limit their outdoor or extracurricular activities and are involved in any decision making. Adolescent girls are often confined to their houses and expected to do the household work. Gender based discrimination is seen in education and even food distribution.

ROLE OF HEALTH CARE PROVIDER IN ADOLESCENT HEALTH

The health care provider plays an integral role in adolescent health care. The following factors are to be considered :

Establishing rapport: Being empathetic and nonjudgmental is the key to effective communication. Direct questioning of the adolescent is as important as questioning the parents. Beginning the conversation with icebreakers, set of open-ended non-sensitive questions and then moving to sensitive/targeted questions is always helpful.

Consent: For a child who is less than 12 years, consent for examination or medical/surgical procedure is obtained from the parent or guardian. While an adolescent aged 12-18 years can give consent for examination, consent for medical/surgical procedure can be given only after 18 years. This also includes consent for medical termination of pregnancy, blood and organ donation.

Confidentiality: One may need to interview a young patient separately, as he/she may not want to discuss sensitive topics in the presence of parents. While examining the genitalia, the doctor can ask patient's preference for presence of their parent inside the examination room. A boy may prefer his parents standing outside the exam room, whereas a girl may find it comforting, if her mother accompanies her during the examination.

Nutritional Intervention: Improving the nutritional status of adolescent girls helps in two ways. It breaks the cycle of malnutrition and low birth weight babies, and prevents long-term complications of the latter in future generations.

Providing Illicit Information: The adolescent health visit is an excellent opportunity to talk to the parents and their adolescent about the pubertal changes. It is likely that they have not received any formal sex education in school and need to be provided correct educational resources for the same.

Referral to social services: National Commission for Protection of Child Rights Act 2005 considers a person below 18 years as a 'child'. It is mandatory for a health care provider to report all cases of child abuse (even suspected) to the Chairperson of the Commission; the complaint can be lodged online or in writing. Doctors are protected in case of erroneous reporting but punishable, if they fail to report. Adolescents with special needs or victims of any kind of abuse need social and psychological support.

Checklist for Adolescent Health Visit is as below:

History from parents and adolescent	History of presenting problems Parental concerns on growth, development Academic success, school absenteeism Diet history including calcium, protein and iron intake; junk food Menstrual history; sleep problems
History on separate questioning of adolescent	Emotional problems; relationship with family and peers Outlook towards physical and sexual changes Involvement in relationship or sexual activity Awareness about safe sex and contraception Specific problems related to sex organs Tobacco or other substance use Concerns and clear doubts on sensitive topics
History on separate questioning of parents	Relationship with family Level of communication on sensitive matters
Physical examination	Anthropometry Blood pressure, markers of obesity, acanthosis Sexual maturity rating Signs of malnutrition, anemia and vitamin deficiencies Signs of skin and genital infections Level of genital hygiene Signs of trauma/abuse Signs of drug abuse or tobacco use
Counseling	Nutritional intervention Hygienic practices Building rapport between parents and adolescent Providing information and sources on sex education
Investigations	Hemoglobin level Blood sugar, lipid profile Genital swabs Ultrasound of ovaries
Referrals	Counselor Diabetian Psychiatrist Gynecologist Voluntary and confidential HIV testing Social services, child protection agencies, support groups

Adolescent friendly health services: Adolescents have diverse problems and special needs. The services include provision of reproductive health services, nutritional counseling, sex education and life skill education. Confidentiality, easy accessibility, friendly attitude and quick comprehensive health care delivery have made a positive impact on adolescent clients. 'Adolescent reproductive and sexual health' has been identified as a key strategy under RCH II programme. Adolescent friendly clinics are functional at many centers in the country.

Package of Interventions for Healthy Adolescents are as follows:

Healthy Lifestyle

- Healthy food
- Exercise and Yoga
- No to tobacco, alcohol, drugs
- Safe conduct on road

Vaccines:

- Papilloma virus, rubella

The healthy Adolescent service that are Provided are as Follows:

Healthy Lifestyle

- Healthy food
- Exercise and Yoga
- No to tobacco, alcohol, drugs
- Safe conduct on road

Vaccines

- Papilloma virus, rubella

Anemia:

- Prevention, detection and management of anemia /especially for adolescent girls

Sexual health

- Sexuality education
- Menstrual hygiene
- Marriage after 18 years, childbirth after 20 ~ears
- Counselling and services for comprehensive sexual and reproductive health, including contraception

Mental health

- Supportive family; counseling and peer/family support in anxiety, depression
- Prevention and management of hazardous and harmful substance use
- Prevention of suicide and management of self-harm/ suicide risk

Violence prevention

- Prevention and management of unintentional injury
- Prevention of and response to sexual and other forms of gender-based violence

Communicable and Non-communicable Diseases:

- Prevention, detection and treatment of communicable and non-communicable diseases

Preparing for adulthood

- Parenting skills, responsible husband, wife and father

SEXUAL VIOLENCE AND ITS MANAGEMENT:

Child sexual abuse (CSA) includes all types of sexual victimization of children – penetrative or non-penetrative sexual intercourse, pornography, sexual harassment, commercial sexual exploitation, sex tourism and online exploitation.

In India, the Protection of Children from Sexual Offences (POCSO) Act, 2012 (that regards any sexual activity with a child below 18 years a crime), describes various forms of sexual offences. CSA has been mostly reported from economically affluent countries, it may be more common in developing countries. A recent epidemiological study mentions that the prevalence rates of CSA in Europe, America and Asia were 9.2%, 10.1% and 23.9%, respectively. CSA is influenced by socio-cultural practices

and frequently goes unreported, as a culture of secrecy, fear of indignity and social embarrassment prevents disclosure of such offences. Moreover, minor forms of CSA are mostly ignored.

Sexual violence takes place in all settings: at home, schools, child care institutions, places of work and in the community. Information on the prevalence and forms of CSA is very scarce and difficult to obtain.

Every case of sexual assault is a medical emergency for which free treatment is mandatory at government or private medical facilities, and no document or precondition is necessary for providing emergency medical care. A victim of CSA may approach a health facility directly for treatment, with a police requisition after police complaint, or with a court directive.

The hospital is bound to provide treatment and conduct a medical examination with consent of the child/parent/guardian, depending upon the age of the child. The victim may or may not want to lodge a complaint, but requires medical examination and treatment. In such cases, the doctor is bound to inform the police as per law.

However, neither court nor the police can force the survivor to undergo medical examination without an informed consent of the child/parent/guardian.

If the victim does not want to pursue a police case, a medico-legal case (MLC) must be made and an informed refusal documented. If the victim has reported with a police requisition or wishes to lodge a complaint later, the information about MLC number and police station must be recorded.

Medical Evaluation and management of sexual abuse child includes the following measures:

- i. Forensic examination and collection of blood or body fluid samples by trained staff.
- ii. Care of the injuries.
- iii. Prophylaxis against pregnancy: Two doses of levonorgestrel 12 hours apart, first dose being given within 72 hours of intercourse.
- iv. Prophylaxis against sexually transmitted infections includes a single oral dose of Azithromycin 1 g along with Cefixime 400 mg and Metronidazole or Tinidazole 2 g, protects against syphilis, gonorrhoea, *Chlamydia* and *Trichomonas*. Hepatitis B vaccination is recommended, if the person is not previously immunized.

v. Prophylaxis against HIV requires referral to the nearest integrated counseling and testing center.

vi. Psychological support includes counselling and referral to a psychiatrist. Informing concerned authorities or social services is important as patient may need shelter and legal help. A teen may not be willing to disclose this assault to his parents.

Childline (1098) is a support service provided by Government of India focussed on child care and protection.

Protection of Children from Sexual Offenses [POCSO] Act 2012:

The POCSO Act protects individuals below 18 years from sexual offense of harassment of any form, be it physical or pornographic. It also explicitly states that an event of abuse must be informed to legal authorities; failing which, the knowing person [including the health care provider] is liable to legal actions including imprisonment.

One Stop Centers (OSC):

The Ministry of Women & Child Development, Govt. of India is establishing One Stop Centers (OSC) to provide support and assistance to victims of gender violence [11]. Thus, comprehensive services, including medical, police, psychosocial counseling, legal aid, shelter, referral and facilities for video-conferencing are provided ‘under one roof.’ For those below 18 years, these are undertaken in coordination with authorities under the Juvenile Justice Act, 2011 and the POCSO Act, 2012. The scheme is centrally sponsored with 100% financial assistance.

Contraception:

A pediatrician should advocate for abstinence and delayed initiation of sex to adolescent patients. In case the adolescent is already sexually active, condom seems a better choice compared to other methods. Adolescents with disabilities or mental retardation are wrongly assumed to be at low risk for STIs and pregnancy. Parents of such children need to be counselled regarding these issues.

MANAGEMENT OF EATING DISORDERS:

1. Treatment of Anorexia Nervosa

Treatment is based on the degree of severity of symptoms and signs. Improvement may vary greatly depending on the level of resources available, patient adherence and family involvement.

Outpatient care

Outpatient care can be helpful in mild to moderate cases and allow patients to continue to attend school or work. Treatment typically requires a multidisciplinary team, including physician, nutritionist and therapist or psychologist, trained in eating disorders. The pediatrician plays an important role in educating the patient, setting weight goals, monitoring weight gain, checking for medical complications, and ensuring that patients and their families receive the optimal level of care. It is important to discuss increasing caloric intake incrementally to improve menstrual function, heart rate, dizziness and to check for evidence of refeeding syndrome and supplement calcium intake. Treatment includes cognitive behavioral therapy (CBT), which focuses on changing negative patterns of behavior and family based therapy (FBT). FBT also referred to as the Maudsley approach has been shown to be very effective. It involves initially giving the family complete control over the patient's food choices to allow weight gain, then gradually giving control back to the adolescent and addressing other behavioral issues.

Inpatient care

Indications for inpatient treatment include a heart rate <50 beats per minute while awake or less than <45 beats per minute while asleep, systolic pressure <90 mm Hg, prolonged QTc or other arrhythmias, sustained orthostatic changes in blood pressure and pulse, syncope, electrolyte abnormalities, intractable vomiting, suicide risk, weight <75% of expected body weight, or ongoing weight loss despite intensive management. Prognosis is associated with length of illness, age and type of treatment. There is mixed data on the use of medications such as antidepressants.

About 33% of those who seek treatment recover within 5 years. However, patients are 5 times more likely to die prematurely and at much higher risk for suicide than non-eating disorder patients which underscores the need for early screening and treatment.

Treatment of Bulimia:

Outpatient treatment

Treatment is multidisciplinary. Patients may benefit from a day treatment program to break the binge-purge cycle followed by intensive outpatient counseling with a therapist and regular follow up with a pediatrician. CBT is generally considered the most effective intervention for bulimia nervosa although FBT is also useful. The use of selective serotonin reuptake inhibitors (SSRIs) has been shown to be effective.

Inpatient treatment

Indications for inpatient are similar as those mentioned in the section on anorexia nervosa. Inpatient medical stabilization focuses on initiating nutritional rehabilitation, replenishing electrolytes, preventing further medical or psychiatric complications and providing resources for subsequent care. If left untreated, bulimia can result in long-term health problems such as abnormal heart rhythms, bleeding from the esophagus due to excessive reflux of stomach acid and dental problems.

Recovery rates in patients with bulimia are similar to anorexia although mortality is much less common. There is a poor prognosis when bulimia coexists with sexual abuse, depression, or substance abuse.

Treatment of Binge Eating Disorder:

Screening involves asking about eating habits and body image and getting baseline labs including a lipid panel, glucose and electrolytes. Medical complications are similar to those with obesity including hypertension, type2 diabetes, and sleep apnea. Treatment includes CBT and weight loss. There is also evidence to support the use of imipramine, topiramate or selective serotonin reuptake inhibitors in treatment.

MANAGEMENT OF SUBSTANCE ABUSE DISORDERS (SUD) IN ADOLESCENTS:

Managing an adolescent with drug abuse is challenging for a clinician. It requires high level of professional expertise and clinical skills. Pediatricians have a role in screening, giving anticipatory guidance, in parental counseling, management and rehabilitation of adolescents with substance use disorders (SUD).

While making a plan of treatment, following factors need to be considered: ·Cultural and family background of the adolescent ·Gender and relationship within family, school,

community and with peer ·Level of psychological maturity, strengths and weaknesses ·Other medical and physical issues.

KEY ISSUES IN MANAGEMENT

The cardinal points of management of adolescents with Substance abuse disorder are:

- Early detection and intervention ensures better outcome
- Management demands a holistic approach of helping the whole person and not just the symptom.
- Co morbidities like anxiety, depression and conduct problems should be adequately assessed and managed.
- Domestic violence and child abuse makes adolescent vulnerable to drug use and should be screened for
- Adolescents with SUD are prone to other high risk behaviors like unprotected sex, body piercing, tattooing, sharing needles, all being the leading causes of blood borne infections like HIV, Hepatitis B and C. Education, prevention, screening and treatment of these becomes a major part of treatment.
- It is necessary for the treating agency to be aware about the legal interventions ·Family influences the adolescent's compliance and completion of the treatment
- Adverse social circumstances can trigger drug use and relapse
- Compliance and long term follow up are the determinants of a positive outcome.

A strong support by family, school counselors, mentors and community members along with an empathetic attitude of the treating physician ensure success in management of substance abuse disorders.

Non Pharmacological Approaches

Non pharmacological approaches are usually practiced by psychologists, psychiatrists, counselors and support groups. The basic principle is to kindle a motivational insight, learn constructive ways to handle craving, strengthen assertive skills to resist peer pressure, improve interpersonal and intrapersonal communications. A few of these approaches are enumerated below:

· **Adolescent Community Reinforcement Approach (A-CRA)** emphasizes on establishing and maintaining abstinence by healthy family and social relationships. Educational and extracurricular activities are conducted to reinforce drug free behavior.

· **Cognitive-Behavioral Therapy (CBT)** focuses on recognizing the unhealthy associations between thoughts, feelings, behaviors, identifying the maladaptive thoughts and enabling a healthy response pattern by developing emotionally mature and selfcontrolled thinking, feeling and acting pattern.

· **Contingency Management (CM)** in which the client is helped by substituting reinforcement gained from the drug use by healthy options

· **Motivational Enhancement Therapy (MET)** is motivational interviewing that resolves the ambivalent attitude of the participant. It helps the client develop a wish and willingness for abstinence.

· **Twelve-Step Facilitation Therapy** is adopted by self-help groups like Alcoholics Anonymous (AA) or Narcotics Anonymous (NA). This therapy details the consequences of the disease, its uncontrollable aspect and the unmanageable effects on life. It convinces adolescents to give up drugs with the support of recovering addicts.

Family-Based Approaches

The family based approach aims at resolving family conflicts and dysfunctional behavior patterns. It also aims at improving behavior and connections at work and school. These are Brief Strategic Family Therapy, Family Behavior Therapy, Functional Family Therapy and Multidimensional Family Therapy.

Medications

FDA has not approved most medications for adolescents that are used in treating adults with SUD They are however sometimes used 'off-label'. The basis of action of these drugs can be to either by rendering certain drugs harmless to user by chemically binding with the illicit drug, by preventing transmission to the central nervous system or by the antigen -antibody mechanism. Buprenorphine and methadone are used as replacement medicines. Disulfiram and naltrexone are used as antagonists. However, for adolescents, the mainstay of treatment is non pharmacological therapies, until approved newer and safer drugs become available.

The Role Of the Pediatrician

Pediatricians have a role to play in primary prevention of SUD in office practice, in diagnosis, management and rehabilitation and taking a lead in community programs to prevent and treat drug abuse. Pediatricians should partner with parents and guide them regarding prevention and management of SUD by nurturing strong connections with their teens

ADOLESCENT IMMUNIZATION:

ADOLESCENT IMMUNIZATION SCHEDULES

Vaccines for adolescents can be classified as below:

1. Exclusive adolescent vaccines
2. Catch-up vaccines
3. Vaccines for adolescents in special situations
4. Vaccines for the adolescent traveler.

Exclusive adolescent vaccines - Tdap and HPV vaccines are the “exclusive” adolescents' vaccines.

Catch-up vaccines- MMR, Hepatitis B, Hepatitis A, Varicella, Typhoid-TCV

Vaccines for adolescents in special situations- Influenza, Pneumococcal, Japanese encephalitis (JE) vaccines, Rabies.

Vaccines for the adolescent traveller- Meningococcal, Yellow fever, JE vaccines, Rabies.

India presently has coverage for Booster doses of TT at 10 and 16 years: Papilloma virus vaccine is recommend for peripubertal girls (before initiation of sexual activity) for prevention of infection with human papillomavirus and cervical cancer. Parents need to be counselled thoroughly as the principle behind giving the vaccine might alarm them.

Vaccines given during adolescence:

1. Tetanus and diphtheria toxoid and acellular pertussis (Tdap) vaccine [TT at 10 and 15 years as per Universal Immunization Program] – 10-12yrs and once in five years thereafter.
2. Papillomavirus - 2 doses, If given between 9 and 14 years

3 doses, If given beyond age 15 years

Barriers To Adolescent Vaccinations:

Immunization is a key preventive cornerstone of pediatric and adolescent care. Poor immunization coverage in adolescents is not a phenomenon peculiar to India or other developing countries, but is universal and seen even in high-income countries. Missed opportunities, low public awareness about the need for immunization coverage in this age group, misperceptions about vaccine safety, and lack of knowledge about the importance of immunizations, were major issues resulting in poor acceptance. Due to fewer contacts with physicians, adolescents are difficult to approach for vaccination and other preventive services. Among the various factors responsible for vaccine hesitancy are low perceived threat due to the disease, fear of adverse effects, belief that scientific data about the vaccine is insufficient and the vaccine had not been on the market “long enough.” Internet and media sources that give misinformation about vaccines, especially vaccine safety is another important barrier against immunization.

What is the way forward ? Adolescent immunizations uptake can be enhanced by interventions at two levels: (1) health care systems; and (2) patients and families

Transition to adult care:

With better medical care, a large number of chronically ill or disabled children are surviving into adulthood. As the problems of these children are diverse, they need multidisciplinary care even in their adulthood. Transition to adult care is not mere transfer of the case to a different physician. It is a gradual and planned process; keeping in mind the abilities of the child to participate in self-care, taking responsibilities and decision making. The age at transfer is not fixed; a window of age 14-18 years is used in some countries for a gradual transfer.

GOVERNMENT INTERVENTIONS IN ADOLESCENT HEALTH CARE:

Kishori Shakti Yojana and SABLA Yojana aim to provide health, nutrition, education and vocational skills to adolescent girls. National Youth Policy believes in youth empowerment through education. Recognizing the contribution of adolescent care to maternal and child health, National Health Mission now follows Reproductive, Maternal, Neonatal, Child

and Adolescent Health (RMNC+A) approach. Under this program, weekly iron and folic acid supplementation (WIFS) program I provides 100 mg of iron and 500 µg folic acid with biennial deworming to all adolescents attending government schools.

Rashtriya Kihore Shwastiya Karyakram (RKSK) program was launched by Ministry of Health and Family Welfare in the year 2014. This program envisions, “all adolescents in India are able to realize their full potential by making informed and responsible decisions related to their health and well-being and by accessing the services and support they need to do so.”

The program strategized to meet the need of adolescent health in holistic manner addressing six thrust areas Reproductive and Sexual health (SRH) (improve knowledge, attitudes and behavior in relation to SRH, reduce teenage pregnancies, prevent RTI/ STI, HIV/AIDS), Nutrition (under or over nutrition) , Mental health (acknowledging depression among adolescents, removing taboo associated and timely addressing the issue, preventing suicides), substance abuse , injuries, aggression and violence and Non-communicable diseases. The highlights of this program are, medical advice and counseling to adolescents through Adolescent Friendly Health Clinic (in Rajasthan state it is known as UJALA Clinic) by doctor and designated counselors, peer counseling through trained peer counselors, quarterly adolescent health day at anganwadi centers, weekly iron folic acid supplementation, bi-annual de-worming and upkeep of menstrual hygiene.

SCHOOL AND COLLEGE BASED INTERVENTION PROGRAMS

School programs are a good way to deal with substance abuse in children and young people. In countries like USA much is lost when a favourite sports or movie star promotes drugscannabis, alcohol, etc. Fortunately, in India advertisements promoting alcohol and tobacco in media and print media is banned but surrogate marketing with the alcohol brand marketing mineral water or soda continues.

PARENTING PROGRAMS

It is important for parents to be attentive to signals and always make the adolescent feel that they have their unconditional love and will support and guide them through their turbulent times. When parents notice general and specific flag signs, they should try to talk it over with the adolescents. Sometimes only listening to them is all that is needed to bring them back on

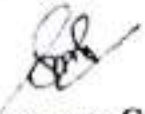
track. Parents need not react to everything. They should ask the teens if help is needed and do the needful. Overreacting and interference will make teens go away from parents making them afraid of confiding in them.

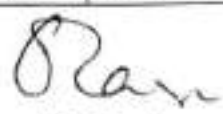
VALUE ADDED COURSE

All About Adolescents (Module on Adolescent Paediatrics) PECO5

List of Students Enrolled July 2017 – Oct 2017

Final Year MBBS Student			Signature
Sl. No	Name of the Student	Roll No	
1	AASHIK MUKESH. M. S	U14MB201	Aashik mukesh. Ms.
2	ABEETHA.M	U14MB202	abeetha
3	ABHINAV. S	U14MB203	abhinava
4	ABINAYA. M	U14MB204	abinaya. M.
5	ABISHEK. R	U14MB205	abishek
6	ABIRAMI. S	U14MB206	abirami
7	AGALYA. S	U14MB207	Agalya. S.
8	AJAY PANDIAN. V	U14MB208	Pandian
9	AJEETH. R	U14MB209	Ajeeth. R.
10	AJITH KUMAR. M.K.	U14MB210	Ajithkumar. MK.
11	AKSHAL. S	U14MB211	Akshai
12	ALLEN DANIEL XAVIER. J	U14MB212	allen
13	ALTHAF AHMED	U14MB213	althaf
14	AMARA LOKESH	U14MB214	Amalokesh.
15	AMRESH. K	U14MB215	amresh
16	ANANT SURYA. R	U14MB216	Anant Surya
17	ANDREW MARIE XAVIER. V	U14MB217	Andrew Marie Xavier
18	APSARA. P	U14MB218	apsara
19	ARPUDHA. A	U14MB219	ARPUDHA. A.
20	ARUL PRABHA MADHIVADHANI. M	U14MB220	Arul Prabha.


 Dr. Satyamanasa Gayatri Vinay.S
 ASSISTANT PROFESSOR
 DEPARTMENT OF PAEDIATRICS
 SRI LAKSHMI NARAYANA INSTITUTE OF
 MEDICAL SCIENCES


 Dr. Raghavendran
 COORDINATOR
 DEPT. OF PAEDIATRICS
 SRI LAKSHMI NARAYANA INSTITUTE OF
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 OSUDI, PUDUCHERRY



SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

Agalya S
U14MB207

Annexure - III

ALL ABOUT ADOLESCENTS (MODULE ON ADOLESCENT PAEDIATRICS)

MULTIPLE CHOICE QUESTIONS

Course Code: PEC05

ANSWER ALL THE QUESTIONS

1. Mid Adolescence defines the age group between

A. 7-9yrs

B. 10-12yrs

C. 12-14yrs

D. 14-16yrs

2. In males, the first visible sign of puberty is testicular enlargement, beginning as early as

A. 8.5 yr

B. 9.5 yr

C. 10.5 yr

D. 11.5 yr

3. The first visible sign of puberty in females is the appearance of breast buds (thelarche) between

A. 5 and 9 yr

B. 6 and 10 yr

C. 7 and 11 yr

D. 8 and 12 yr

8/10
[Signature]



**SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Annexure - III

ALL ABOUT ADOLESCENTS (MODULE ON ADOLESCENT PAEDIATRICS)

MULTIPLE CHOICE QUESTIONS

Course Code: PEC05

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8/10
[Signature]

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Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



CERTIFICATE OF MERIT

This is to certify that ABINAYA. M (U14MB204) has actively participated in the Value Added Course on *All About Adolescents (Module on Adolescent Paediatrics)* held during July 2017 – Oct 2017 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. Satya Manasa Gayatri Vinay
RESOURCE PERSON

Dr. Raghavendran
COORDINATOR



Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)



CERTIFICATE OF MERIT

This is to certify that____**ABEETHA.M** (U14MB202)___ has actively participated in the Value Added Course on *All About Adolescents (Module on Adolescent Paediatrics)* held during July 2017 – Oct 2017 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. Satya Manasa Gayatri Vinay
RESOURCE PERSON

Dr. Raghavendran
COORDINATOR

Student Feedback Form

Course Name: ALL ABOUT ADOLESCENTS (MODULE ON ADOLESCENT PAEDIATRICS)

Subject Code: PEC05

Name of Student: Balaji .k Roll No.: U14MB228

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear					✓
2	Course contents met with your expectations				✓	
3	Lecturer sequence was well planned				✓	
4	Lectures were clear and easy to understand					✓
5	Teaching aids were effective					✓
6	Instructors encourage interaction and were helpful					✓
7	The level of the course				✓	
8	Overall rating of the course	1	2	3	4	5

* Rating: 5 - Outstanding; 4 - Excellent; 3 - Good; 2 - Satisfactory; 1 - Not-Satisfactory

Suggestions if any:

Balaji .k
Signature

Student Feedback Form

Course Name: ALL ABOUT ADOLESCENTS (MODULE ON ADOLESCENT PAEDIATRICS)

Subject Code: PEC05

Name of Student: Balaji K. Roll No.: U1PM2228

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance.

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear					✓
2	Course contents met with your expectations				✓	
3	Lecturer sequence was well planned				✓	
4	Lectures were clear and easy to understand					✓
5	Teaching aids were effective					✓
6	Instructors encourage interaction and were helpful					✓
7	The level of the course				✓	
8	Overall rating of the course	1	2	3	4	5

* Rating: 5 - Outstanding; 4 - Excellent; 3 - Good; 2 - Satisfactory; 1 - Not-Satisfactory

Suggestions if any:

Balaji K.
Signature



SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

VIF MB 232
Bail V

Annexure - IV

ALL ABOUT ADOLESCENTS (MODULE ON ADOLESCENT PAEDIATRICS)

MULTIPLE CHOICE QUESTIONS

Course Code: PEC05

ANSWER ALL THE QUESTIONS

1. Mid-Adolescence defines the age group between

- A. 7-9yrs
- B. 10-12yrs ✓
- C. 12-14yrs
- D. 14-16yrs

2. In males, the first visible sign of puberty is testicular enlargement, beginning as early as

- A. 8.5 yr
- B. 9.5 yr ✓
- C. 10.5 yr
- D. 11.5 yr

3. The first visible sign of puberty in females is the appearance of breast buds (thelarche) between

- A. 5 and 9 yr
- B. 6 and 10 yr
- C. 7 and 11 yr
- D. 8 and 12 yr ✓



SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

U14MB202
Abetha M.

Annexure - IV

ALL ABOUT ADOLESCENTS (MODULE ON ADOLESCENT PAEDIATRICS)

MULTIPLE CHOICE QUESTIONS

Course Code: PEC05

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- A. 5 and 9 yr
- B. 6 and 10 yr
- C. 7 and 11 yr
- D. 8 and 12 yr

Date: 01.11.2017

From

Dr. Raghavendran
Professor and Head,
Department of Paediatrics,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Through Proper Channel

To

The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

**Sub: Completion of value-added course: All About Adolescents (Adolescent Pediatrics Module)
for Undergraduates**

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled: All About Adolescents (Adolescent Pediatrics Module) for Undergraduates Final Year MBBS from July 2017 to Oct 2017 for 10 Final Year MBBS students . We solicit your kind action to send certificates for the participants, that is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards,



Dr. Raghavendran

**PAEDIATRICS HEAD
DEPT OF PAEDIATRICS
SRI LAKSHMI NARAYANA INSTITUTE OF
MEDICAL SCIENCES
OSUDU, PUDUCHERRY**

Encl: Photographs

PECOS – All About Adolescents (Adolescent Pediatrics Module), July 2017

