

Course Name: Adolescent Health and Well-being: A Holistic Approach

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Lecture 06 - Physiological and Psychological changes during Adolescence

Hello and welcome to another lecture in this course on Adolescent Health & Well-being: A Holistic Approach. Today I will be dealing with physiological and psychological changes during Adolescents. Various concepts that will be covering in today's lecture are Puberty, Adolescent Development, Factors affecting adolescent health and development, The Science of Sexual Maturation in Adolescents, The Brain Development, Psychological Changes in Adolescents and the various theories of development. The various keywords in this presentation are puberty, growth spurt, cognitive changes, menarche, sexual maturation and psychological changes.

Now coming to the growth during adolescence. Now as we all know that adolescence is a critical transitional stage between childhood and adulthood. Now in this adolescence, there is something known as adolescent growth spurt. This growth spurt is a period of rapid growth in height and weight during the adolescence period. Another term to note here is puberty. Puberty is basically the physiological changes that adolescent undergo in order to reach sexual maturity. Now let us have a look at the universal features of adolescent development. With the onset of puberty, there are plethora of biological changes that the adolescent undergo. With the emergence of more advanced cognitive abilities, there are cognitive changes in the adolescence. There is change in the perception of self-image, intimacy among the adolescents, change in relationships with adults and peers. All these go under the emotional changes that the adolescents are going through. Also the various transitions into their new role in the society come under the social changes for the adolescents.

Now let us have a look at puberty. This puberty basically is originated from Latin word 'pubertas' which means the age of manhood. Now this is the time of rapid physical maturation which involves both hormonal as well as physical changes in the adolescence. Now this puberty period, this basically encompasses the closing years of childhood and the

beginning years of adolescence. This period of puberty is divided into three stages per se. The prepubescent, pubescent and postpubescent. Now let us have a look at these stages one by one. Coming to the prepubescent stage. In this stage, basically there is no longer a child but still not yet an adolescent. There is first evidence of sexual maturation that is the primary sexual characteristics of peers and this stage terminates at the beginning of pubic hair. There is beginning of appearance of secondary sexual characteristics but reproductive organs are not yet fully developed in the prepubescent stage. Now let us try and understand what are primary and secondary sexual characteristics. The primary sexual characteristics are processes related to the sex organs which are present at birth and mature when the sex hormones are released. Whereas secondary sexual characteristics mature during puberty. The primary sexual characteristics in males are enlargement of penis and testis while in females are the growth of uterus and vagina, occurrence of ovulation etc. Secondary sexual characteristics in males are the growth of chest, pubic and armpit hair and deepening of the voice. While in females are the breast development, growth of pubic hair and armpit hair etc.

Now coming to the pubescent stage. This is the stage when the criteria of sexual maturation actually appear. The growth spurt basically begins to accelerate during the pubescent stage. The males experience their first emission of semen which is also known as wet dreams. The males may react differently, relevant to the social customs prevalent in the society to the wet dreams. Menarche occurs during the pubescent stage in the females. The secondary sex characteristics these continue to develop and cells are produced in the sex organs. Fertility is possible in this stage.

Now coming to the post pubescent stage. Now this basically overlaps with the first year of two of adolescence. The secondary sex characteristics become well developed and sex organs begin to function in a mature manner. There is deceleration of the growth spurt and there is completion of both primary and secondary sexual characteristics and fertility is possible in this stage. The skeletal growth also is completed by post pubescent stage.

Now this puberty generally occurs in girls in the age group 10 to 15 years and in boys it begins from 11 to 16 years. There are four stages which represent basically the criteria of puberty. They are Menarche which is the first menstruation of girls, Adrenarche which is the hormonal changes in the adolescence basically the production of androgens, Spermarche which is the boys first ejaculation of semen and Gonadarche which is sexual maturation and development of reproductive maturity during puberty.

Now let us have a look at the adolescent development period. Again this adolescent development period is divided into three stages. The early adolescent, the middle adolescent and the late adolescent. The early adolescent spans from 10 to 14 years. This basically is the puberty period where the adolescents are trying to adjust to their various physical and psychosexual changes that are occurring in their bodies. And there is beginning of psychological independence from their parents as well. The middle adolescent that is the period of 14 to 17 years, under this there is sexual attraction to the opposite gender and development of relationships very common in this stage. The adolescents in

this stage are in search for their own identity. The intellectual knowledge and cognitive processes they become quite sophisticated in this stage and there is more experimentation, more risk taking behaviour on part of the adolescence in middle adolescent. Now coming to the late adolescent stage from 17 to 19 years, the adolescents here are more mature and more self confident with their relationships. They try and build a successful rapport with parents in this stage and there is more of abstract thinking, more reality based in this age group.

Now the perception of the body image or the reaction to physical changes in adolescence. Now what actually happens is adolescents? They are acutely aware of the physical changes taking place in their bodies during this adolescence. Now they may at times be horrified or delighted by the constant changes that are occurring in this age. They often spend a lot of time looking in mirrors, looking at various changes that are happening. And the timing of puberty has an impact on how youngsters basically respond to it.

Now there can be early maturation or late maturation. Early maturation there can be distinct perceptions for both boys and girls. Early maturation in boys it can often be a big positive for them. And the culture norms and standards regarding how women should actually look, displays a significant impact on how girls experience early maturation. These effects of early maturation, these differ based on a lot of factors. Now this could be opinions of girl's peer group, this could be the prevalent sex norms in the community as well. Early maturing adolescents they generally look older than their peers and then they have to act accordingly. Now coming to the late maturation. When it comes to late maturation per se boys actually fare worse than the girls. Now late maturing adolescents they actually look younger than their classmates. Many times it is difficult for adolescents to accept the fact and they may feel inferior than their peers. They may feel that there is something wrong with them. And there are other factors which may be more pertinent actually in determining adolescent behavior than the presence of early or late maturation or the effects of puberty in general.

Now what are the various factors which affect adolescent health and development? The first and foremost is the relationship that they have with family and friends. Healthy lifestyle habits, though it could be nutrition, this could be hygiene, physical activity and other areas, these are crucial components of family education. And these various health behaviours and attitudes in adolescents, these basically start in the family right in the childhood itself. Then we have the social attitudes and norms. Now the various social norms which value adolescent health and development actually promote the health and development of the adolescents. And there may be social norms which may also serve as negative influences such as early marriage. So again that can be negative or that can bring down the adolescent health and development. The other major factor is mass media and indeterminate. Now this can provide reliable information on health and development issues and this can promote adolescent health and development in general. The community support for enhancing adolescent health and development, this can be communicated and mobilised through the mass media and entertainment avenues. And these address the

societal policies and practices that have an adverse effect on the health and development of adolescents. So these are some of the factors affecting the adolescent health and development.

Now coming to the hormonal changes happening during puberty. What basically happens is the hypothalamus releases the gonadotropin releasing hormone which then triggers the luteinizing hormone and follicle stimulating hormone. Now this follicle stimulating hormone in the female leads to menarche or the first menstruation in the girls. The luteinizing hormone or the LH basically stimulates the release of testosterone and aldosterone which triggers androgen leading to development of penis, pubic hair and testosterone in the males. Development of pubic hair, armpit, hair and acne while extrusion in females leads to development of breasts, ovaries and uterus. So this was the hormonal changes that occur during puberty basically leading to lot of physiological changes in the adolescents.

Now coming to the anatomical development of the adolescent. In the females there is a layer of subcutaneous fat which develops leading to the face and body outlines becoming rounder and softer in the females. In males there is leaner and more angular face than the females due to development of the muscles and bones in the face. Also there is less prominent growth of subcutaneous fat in the males. The pubic hair becomes longer, thicker and darker as it spreads over the genital areas. In the males the facial and chest hair growth is noticeable. The post pubic stage is often when noticeable, chest hair with a thick texture first appears and this continues to grow through manhood as well. Now above the lips the facial hair typically appears as a black shadow following which it starts to show up on the chin along the jawline and finally along the neck as well. The females may also have small amounts of facial and chest hair.

Now let's have a look at the science of sexual maturation in the male adolescent. There is increase in size of the scrotum and testis. The pubic hair then starts to develop. The penis gets bigger and the adolescent growth spurt actually starts. The voice in the males becomes deeper as the larynx begins to grow. On the upper lip the hair growth also starts to begin. There are nocturnal emissions that is semen ejaculation while sleeping this could happen in the males. Pigmented pubic hair development and the growth spurt peaking. There is increase in prostate size also in the armpits beginning of the hair growth.

Now let's have a look at the science of sexual maturation in the female adolescents. The adolescent growth spurt begins. The non-pigmented pubic hair appears. Beginning with the breast elevation and the rounding of the hips, the budding stage of development also sees the appearance of downy auxiliary hair. And the growth of pubic hair accelerates and becomes slightly pigmented as well. Then there is nipple pigmentation beginning, rise in the areola size and the breast development which continues. The auxiliary hair becomes slightly pigmented. Menarche occurs which is the first menstruation in females. The development of pubic hair becomes completed. Then the mature breast development and auxiliary hair development also gets completed. So these were the science of sexual maturation in the males and females. Moving on to the brain development in adolescents.

Now there are dramatic changes in the brain structures in the adolescents. The brain development process generally begins in the back of the brain i.e. in the limbic system or the emotional center. And then it slowly moves forward towards the prefrontal cortex or the reasoning center. The feeling part of the teenage brain i.e. the amygdala which is responsible for emotions like anger, happiness and sadness. This develops rapidly and faster than the thinking part i.e. the prefrontal cortex responsible for thinking, reasoning and logic. And this makes it difficult for the adolescents to regulate their emotions and follow the instructions. The neurons and synapses proliferate in the cerebral cortex notably at the prefrontal cortex and are then gradually pruned throughout adolescence. The white matter continues to grow which explains the modest rise in the brain mass. Now amygdala which is the brain's emotional processing center, this also matures and experiences changes influencing the strong emotional responses among the adolescents. Now the prefrontal cognitive control network which is the network of connections between the prefrontal cortex and other brain regions. The adolescents utilize this network less successfully than the adults. And this affects their performance of the adolescents on self-regulation situations, the task requiring inhibition and planning. And this is the reason for adolescents indulging in high risk behavior. Now during puberty, the neurons become more sensitive to excitatory neurotransmitters and this leads to increased sensitivity to unpleasant situations among them, stronger reaction to pleasure stimuli, they have trouble reigning in their strong urges such as unchecked drives for drug use, reckless driving among them, delicate behaviors, unprotected sex and self-harm behaviors as well.

Now the adolescent brains, they are very sensitive to stressors such as biological which is due to change in hormone levels which affecting the development of neurobiological circuits. At the population level, mass events such as wars, disasters, these can have a negative impact on these young minds. At the social level, the adolescents need a supportive environment to develop their social identity and connect to their peers. So, important to support the adolescents to cope with stress to promote resilience among them.

Now coming to the physical activity among adolescents. The optimal health benefits, the adolescents should engage in regular physical activity. The recommended amount varies by age and the activity level. Now the age group recommended physical activity level from 7 to 18 years. It is recommended that at least 1 hour of moderate to vigorous activity per day. This could include a mix of aerobic, muscle strengthening and bone strengthening activities as well. Now what is the importance of physical activity during adolescence? There are mental health benefits. This physical activity, this can improve mental health which can include reducing the risk of depression, anxiety, this can reduce the risk of suicide as well. Cardiovascular health benefits, regular physical activity, this can lower the risk of heart disease and stroke by actually strengthening the heart and improving the blood flow. Increased energy, so by improving the stamina and energy levels, physical fitness can actually help the adolescents tackle the daily activities and improve their physical activity. This can increase activities without actually feeling fatigued.

Now the recommended sleep hour for adolescents is 8 to 10 hours per day as per American Academy of Sleep Medicine. Sleeping less than recommended can actually result in decline in the academic performance of the adolescents. This can be linked to attentional issues and learning problems among them. This can lead to difficulty controlling moods of them, can actually lead them to depression and there can be higher risk of accidents and injuries as well.

Now coming to nutrition. So good nutrition is often neglected among adolescents. They eat less fruits and vegetables and more emphasis is on fats and calories. Also there is growing popularity of junk food among the adolescents due to their constant juggling with their studies, with their other peer groups, with their other activities that they are engaged in. So these become easy for them to consume. The various eating disorders prevalent among the adolescents are anorexia nervosa and bulimia nervosa. We would discuss these in greater details in the coming lectures.

Now coming to the psychological changes in adolescents. The adolescents slowly start to shift from depending on their parents to actually developing an independent sense of self. There is exploration of new relationships with peer groups, with the opposite gender, with families and the community. They become more aware of their cultural and social identity and may struggle with maybe fitting in or feeling accepted. There are changes such as arousal, irritability and aggressiveness as well.

Now adolescent moodiness. The adolescents actually experience mood swings and intense emotions as they navigate through various changes and transitions. They report less favorable moods than school age children and adults. The mood swings are often linked to negative life events. They have difficulty with parents, failure in exams and dealing with breakups. Low mood often is associated with parents, with exams, with jobs while high mood may be associated with time spent with the peer group.

Coming to the parent-child relationships in adolescents. There is rise in intensity of the parent-child conflict. Often due to individuation that the adolescents want which involve the struggle for autonomy and differentiation or personal identity. As the adolescents they become more mature, they actually demand to be treated like adults. Like they need permission for driving vehicles from their parents to go on dating with the opposite gender and so on. It is important for parents to have a balance between too much freedom and too much intrusiveness in this stage so that adolescents do not turn the barrier. So the adolescent friendships. The adolescents actually value their relationships with peers and seek social acceptance and approval. Friendship is actually more important in adolescents than any other life period. And as actually the intimacy increases, the adolescent friendships become more reciprocal and stable than the childhood friendships. Adolescents generally who are intimate with friends tend to do well in school and have high self-esteem as well. The romantic relationships. Now these romantic relationships are often a central part of most adolescent social worlds. Adolescents interact with and think about their romantic partners more often than parents, their friends or siblings. And the relationship with parents actually may affect the quality of their romantic relationships.

Now let's have a look at various theories of development. First coming to the Piaget's theory of cognitive development. So under this theory, basically there are four stages in various age groups. From birth to two years, basically there is sensory motor stage where the behaviours are learnt through senses and learnt through reflexes as well. In 2 to 7 years age group, the pre-operational stage, here the ideas are formed based on the perception. In 7 to 11 years age group, which is the concrete operational stage, the ideas are formed basically based on reasoning. While the 12 years plus or the adolescent group is the formal operational stage where there is thinking conceptually and hypothetically. So basically the formal operations is the highest level of cognitive development that we have seen. This is reached when adolescents actually move from the concrete real world stimuli and they actually develop the ability to think abstractly. Now there are certain drawbacks as has been pointed by few other researchers of the Piaget's theory. That is many adolescents and adults, they may seem incapable of abstract thinking and emphasis in this theory is not given to social and cultural influences.

Now next is Kohlberg stages of moral reasoning which has been developed post the Piaget's theory of cognitive development or add on to it. So basically there are three stages in the Kohlberg stages of moral reasoning, each stage having two levels. Total six levels of moral reasoning. So stage one is the pre-conventional morality or this can be the basic morality. In the level one there is obedience and punishment. That is basically the behaviour is driven by avoiding a certain punishment. Level two is based on individual interest. That is the behaviour is driven by self interest and rewards. So people often resort to certain morals or behaviours driven by their own self interest, driven by certain rewards.

Next is stage two or the conventional morality. Here we have level three and level four. So level three is interpersonal. That is the behaviour may be driven by social approval. So let us try and see a certain example to see the same. Probably there is a certain person who doesn't throw his garbage through his waste normally in a dustbin when he is alone. But when there are people around who are looking at him or there he is in a social group, he normally puts the garbage in the dustbin. So this is socially approved thing that is in front of people. They do the same. Same can be a proper hand washing before eating or any other thing. So when an individual is with other persons, he or she may resort to proper hand washing while he is alone may not do so. So this is behaviour which is driven by social approval.

Next is level four, authority. That behaviour can be driven by obeying authority and conforming to the norms. Then we have stage three which is post conventional morality or this is the cream or this is the ideal situation where we have level five and level six. Level five is a social contract where the behaviour is driven by balance of social order and individual rights. And the level six is universal ethics where the behaviour is driven by internal moral principles and the universal ethics principles.

Coming to the Erickson's definition of identity. So basically according to Erickson, identity is a coherent conception of the self which is made up of goals, values and beliefs to which a person is solidly committed. The chief task of adolescence is basically to confront the crisis

of identity versus actually the identity of confusion. And when there is successful resolution of this stage by the adolescence, this results in the development of fidelity. Then what is fidelity per se? Fidelity basically is sustained loyalty, faith or a sense of belonging. This could be to a loved one, to friends or companions.

Now next is Marsha's category of identity status. So when we are talking of identity, Marcia basically categorizes into four different types of identity. These are identity achievement, identity moratorium, identity foreclosure and identity diffusion. And these are based on commitment and exploration. So coming to identity diffusion. This is more common among the children who have no commitment and no exploration. For that let us see an example of probably a job, somebody who wants to become a doctor in future or somebody whose parents are doctors. So basically in childhood, the child doesn't know what job they need to do, have not explored what all options are there. Identity diffusion is such stage where there is no commitment and no exploration as well. Next coming to identity foreclosure. In this there is the commitment to do a certain job. So that can be becoming a doctor. But exploration is not there. So this is like a passive acceptance of the identity just because the parents are doctors, the child has gone to become a doctor but has not explored the other avenues, other options. So this is a passive identity that has been accepted. So this is again more common in adolescents and adults as well, young adults. Next is identity moratorium. In this identity stage, commitment is not there but the person has explored various options. So again this can be like the adolescent we are talking about. So the parents are doctors, so he is not committed to become a doctor but might have explored various other options. Again this stage is common in adolescents and young adults. So next is the ideal stage which is identity achievement. So in this the person has made a commitment and also has explored various options. This can be the same adolescent who has looked at various avenues, also had looked at his parents as doctors and finally decided to become a doctor. So commitment and exploration is there and this is identity achievement. This was Marcia's category of identity statuses.

Next coming to sexual orientation in the adolescents. Now the heterosexual orientation is generally attraction to the opposite gender. Homosexual orientation is same gender attraction. Bisexual is attraction to both genders. Now what are the factors associated with early sexual activity among the adolescents? This could be due to early puberty, poor school performance, history of sexual abuse or neglect, the cultural patterns prevalent in the society and the perception of peers. This could lead to early sexual activity. Now the risks of early sexual activity, this could lead to sexually transmitted infections and adolescent pregnancy.

Now coming to the take home message from today's lecture. Now we all know that the adolescents are the delicate transitional stage between childhood and adulthood. The universal features of adolescent development are biological, cognitive, emotional and social changes. The various factors affecting adolescent health and development are relationship with family and friends, the social attitudes and norms, mass media, entertainment and so on. The adolescents face various challenges growing up, various development and health

related challenges as well. But there are strategies and resources available to help and support them. Understanding this stage of life is very essential for their parents, for educators and health professionals to actually help & provide support and guidance for adolescents.

These are few of my references.

That's all from my end. Thank you so much. .