Introduction to Maternal Infant Young Children Nutrition
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Lecture - 11
Session - 3

Hidden Hunger and Types of Malnutrition

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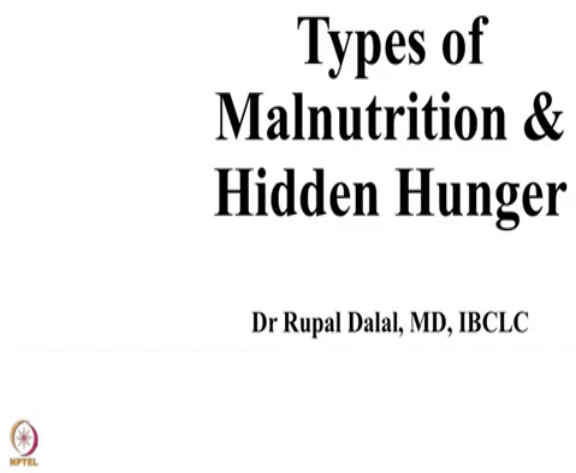

Hello everyone! So, this is going to be session number 3 and in this session I am going to talk about hidden hunger and types of malnutrition. Very important, we have already discussed about type 1 and type 2 nutrients. I will touch base upon it because primarily our types of malnutrition depends upon what kind of nutrients are lacking in children. So, I will again touch base on that but let us start with the types of malnutrition.

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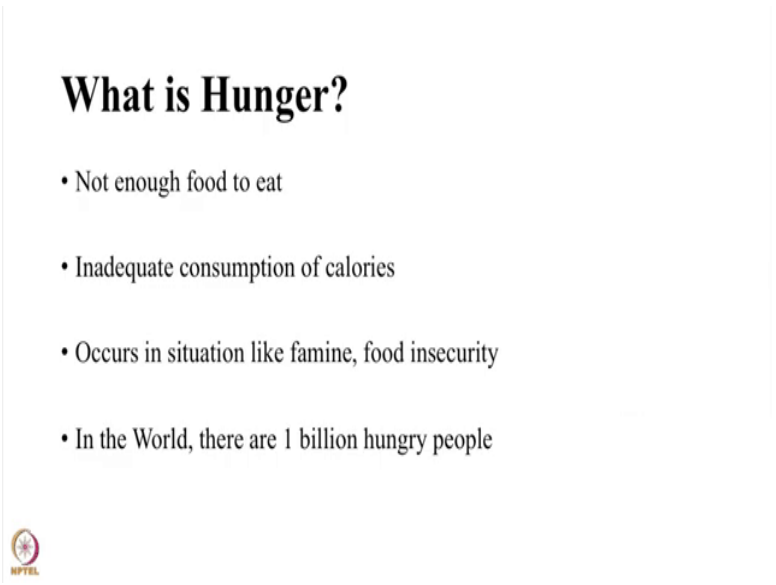

So, basically we all know there is hunger, but there is a difference between actual hunger and hidden hunger. Hunger means like you do not have food to eat, so when you say that child is hungry means basically there is no food to eat to the child. In India, we do not see hidden hunger as much because through PDS system children are getting some food, of course. They are getting rice, depending upon the state they are.

They get THR – Take Home Ration, they get midday meals, so they do get food. It is not that they go really hungry, very few; I would say literally very few percentage children have really no food, but generally in my experience, in working in slums of Mumbai I hardly saw any child going hungry. So, in that hunger, when a child is hungry obviously child is not getting enough calories, but main thing is child is not getting lot of nutrients also.

So, absence of calorie is just child is not getting food that is what is called hunger. And it occurs mainly in a situation like famine and food insecurity and generally in a world there are about 1 billion hungry children, so we do have a issue of poverty, of course, in war stricken areas and food insecure areas or in during famine time or in emergencies.

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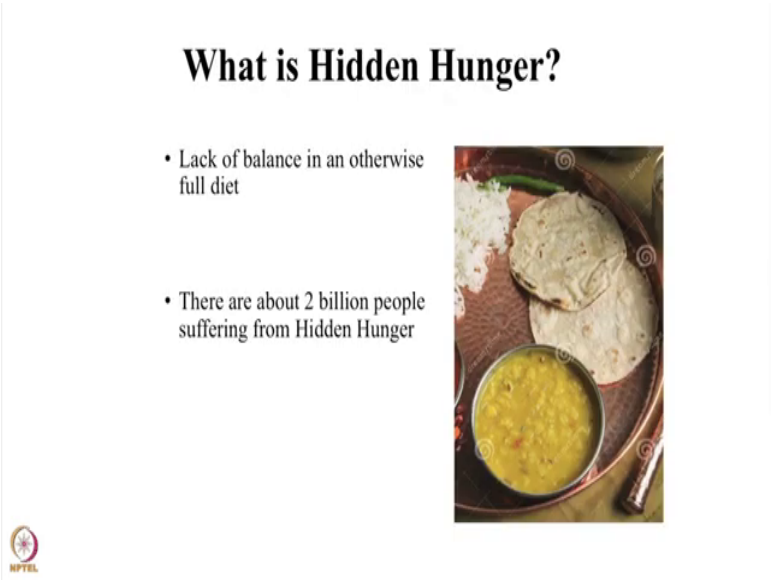

What is hidden hunger? So, if you look at, if you ask any mother in slums or even rural areas or tribal areas or even in a regular day to day middle class family, mostly their diet is roti, sabji, some sabji, dal and rice, very monotonous food. So, they have rice in the morning, so they have either poha or they will have wheat, so upma or idli or any of those. So, grain based diet in the morning.

Afternoon it is mainly roti sabji or roti, and evening they have like depending upon states, khichdi or maybe some vegetable, so very monotonous diet that we Indians eat, by and large I am talking about on a day-to-day basis. There might be some time that you may have more dishes, but by and large, routinely we eat a very monotonous diet and that has changed in past few years.

And when you eat such monotonous diet, then you will not get many of these nutrients which are required for child to grow. So, that is called hidden hunger, when child stomach is getting filled with this food, because he is eating all this food, but what is required to grow that child, that is not going in his tummy or that is not going in his body and that is called hidden hunger. So, we will focus on hidden hunger and why it occurs? So, what we see?

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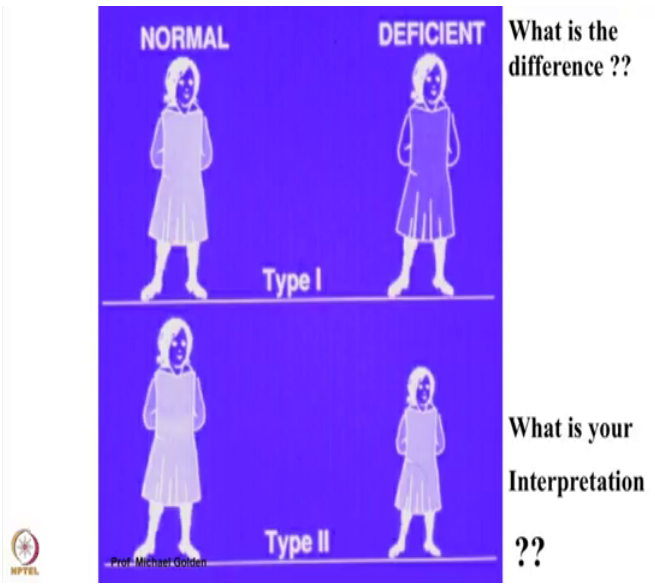

Now as you have already gone through type 1 and type 2 nutrient from our tutorial and also from my session, so here let us apply it in the field like apply it and let us figure out like what is hidden hunger and then discuss in a bit more detail about some type 2 nutrient. One type 2 nutrient we have already discussed is protein, but here I am going to discuss many more like other micronutrients, which are probably lacking in a diet.

So, if you look at type 1 micronutrient deficiency, here the child, normal child who does not have type 2 nutrient deficiency in the diet and if suppose this child say develop type 1 deficiency, so for example, say iron, so look at the growth of this child. The growth is absolutely normal, but here in this child because… even here the growth is normal. Type 1 initially growth is normal.

So, the growth does not get affected, same height, even the arm circumference looks the same, so muscle mass is still the same. But what happens, you see the symptoms of type 1 deficiency. So, here because child is iron deficient you are seeing a child is probably pale. Now look at the type 2 deficiency. Now type 2 deficiency, when child has enough type 2 nutrient-rich food the height and weight looks good.

But when you have child who is deficient in type 2 nutrients say for a long period of time you see stunting, so here you can see the growth has stunted. When the type 2 nutrients are deficient for say shorter period of time, say child has diarrhea, child did not eat anything or say over a period of 2, 3 or maybe 4, 6 weeks child did not get a protein in the diet or some important nutrient genotype like which is required for growth you will see that child initially will have wasting which that means the muscle mass has kind of belted.

And then, eventually the height will suffer. So that is your, that is the difference between your type 1 and type 2 deficiency and what you will see, mainly in the growth, so most important is the growth, so growth failure is your type 2 nutrient deficiency. Specific signs and symptoms of some metabolic disease, metabolic condition like, for example, say micro-biochemical reaction, so that is your type 1.

So, in iron deficiency you will see anemia, in calcium and vitamin D deficiency you will see the rickets, so very specific, you will know where exactly which organs are involved, if it is vitamin A deficiency you will notice the child has night blindness or child has xerosis, the dryness of conjunctiva or child has immune problem, they have more, they do not have good resistance to infection.

So, those are basically, those are very specific kind of signs and symptoms that you see with type 1. Growth is not affected initially, growth may affected may be later in the stage, so if the growth is affected is basically a type 2 nutrient, all right?

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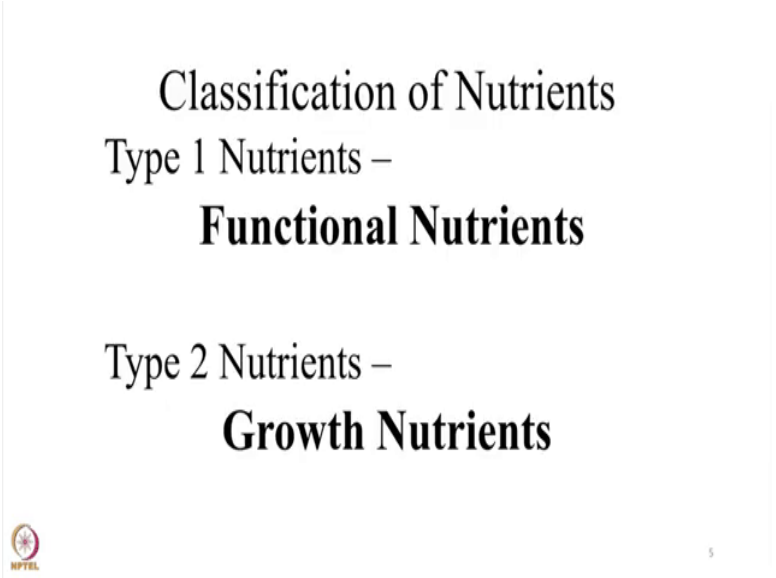

So, here I have mentioned already about what are type 1 functional nutrients and type 2, those are growth nutrients.

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Type 1 Nutrients	Type 2 Nutrients
Minerals: Iron, Iodine, Copper, Calcium, and Selenium	Nitrogen and Essential amino acids – (Histidine, Isoleucine, Leucine, Lysine, Methionine, Cystine, Phenylalanine, Threonine, Tryptophan, and Valine) from Proteins
B-complex vitamins: Thiamin, Riboflavin, Niacin, Pyridoxine, Folate, Cobalamin	Minerals: Potassium, Magnesium, Phosphorus, Sulphur (Sulphur containing amino acids – Methionine and Cystine), Zinc, Sodium, and Chloride.
Fat-soluble vitamins: A, D, E, and K	Essential fatty acids: Linoleic acid, alpha-Linolenic acid, and Arachidonic acid

Mainly type 1 nutrients I again mentioned iron, iodine, copper, calcium, selenium, all your vitamins, your fat soluble vitamins, your B-complex, your water soluble vitamins. Then your type 2 nutrients are basically your essential amino acids, your essential fatty acids, your minerals, potassium, magnesium, phosphorous, sulphur, zinc, sodium chloride, those are your type 2 nutrients.

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	TYPE 1 FUNCTIONAL NUTRIENT	TYPE 2 GROWTH NUTRIENT
GROWTH	Continues in early stage	Growth failure 1st response
	Baby can continue growing, consume body stores and then have a reduction in bodily functions that depend upon the deficient nutrient	Baby will stop growing - conserve nutrient in body - make it more internally available and maintain nutrient concentration in tissues
DEFICIENCY	Specific clinical signs	No specific clinical signs
BODY STORES	Present	Absent
TISSUE CONCENTRATION	In particular tissue	Not in any particular tissue
TISSUE CONCENTRATION IN DEFICIENCY	Declines	Stable
EFFECT	Affects specific enzymes	Affects general metabolism
STORES IN BREAST MILK	Variable	Stable

And this I already have discussed, so I may not go too much in detail. Remember the type 2 is growth failure, type 1 is, initially there is no growth failure. In type 2 when it gets very severe, child's appetite gets affected, so those children are basically, they are called complicated severe acute malnutrition child because when malnutrition becomes very severe, when the wasting becomes very severe they lose appetite. In type 1 by and large there is not, we do not see much loss of appetite in these children.

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	TYPE 1 FUNCTIONAL NUTRIENT	TYPE 2 GROWTH NUTRIENT
EFFECT OF OTHER NUTRIENTS ON TISSUE CONCENTRATION	Independent of other type 1 nutrients	Dependent upon other type 2 nutrients
EFFECT OF METABOLIC STATE ON TISSUE CONCENTRATION	Maintained in different metabolic states	Change (drop) with metabolic state
RATIO IN FOOD SOURCES	Very variable	Not very variable
BIOCHEMICAL ABNORMALITIES	Present (used in diagnosis)	Absent
ANTHROPOMETRIC ABNORMALITIES	Appear late in deficiency	Diagnosed by anthropometric abnormality
ANOREXIA	Absent	Present

Again this is same thing, again I do not want to go too much in detail because we have already discussed about it. Signs and symptoms of type 2 deficiency. What are the three things that we check for growth? We check weight, we check length and height or we check

MUAC - Mid Upper Arm Circumference. So, if any of these are affected that means it is type 2 nutrient. So, please in your program do focus on type 2 nutrient food, rich food, mainly complementary food and your pregnant mother's diet, lactating mother's diet.

Tell mother to start giving type 2 nutrient dense food in children's diet, they will grow beautifully and in my… protein I have already mentioned, which are protein rich food is basically your eggs, your child is non-veg start with the meat, start with fish, start with bone broth, you can start those as first foods, lot of countries in Europe are recommending those non-veg diet to begin with.

Egg is the best food to start actually, but if children are vegetarian, then you can start basically; more than dals I would recommend beans, so sprout it, dry it, make powders, I am going to show recipe of those powder recipe, those beans also, you can also start with dahi, also start… you can give paneer. Do not give milk because mother's milk is good enough, so you do not give milk otherwise, the mothers will stop giving their own milk.

But then also think of adding some seed powder, some nut powder, peanut powder and those are protein rich recipes, but also think of other nutrients which today I am going to discuss is magnesium, potassium, zinc, sulphur, those are all types 2 nutrients and those are basically hidden hunger, so if child is getting food, but if child does not have food which is rich in magnesium or potassium or zinc, those children will have type 2 deficiency.

They will not grow well. So, and some of them are kind of rate limiting nutrient, means, even if you give a lot of protein but if that protein source does not have say enough zinc, or enough magnesium or any of those children will not grow. So, that is called your hidden hunger.

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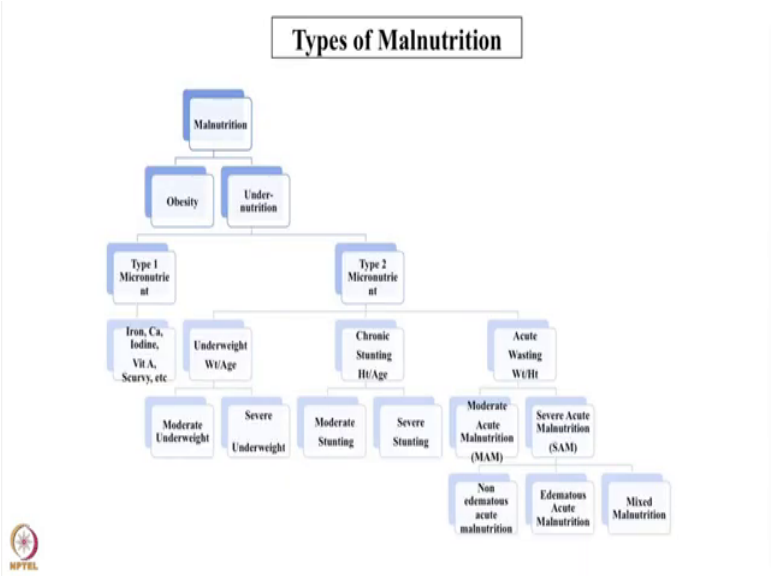

Now these are types of malnutrition. So, basically when you say child is malnourished or even if you say adult is malnourished, malnourished means, obesity means big, over or under. In India, now we are seeing both, we are seeing under nutrition also, we are seeing all these adults are big, huge, if you look at their tummy, if you do your waist circumference is much bigger.

In some states it is like 80 to 90 percent women have waist circumference higher, higher than normal, all right? So that means, we are struggling with both, our children are not growing, they are undernourished, they are stunted, they are underweight and our older people are becoming big, so that means something is wrong in food. I mean give if you are getting right kind of nutrition why would you become big or why would child become undernourished?

So, think about it. Second thing is our children are becoming big too, so in urban areas and some of the rural areas some of the children are very thin, some of the children are very fat, big. So, think about it why that is happening? Now obesity again I will discuss it later in other sessions, but I will not discuss obesity right now. Today I am going to talk exclusively about under nutrition.

So, type 2 nutrient as I mentioned they are underweight, they are stunting and they are acute wasting. Acute wasting means suddenly become thin, so the height is not suffered, but suddenly they have become thin because of diarrhea or some type 2 nutrient deficiency over a short period of time. Chronic stunting, stunting means height, so if you look at height for age, or length for age that is also type of malnutrition, type of under nutrition.

Short children that means they are stunted, they are under nourished for a long period of time, it is called chronic, chronic means for a long period of time. Acute means suddenly, that is a medical term, acute. And third is underweight. Say if you weigh the child and say the average weight of a child for that age is it 10kg, a child is only 7kg or child is only say 6 kg that means that child is underweight for that age.

And that basically, that is also type of undernutrition and that is your type 2 nutrient because this all growth, your weight, your height, your wasting, your mid upper arm circumference, those are all growth. So, when you have type 2 nutrients you will see growth failure and to look at growth failure whether it is in the short duration time or a long duration time you look at whether it is acute malnutrition or whether it is the chronic malnutrition.

And then you have type 1 nutrient deficiency. So, remember type 1 what nutrients I mentioned. I mentioned about iron, I mentioned about calcium, I mentioned about iodine, vitamin A, vitamin C, vitamin B, those are all basically type 1 nutrient deficiency and in that as I said you will not see much of a nutrient deficient with the growth failure, but what you will see is you will see symptoms.

Now let us come back to your type 2 nutrient deficiency. So, in type 2 nutrient deficiency suppose you have underweight child, then I am going to come back again and explain to you those growth charts, but just for this particular session remember that any of this growth failure either they are severe, means very severe, means really bad or moderate, means moderate.

So, each growth failure are divided into moderate for example, underweight, moderate underweight, severe underweight, stunting, moderate stunting; severe stunting and wasting, moderate malnutrition, acute malnutrition, severe acute malnutrition. So when we talk about SAM MAM that is your under nutrition or wasting in a short duration and that is your acute malnutrition.

Now how they are defined? Basically what they do, they look at your growth chart, they use the Z Score WHO growth chart or standard deviation. So that I will explain in my last session, I will explain those growth charts, so then I will come back again, which children are SAM, which children are MAM, how will you know that they are SAM, MAM. So, we will go in detail in that.

I do not want to go too much in detail in this lecture. And SAM is divided into basically non-edematous but sometimes these severely malnourished children have a lot of swelling in the body, so when you basically, when you press their feet, when you press their legs or hands they have lot of edema. They have beating edema. So, those children are basically we call it edema, edematous acute malnutrition.

When you have some children they do not have edema, they look very thin, there is no edema, so those are non-edematous acute malnutrition. And sometimes you find children who are say both edematous as well as non-edematous malnutrition. They have mixed malnutrition, so those are basically mix SAM.

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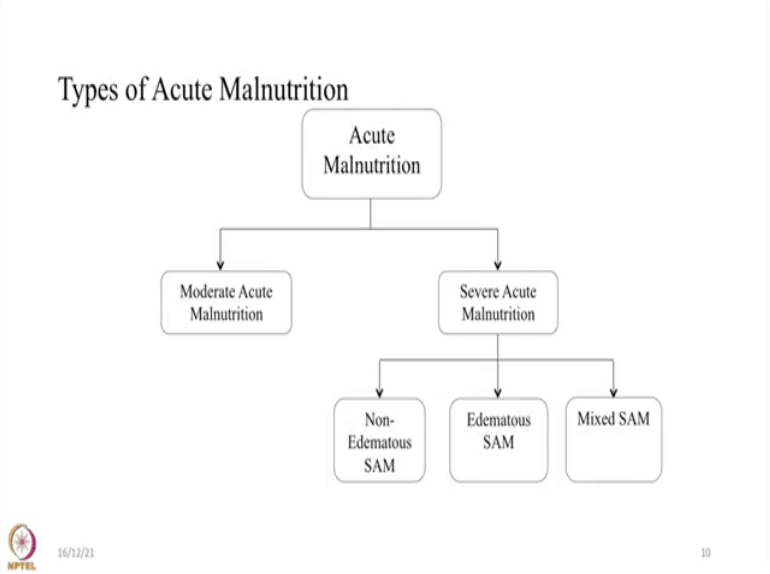

So, again here I, again I just talked about this acute malnutrition, moderate acute malnutrition and SAM – Severe Acute Malnutrition. Severe Acute Malnutrition depending upon child has edema or does not have edema, it is divided into three types, non-edematous SAM, edematous, edema means swelling and mixed SAM.

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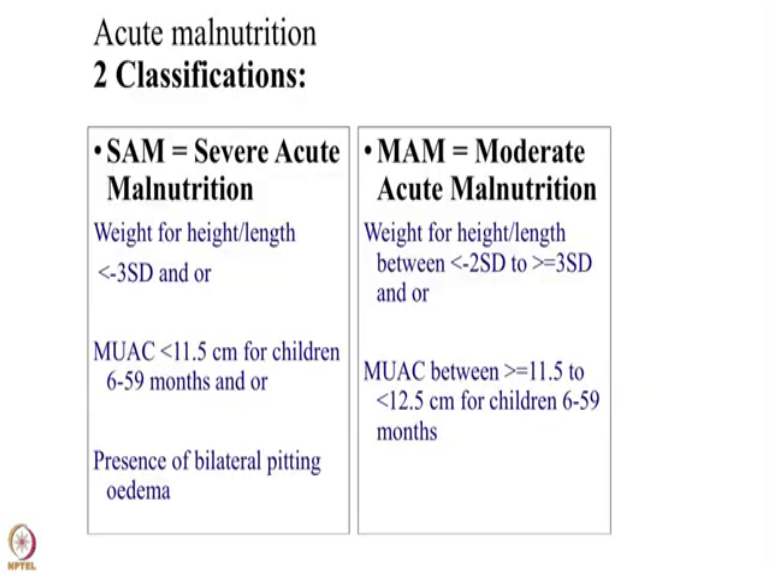

Here what we have done we have just shown, and I will go again detail in my last session, so SAM basically is you take a growth chart which is WHO and you look at the Z score, not the percentile growth chart, although I love percentile growth chart for individual monitoring, but to look at if the child is underweight or stunted or for SAM we look at Z score. So, in the Z score basically your weight for height is less than minus 2 standard deviation.

For SAM MUAC – Mid upper arm circumference is less than 11.5 centimeter, for 6 to 59 months of age. And if child has any present of bilateral pitting edema, there is no other cause of that pitting edema; basically it is because of severe acute malnutrition. This children might not be having, their weight might be okay, because there is a lot of fluid collection.

And in MAM what you have is basically when you look at the standard deviation growth chart these children fall between minus 2 standard deviation and minus; between minus 2 and minus 3 standard deviation. And MUAC is between more than 11.5 to less than 12.5 centimeter. So that…

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So here, I am going to discuss about type 2, so again in last presentation in last session I showed you what happens when you have type 2 nutrient deficiency. Obviously because type 2 is not stored in the body, it is part of your tissue, muscle tissue, your organ, those are made up of your type 2 nutrients, so when you do not have type 2 in your food, then because it is part of so many metabolic functions, so many enzymes, so it has to come from somewhere. Otherwise, a child would die right away.

So, here your nutrient, type 2 nutrients are coming from muscle mass, so that is why muscles are melting. So, obviously, this child would be underweight, they would have MUAC which is much smaller than 11.5 and also if it continues for a long time, if that child survives, then it would, child would have growth failure in a sense, child will have less height or less length, so that is an important aspect.

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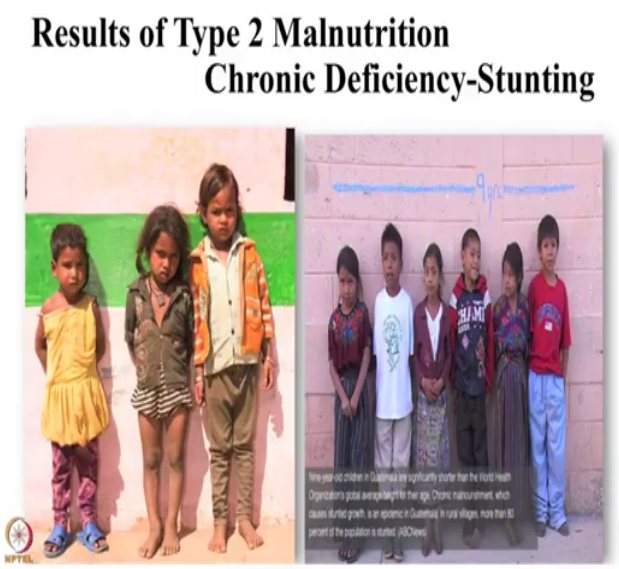

When it is go, when it goes on for a long period of time as I mentioned they will become short, so this is, all these are about the same age children and look at their height difference. Similarly, you know this is a picture from Guatemala and for 9 years old supposed to be here, but they all are short, means obviously they have not got type 2 nutrient for a long time.

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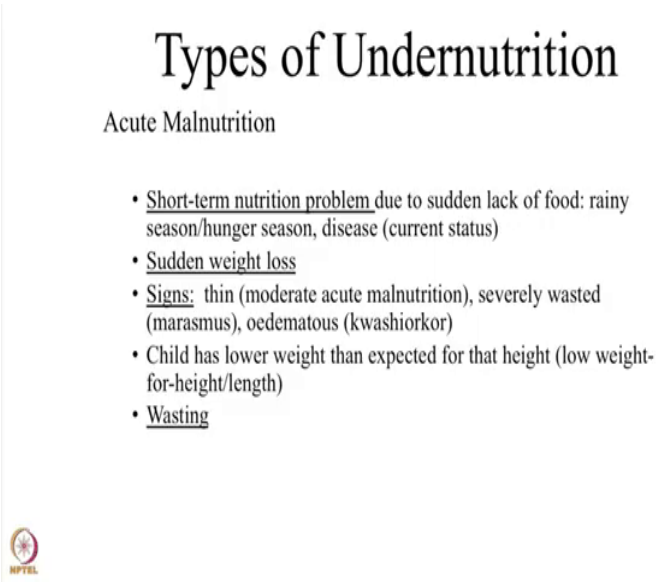

So again, what is acute malnutrition? Short-term nutrition problem, primarily type 2 micronutrient deficiency; it could be because of lack of food, sudden lack of food in rainy season or in any famine or any of those, sudden weight loss; signs you are thin, severely wasted or edematous, we do not call it marasmus or kwashiorkor, I have just kept the name,

so that people who have learned this marasmus and kwashiorkor, they would they would be able to relate to it.

But what we were taught is that marasmus is mainly, edematous SAM and it was marasmus what we were told was a calorie deficiency, so children were thin, but we do not call that anymore, we do not call marasmus as… or kwashiorkor. In kwashiorkor, what we were told was a protein deficiency.

Now child has a lower weight than expected for that height, so in acute malnutrition the weight kind of decreases remarkably. So, the, as per height child needs to have certain amount of weight but because a child has lost that weight, child is wasted, so that is called wasting.

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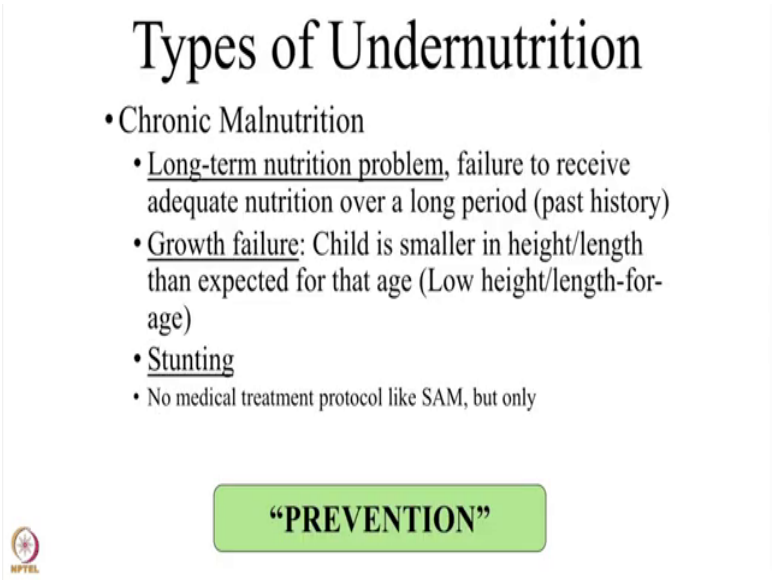

Chronic malnutrition is long duration of malnutrition, failure to receive adequate nutrition for a long period of time. They may have diarrhea on and off, on and off they get better, but they do not get, put on that weight whatever they have lost and slowly, slowly their height suffer. They have growth failure and they are called stunting.

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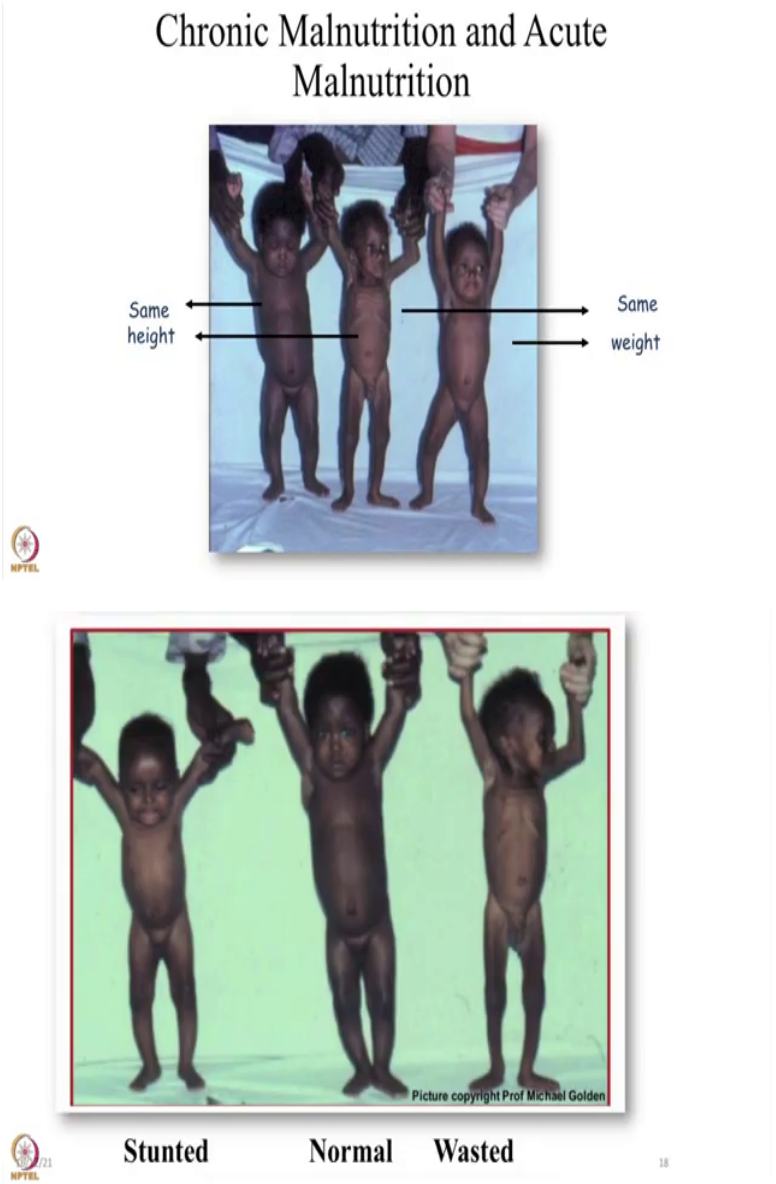

Now here is example, so if you look at this child, this child is say normal about 11 month old babies, this child you can look at it, he looks thinner. So, if you look at the muscle mass see how thin is, you can see his rib cage also, so this trial is wasted, wasting, acute malnutrition, height is a little bit low, but it is not that bad.

Now look at this child, this child you can see the muscle mass is good, it looks okay, but the height is suffered, so this is called, this child is called chronic malnutrition, and this child is basically acute malnutrition, this is acute malnutrition, this is chronic malnutrition. Similarly same thing, same (chi) this is the normal child, this is your wasted child, means look at the mid arm circumference, much smaller.

The muscle is gone and this child has now lost the height because this child probably was like this on and off, on and off, not so bad but eventually his height has suffered. Now if this child, chronically stunted child develop some say diarrhea or pneumonia or stop eating and if this child gets acutely malnourished like this where he loses a lot of muscle mass, that child is at very high risk of developing any severe condition in which we can lose this child. So, mortality is very high in a child who has stunting as well as wasting.

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So, this is of course the example of a type 2 deficient rats, so rats which are type 2 nutrient deficient are much smaller than the rats which are which are normal. So, you see similar kind of results even in plants, so in plants where you put lot of this nutrients, phosphorus and all those minerals, then you will see much better growth in those plants while plants which does not have good amount of fertilizers they will not grow as big or tall.

With this I am going to end part 1 of the session. We discussed about types of malnutrition and hidden hunger. Most of us have one or the other deficiency of vitamins, minerals or any of those nutrients I discussed, so that is why we have created tutorials on recipes, so that if you have any of those symptoms do think of one of those nutrient deficiency.

And then, you can learn to cook and add those food, natural food which can give you all those nutrients which are required for you to maintain your health and also to maintain your immunity, resistant power, to prevent you from chronic conditions, so I do kind of, I do request you all to watch those tutorials. Thank you!