Severe Acute Malnutrition in Children: Management in Community

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Introduction:

Malnutrition is a general term of under nutrition resulting from inadequate consumption, poor absorption or excessive loss of nutrients, but the term can also encompasses over nutrition, resulting from excessive intake of specific nutrients. Undernutrition is one of the most concerning health and development issues in India as in other parts of the world. Undernutrition encompasses stunting (chronic malnutrition), wasting (acute malnutrition) and deficiencies of micronutrients (essential vitamins and minerals). The high mortality and disease burden resulting from under nutrition call for urgent implementation of interventions to reduce their occurrence and this would include determined action on the social determinants of under nutrition. [1]

National Family Health Survey- 4 (NFHS-4) shows that the proportion of children who are stunted or underweight increases rapidly with the child's age from birth to age 20-23 months; peaking at age 20 months. Even during the first six months of life, when most infants are breastfed, 20-30 percent of children are underweight. It is notable that by age 6-23 months, when many children are being weaned from breast milk, 38.4 percent of children are stunted and 7.5% are severely underweight. [2]

Wasting in individual children and population group can change rapidly and shows marked seasonal patterns associated with changes in food availability or disease prevalence to which it very sensitive. A wasted child has a weight for height Z score that at least two standard deviation (-2SD) below the median for the WHO Child Growth Standards. As per WHO fact sheet of September 2014, malnourished children, particularly those with Severe Acute Malnutrition have a higher risk of death from common childhood illness such as diarrhoea, pneumonia and malaria. Nutrition related factors contribute to about 45% of deaths in children under five years of age. Acute malnutrition is classified into severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) according to severity of malnutrition.[1]

Severe Acute Malnutrition (SAM) is both a medical and social disorder. The medical problem is due to the social problems at home. Incorrect breast feeding practices, late introduction of complementary feeds, inappropriate foods and feeding practices, feeding diluted feeds containing less amount of nutrients, repeated cases of diarrhoea, acute respiratory infections, malaria and measles. SAM increases significantly the risk of death in children under five years of age. It can be direct cause of child death by increasing the case fatality rate in children suffering from common illnesses such as diarrhoea and pneumonia. Children who are severely wasted are 9 times more likely to die than well-nourished children. SAM children are at greater risk of mortality due to severe depletion of fat and muscles of body with compromised immunity leads to recurrent morbidity. To prevent morbidity and mortality various means of management and interventions for SAM children are essential. [1]

Severe Acute Malnutrition

Acute malnutrition is a condition resulting from a nutritional deficit over a relatively short duration of time, and Severe Acute Malnutrition is an exacerbation of symptoms. Severe Acute Malnutrition (SAM) is defined as a weight-for-height measurement of < -3SD or more below the mean National Centre for Health Statistics reference values, which is called “wasted”; the presence of bilateral pitting edema of nutritional origin, which is called “edematous malnutrition”, or a mid-upper-arm circumference of less than 115 mm in children age 6 months–5 years. [3]

Malnutrition in all forms is a serious public health problem in both developing and developed

countries worldwide, and is an underlying factor in 10-11 million deaths of children under 5 years old who die from preventable causes. [4] The most concentrated prevalence of acute malnutrition in children under 5 years old throughout the world can be found in Sub-Saharan Africa and South Asia with 9% and 15% of children population respectively. [3]

There are classically two forms of protein energy malnutrition: Kwashiorkor and Marasmus. Both forms are deficient in protein; however, their etiologies and clinical presentations are different. Marasmus, stemming from the Greek terminology meaning "withering" is classified as severe wasting.

In contrast to Marasmus, which is previously described as a chronic malnutrition of total calorie deprivation where the body is able to adapt the under nutrition for a prolonged period of time, Kwashiorkor is specifically a deprivation of protein in the child's diet and clinically presents in a much different way. This type of malnutrition is often an acute process as a result of rapidly decreasing nutrients. Children have severe diffuse edema, dry skin lesions as well as lethargy and liver malfunction. Commonly, children globally will have a mixture of both forms of protein energy malnutrition and will present with Marasmus Kwashiorkor. This presentation is a combination of abdominal edema and extremity wasting. Severe acute malnutrition is a major area of importance globally causing millions of preventable deaths. In order to address this epidemic, identifying the risk factors that lead to the development of this illness provide a foundation to remedy the issue. Many studies have evaluated numerous risk factors associated with SAM.

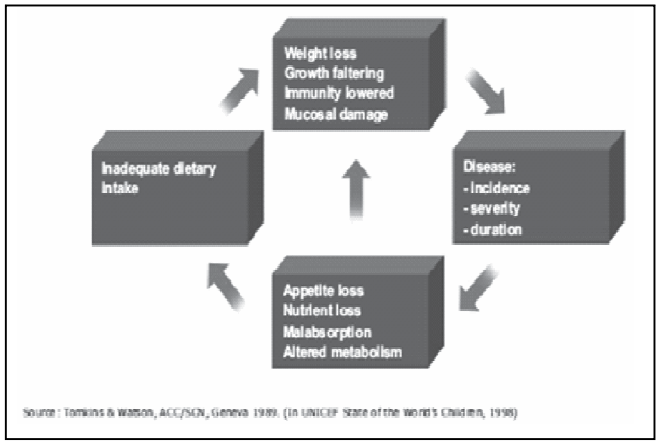
The burden of under-nutrition among under-five children has not changed much even though various intervention programs are in operation in India. Current changing dietary patterns are also affecting the nutrition status of under-five children resulting in increased prevalence of adult non-communicable diseases such as obesity, diabetes, hypertension and coronary heart disease.

Malnutrition in children under the age of 5 years

Substantial global progress has been made in reducing child deaths since 1990. The total number of under-5 deaths worldwide has declined from 12.6 million in 1990 to 5.6 million in 2016 – 15000 every day compared with 35 000 in 1990. Since 1990, the global under-5 mortality rate has dropped 56%, from 93 deaths per 1000 live births in 1990 to 41 in 2016. [5]

Although the world as a whole has been accelerating progress in reducing the under-5 mortality rate, disparities exist in under-5 mortality across regions and countries. Sub-Saharan Africa remains the region with the highest under-5 mortality rate in the world, with 1 child in 13 dying before his or her fifth birthday. Inequity also persists within countries geographically or by social-economic status. The latest mortality estimates by wealth quintile show that in 99 low and middle income countries, under-5 mortality among children born in the poorest households is on average twice that of children born in the wealthiest households. Eliminating this gap between mortality in the poorest and wealthiest households would have saved 2 million lives in 2016. [5]

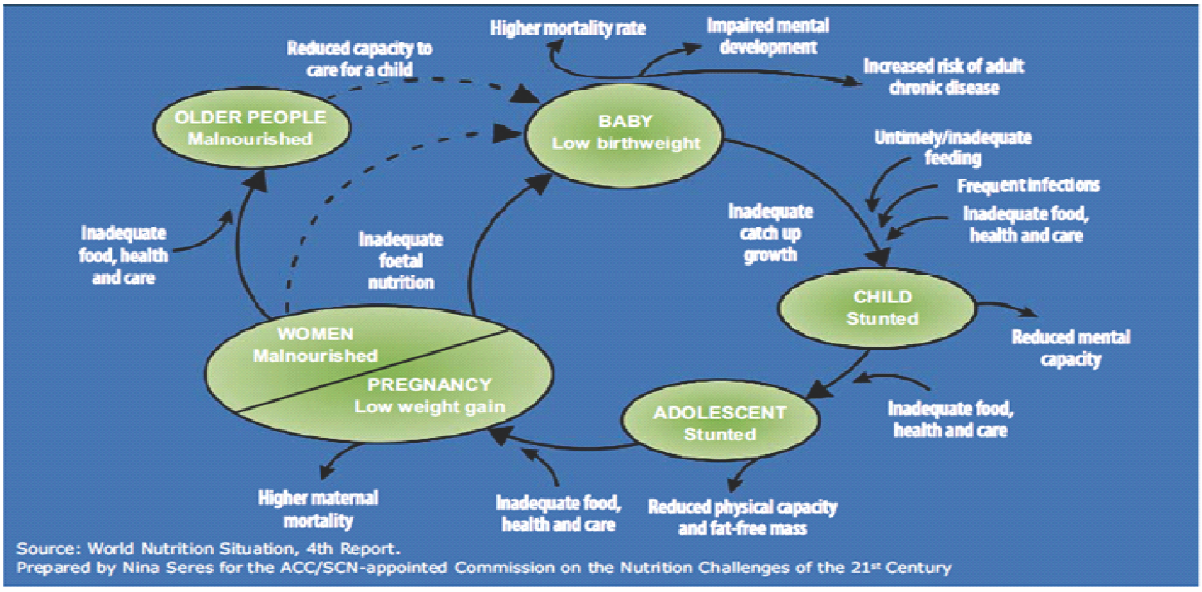
Figure 1: Interactions between malnutrition and disease



More than half of under-5 child deaths are due to diseases that are preventable and treatable through simple, affordable interventions. Strengthening health systems to provide such interventions to all children will save many young lives. [5]

Malnourished children, particularly those with severe acute malnutrition, have a higher risk of death from common childhood illness such as diarrhoea, pneumonia, and malaria. Nutrition-related factors contribute to about 45% of deaths in children under 5 years of age. [5]

Figure 2: Life course and intergenerational effects of malnutrition



In 2013, an estimated 2.9 million children underfive were admitted globally for treatment of severe acute malnutrition (SAM). This figure represents significant progress when compared with just over 1 million reported during 2009 (UNICEF Nutrition Section 2013) yet is clearly insufficient when compared to the global burden of 17 million children affected by SAM (UNICEF, WHO, World Bank 2014). [6] Children with SAM are nine times more likely to die than well-nourished children. In light of the growing understanding of the links between episodes of acute malnutrition and stunting, it is clear that prevention and treatment of acute malnutrition is critical to child survival and development.

Management

SAM children could be with medical complications and without complications, and this would form the basis of their management.

1. SAM children with complications require treatment at the facility level and needs hospital based care and management for stabilization and rehabilitation. Facility based management includes setting up and managing within the health facility premises, a functional space basically Nutrition Rehabilitation Center (NRC) and Child Malnutrition Treatment Center (CMTC) where these children are cared for.
2. SAM Children without complications could be treated at community level under the supervision of health functionaries, using standard feeding and treatment protocols.[7]

The Government of Gujarat has established NRCs/CMTCs at the District and sub-district levels for the management of children with SAM. The GoG has initiated community based management of SAM, using a standard therapeutic food and treatment protocols.

Nutrition Treatment

Children with SAM need more energy and protein so that in addition to their normal energy and protein requirement, lost body mass is rebuilt. The most effective therapy is based on the use of Ready-to-Use Therapeutic Foods (RUTF) enriched with essential vitamins and minerals that is designed to treat severe acute malnutrition in the Community-based Management of Acute Malnutrition (CMAM) programme. This energy-dense, RUTF can be given as take home ration and fed to the child as instructed by the Auxiliary Nurse Midwife (ANM)/ Accredited Social Health Activist (ASHA)/ Anganwadi Worker (AWW). RUTF is a medicinal food for children with SAM only. It should NOT be shared with any other child.

Mother/Caretaker should wash her/his and child's hands with soap before preparing the feed and feeding the child respectively. Then, the child should be given RUTF 6-8 times a day in small amounts. It should be given after breastfeeding the

child and before any other food. Plenty of clean drinking water should be offered along with RUTF. Sick children often do not like to eat. In such cases we should give small regular feeds of RUTF and encourage the child to eat often (if possible eight feeds a day). If the child is breastfed, breastfeed the child before giving RUTF and it should be continued for up to 2 years and beyond. If the child finishes the recommended amount of RUTF being given and is still hungry, s/he can be given any other foods (supplementary food, local homemade food). Always offer child plenty of clean water to drink while he/she is eating the RUTF. Keep food clean and covered. When a child has diarrhoea, do not stop feeding. Continue to feed RUTF and (if applicable) breast milk. If the child is able to eat on his/her own, then encourage him/her to do so.

During nutritional treatment along with RUTF child should also offered homemade food if s/he is hungry and demands for more food. RUTF will be given to child according to his/her age on daily basis for 8 weeks of treatment and after finishing the daily dose of RUTF child can be given the home made food like khichdi, suji kheer, rice and dal, chapatti, dal, vegetables and mashed fruits and vegetables also. Priority should be given to RUTF and then other food shou2ld be offered. Child should be provided plenty of water for drinking. Home food offered should be age appropriate in terms of consistency, texture, and safe.

Vitamin A

Vitamin A Deficiency (VAD) is the leading cause of preventable blindness in children and increases the risk of disease and death from severe infections. Children with SAM usually have deficiency of Vitamin A. Vitamin A deficiency also makes them prone to infections. RUTF given to children with SAM in the CMAM programme has Vitamin A. Still we need to give Vitamin A dose as per the protocol. If the child is not able to open his/her eyes or has night blindness, send him/her to NRC for further checkup. Vitamin A should not be given in oedema cases. If the child vomits within 15 minutes of administration of Vitamin A, don't give it again to child. Vitamin A should be given as per age of the child. Use marked spoon (1 ml, 2 ml) which is given with vitamin A bottle. Vitamin A solution should be ONLY administered with the spoon that accompanies the bottle.

Antibiotics (Amoxicillin)

The body defense system (immune function) does not work properly in children with SAM. The usual signs of infection such as fever are often absent and infections remain hidden. The important principle of community based management of SAM is that all children should be given oral amoxicillin. Amoxicillin is also effective in reducing overgrowth of bacteria in the Gastrointestinal (GI) tract which is commonly associated with severe acute malnutrition.

Albendazole

Albendazole is best absorbed after reconditioning of the GI tract with broad spectrum antibiotic. Albendazole is actively absorbed from the intestine and is more effective when the GI tract is free of other infections. It is therefore given on the second week (on 7^{th} Day). Albendazole is metabolized efficiently by children over twelve months; routine treatment should therefore be given only to children over twelve months of age. Children who have been transferred from the NRC should not receive routine medications that have already been administered in inpatient care.

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