

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

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Lecture 08 - Malnutrition in Adolescents & their effects in adult life

Hello everyone.

Let us start the session on Malnutrition in Adolescence and their Effect in the Adult life. In this lecture, I will try to cover the dual burden of malnutrition in India, types of malnutrition like underweight, stunting, overweight or obesity, causes of malnutrition, various consequences of undernutrition as well as over nutrition in the later life and the concept of malnutrition across the life cycle. Here are few keywords like adolescent malnutrition, underweight, stunting, overweight, obesity.

Let us have an idea that why our country is facing the dual burden of malnutrition. Dual burden means under nutrition as well as over nutrition. Many of the countries like India, those are low- and middle-income countries, they are dealing with infectious diseases and under nutrition as well as they are experiencing some risk factors of the non-communicable diseases. What are those? Like diabetes and hypertension and those risk factors are overweight and particularly we have seen these things in the urban setting. In my initial lecture where I have shown the statistics regarding adolescent health, that time I have already given you the idea that in the urban population the adolescent obesity is more than the rural population. And what is the cause of this? The children are exposed to high amount of high fat, high sugar, high salt and energy dense and micronutrient poor foods. That is why they are getting more calorie, but less nutrient. And along with that whenever there is progression in the country, when there is development, there is improvement of the transport system improvement or there is modification of the lifestyles; all those things ultimately lower the level of physical activity. So, the people are becoming more and more sedentary. This sedentary lifestyle is not only affecting the adult life, but also it is affecting the adolescent life.

Now, if you are telling that what is the definition of this malnutrition then it is very tricky, because malnutrition does not mean all the time there is deficiency. Even if there is excess

or even if there is imbalance which lead to malnutrition. Because of our ease of understanding we can divide the malnutrition in 3 broad groups. Those are undernutrition, micronutrient related malnutrition, overweight, obesity and diet related non communicable diseases. The undernutrition again divided into wasting, stunting, underweight and whereas, the micronutrient related malnutrition that may be of the deficiencies and excess of vitamins and minerals. Finally, in the third group contains all the risk factors, all that is diet related or weight which are the risk factors for the non communicable diseases. Those non communicable diseases are the heart disease, stroke, diabetes and few cancers.

Now, let us have an idea that what is undernutrition or you can tell it as a wasting. It is the low weight for height. Low weight for height means in a certain height one person should have a specific weight. If that is less then it is called wasting and if it is less in your child then it indicate the recent and severe weight loss. That means, that the person is not getting enough food or they are having some infections and these infections ultimately leading to lose their weight. The adolescents who are moderately and severely wasted they are facing the premature death in the adult life. The reason of wasting, we can correct it that means, their treatment is possible.

Now, the stunting. Stunting means the low height for age that means, in a specific age there should be a specific height. So, if that is less then it is called stunting and that stunting usually we get if there is chronic and recurrent undernutrition. It is associated with the poor socioeconomic conditions, poor mental health, frequent inappropriate infant and young child feeding and care in the life early life. And the stunting it actually holds back the children to reach their optimum physical and cognitive development or to have their optimum physical cognitive development. So, you can see that in various stages of life there are various types of malnutrition, also the wasting and stunting have different reason.

Now, coming to another type that is the underweight. Underweight means it is low weight for age. For a specific age, a specific weight should be there but if it is less for that person then it is called underweight. Underweight adolescent that may be stunted or that may be wasted or may be both. Now, there are certain effect of stunting and thinness in adolescence. What is that? We already know that during the time of adolescence there is immense physical and mental development. So, if there is stunting then it will impair the cognitive development and the school achievement and it will reduce ultimate economic productivity, also it will hamper the reproductive health of the female child. Now, many of the time we have seen that childhood stunting can coexist with the overweight or obesity. What is the reason for that? Because the stunted child they have less resting energy expenditure than the child who are not stunted. Even if they are taking adequate food in the later life, their fat oxidation is less, but carbohydrate oxidation is more and respiratory quotient is more. So, the accumulation of fat is more in the stunted child than in the non stunted child. In the adolescent period whenever they are growing that time chances of fat accumulation is more in the stunted child. And these have a immense health impact on the adulthood and specifically in females because of their risk in the obstetric health.

Now, the consequence of thinness is also very immense because it will delay the maturation, it will hamper the increase of muscle strength and it will decrease the capacity of the physical work in their later life. So, you can see that if your child is stunted, if your child is thin, if your child is malnourished then not only the physical or mental health of adolescent period is hampered, but also that will hamper the adulthood.

Now, the micronutrient related malnutrition. Only the weight is more and weight is less that is the malnutrition it is not like that even the micronutrient deficiencies like vitamin and minerals or the excess that will lead to malnutrition. Because these micronutrients are required to produce the enzymes, hormones and the substance that are required for the proper growth and development. And it is been seen that during this adolescent period requirements of iodine, vitamin A, iron is very high. Deficiency of these things can lead to a huge impact on the adolescent health. Particularly it has been seen that the children, adolescent and pregnant of the low-income countries are more vulnerable. There is certain neuro development occur during this adolescent period, because it is that time or the critical time of brain development, huge cognitive and behavioral development occurs during this period. And if malnutrition occurs then there is lots of impairments occur in cognitive and behavioral developments. It can cause inattention in your child, it can cause the conduct problem, there may be aggression towards their friends, there may be depression, there may be the school failure, their grades may be very less, their scholastic performance will be poor and there may be reduced IQ. All those things may continue in the later life, not only the later life it can persist in the subsequent generation. I will show you in the later slides.

Now comes the idea of overweight and obesity, when we will tell that a child is overweight and obese. There is a definition by World Health Organization. By putting your child's BMI in the chart provided by World Health Organization. The chart already been shown in my previous lecture, but I will show you here also. The overweight means the BMI for age, if it is more than one standard deviation above the growth reference medium. Whereas, the obesity that is the BMI for age is more than two standard deviation above the growth reference medium. So, what will be the actual picture? This pink chart is basically for girls and this one is for boys means the blue one. And if you see the blue one here you can see that this zone if your child's weight is falling in this group, then it is the overweight and it is falling in this group in this zone then it is obese. And for girls if it is falling in this zone, it is overweight and again it is falling in this zone then it is obese or obesity. You have to calculate the BMI beforehand and you have to put it here along the age axis and this is the age axis and this is the BMI axis. When you will put or draw a line and the two line will meet at point and there will be a intersection and that point will notify the actual nutritional status. If that point is falling in this zone that plus 1 to this minus 2 standard deviation this zone this is the normal BMI for age. And if your child is girl child then plot in this pink chart if your child is the boy child then plot this in blue chart.

Now, UNICEF has already shown in their survey that there are few drivers of overweight in the adolescence. There are certain factors or there are certain determinants which can

actually affect the overweight in adolescence. First and foremost, thing is if the maternal and paternal obesity is there or overweight is there. You have already seen if the mother and fathers are obese then there is a chance that their child will have the obesity in their adulthood. If the mother is undernourished then definitely I have told you that the child which will be born that will also be undernourished and if the child is undernourished in their early life, there is a chance that they will become obese in their adolescent period when they will accumulate more and more junk food. Inadequate breastfeeding practices this also been evidenced by different researchers that if there is no exclusive breastfeeding during the first 6 months or if the exclusive breastfeeding has been cut short less than 6 months then there is a chance of childhood obesity. If the inadequate complementary feeding is there, if you are providing the readymade food as a complementary food to your child after 6 months there is a chance of childhood obesity.

Unhealthy food habits in the adolescence that is high intake of salt, high intake of sugar, high intake of fat, what we found in the junk food that ultimately led to the obesity. Now, the obesogenic food environment is the today's environment where we have the accessibility and the availability of those foods because whenever we think that we are hungry we do not keep the healthy snacks in bag rather we usually go to the nearby shop and usually those shops keep the junk foods because most of the junk foods and many of the times the junk foods are of lesser cost than the actual proper meal. This type of environment is there surrounding you then definitely there is a chance that adolescents will become more obese or adolescents will become overweight.

Inadequate physical activity is another reason because nowadays I have already told you that children are engaged themselves in mobile, they are engaged themselves more in the video games, they are not very much interested in the outdoor game activities. So, there are less physical activity and more intake of the junk food, that ultimately lead to their more uptake of the energy and ultimately lead to obesity in them.

Now, the obesogenic cultural environment what does that mean? That means, the low levels of knowledge of healthy diets and people do not bother to take healthy diets during the adolescence. I have already told you that the cognitive and the behavioral changes during this period occur and they are least bothered about the nutrition and nutritious diet. They think that they can take any of the food because more important is their scholastic performance, their relationship with their peers because they are more interested in their external appearance. All those things ultimately lead to overweight and obesity in the children. Some epigenetic mechanism is also there that will lead to the genetic function. The genes in our body and the socioeconomic status. Sometimes in lower socioeconomic status there is lack of access to the good food and quality food which can lead to obesity in the adolescent age group.

What is the effect of this increased BMI or what is the effect of this overweight and obesity in the adolescents because that is a healthy age group as far we know because their age is very less, they are young, they can work more, they are more active. So, we think that there will be no problem even if they are overweight or obese. It is not like that because if they

are obese there will be breathing difficulties, there will be frequent fractures, hypertension and diabetes and there may be increase chance of early markers of the cardiovascular diseases like heart disease and stroke and musculoskeletal disorder specifically the osteoarthritis which usually develops in the later life, some cancers that is endometrial breast cancer, ovarian cancer. Prostate, liver, gall bladder, kidney and colon. So, you can see that even if your child is not facing any difficulty at this moment if they are obese or they are overweight, there is a high chance of the premature death and it will hamper their adulthood.

Now, is the concept of malnutrition across the life course. In this picture you can see that there is a vicious cycle. From any of the point you can start. You can see that any of the point you are starting if there is malnutrition ultimately it will lead to the malnutrition in your whole life. That malnutrition may be under nourishment under nutrition or that may be of over nutrition. Let us start from the point of fetal or infant malnutrition where we are seeing that if your child which is born that is malnourished or that is low birth weight. What will be the outcome? There is a chance that child may die after few days or after few months or there is a chance that there is impaired mental development and there is a chance that it will compromise the body composition even if the child is not dying. The under nourishment is there in the newborn child when they are growing, there are influencing factors like social and environmental factors if they are not getting proper feed. That means, that the exclusive breastfeeding up to 6 months and after that the adequate complementary feeding, if they are not getting then they are having the frequent infections because already their immunity is low and there are inappropriate food and health care practices. All those things ultimately lead to the child malnutrition.

We can see that if there is child malnutrition, your child will have less scholastic performance and their intellectual potential will be less. Again, this child is coming to adolescent, but if they are the inappropriate food and health care if they are getting then this child is becoming a malnourished adolescent. This malnourished adolescent I have told you that lots of physical and mental impairment will occur if there is under nutrition or over nutrition in them. Now, this child again getting that inappropriate food and health care they are becoming adult. The adult female when they are malnourished, they are not gaining proper weight. That means, the baby is not getting the proper weight inside that mother. Finally, the malnourished adult will again giving rise to the malnourished elder.

Now, this malnourished pregnant mother when they are giving birth they are giving birth a low birth weight baby because of their poor weight gain and that is affecting the poor weight gain of their newborn child. Now, see that this malnourished adult which are coming to the malnourished elderly they will have the reduced capacity to take care of the babies. So, finally, you can see that the child which has born as low birth weight baby or which has born malnourished again there are certain outcomes those are not at all favorable. From anywhere you start or from any point you start if the child or if the adult if the adolescents even if the elderly they are malnourished ultimately the whole life cycle will be damaged. Means in the whole life cycle you will have the malnourishment.

Even some of the adolescents if they are getting obese then there is abdominal obesity, diabetes, cardiovascular disease. So, you can see that not only you need to focus on the adolescent malnutrition but you need to take care of the whole. That is why we actually have made this program or this course of adolescent malnutrition, but the main purpose is just to sensitize this because if you want to avoid malnutrition then you have to start thinking from the very beginning. So, your child should be well nourished then that will develop a healthy adult. When adolescents will develop a healthy adult again that will produce the healthy child. So, this is the actual idea that how you can prevent malnutrition in your child that or how can you prevent malnutrition because malnutrition is not that it will affect only one specific stage or one specific generation but not only it will affect the whole life cycle, but also it will affect the subsequent generation.

Now, here are certain cause that why the under nutrition is there. Some basic causes are the lack of education, poverty, gender inequality, our culture and customs, inadequate infrastructures. These are the basic cause and inadequate dietary intake, diseases, inadequate care of the women and children, insufficient health service these are the underlying cause.

There are 3 broad causes. These are the underlying causes and the immediate cause is the diseases and inadequate dietary habits or inadequate dietary intake. So, ultimately all these things lead to the malnutrition. We will see that what are there in these 3 broad groups of underlying cause. First and foremost, is inadequate access to the food. Inadequate access to the food in every age group. There are specific requirement that is 0 to 6 month early initiation exclusive breast milk, 6 months to 5 years there should be the complementary feeding rather adequate complementary feeding, 5 to 9 years the meal should be supervised by the adults and in some places the meals are bought by the children from the nearby shops and in the 10 to 19 years there is high requirement of the high nutrient requirement that already been discussed for the development of the physical and sexual development. And another thing is that in this period they are able to differentiate the information of nutrition. So, in this age group you can see that if these specific requirements are not made then definitely there is a chance that your child will become malnourished.

Nest is the inadequate care for children and women. These are certain points which will ultimately lead to the proper nourishment in the children and women like you need some technologies for the women for effective care practices and proper maternity leave policies and programs. Pregnancy intervals is very important because we know that in between the 2 interval there should be a gap of minimum 3 years. These 3 years is required to replenish the body of a woman to get the burden of another pregnancy. So, if there is too frequent pregnancy then your body will not be able to cope with the changes and the chance is there that the mother will be undernourished and the newborn child again will be malnourished.

Teenage pregnancies and forced marriage is another reason of malnourishment. We can see that in teenage or in adolescent period, body is not yet developed to get the burden of

the pregnancy. Lack of proper knowledge and education regarding nutrition, lack of social protection schemes and measures all these things ultimately lead to under nutrition or over nutrition in the adolescent age group.

Some insufficient health services and unhealthy environment are also related to the malnourishment that is inadequate access to clean and potable water because ultimately it will lead to frequent infections. Unhygienic sanitary conditions, lack of appropriate toilet facilities and the impact of open field defecation, inappropriate hygiene and sanitary practices etc. All these things ultimately lead to insufficient health service or unhealthy environments and there is a chance that your child will suffer from different types of infections very frequently and there is a chance that your child will be chronically malnourished.

Let's see some certain consequences of malnutrition. That may be short term and medium term. These are impairment of IQ, the premature death, low birth weight, lost of productivity, the weakened immune system or chances of diabetes and cancer or stroke.

There may be some vitamin and mineral deficiencies. If there is deficiency of vitamin A and zinc then there is a chance of increased morbidity and mortality. And if the maternal under nutrition is there then there is intrauterine fetal growth restriction and if there is IUGR then there may be a chance of neonatal deaths, even if the child survives there will be a stunting by the age of 2 years. Now, some long-term consequences like adult height linked to this shorter height they are linked to childhood stunting. Higher rates of stunted child become overweight and obese. There will be the chance of lower economic productivity and earning capacity, reduced reproductive capacity of the females. Increase chance of metabolic and cardiovascular diseases and ultimately all these may lead to the lower IQ level and cognitive function.

So, what we want to do? Our ultimate goal is if you want to have the optimum nutrition, growth and development for adolescents we have to protect and promote the dietary practices and services everywhere. Because you can see that actually anyone's health rather children's health or adolescent's health are interconnected with the good diets, good practices and good services.

Here are my references. with this I want to conclude the session.

Thank you.