

Dietetics Prescribed in Ancient Ayurveda Correlated with Pediatrics Guideline of Dietetic Prescription for Severe Acute Malnutrition in Age of 6 Months to 60 Months

Tripti Dhawan¹, K. N. Singh¹, K. Rama Chandra Reddy²

¹Department of RachanaSharir, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India, ²Department of Rasa Shastra, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

Abstract

“India had been called the golden sparrow,” we have grown up listening to these lines since childhood, but today when we look at the figures of National Family Health Survey, World Health Organization, National Institute of Nutrition etc., it hurts a lot. Today, about 45% children of India fall in the stunted category. However, to fight malnutrition, a Nutrition Rehabilitation Centre has been established here in India, in which children are treated with therapeutic diet and if studies are to be believed, its results are also very good. After studying the traditional medical method of our India (Ayurveda), it was found that even from the Ayurvedic point of view, the elements of the therapeutic diet used in this center proved to be equally good and capable of fighting malnutrition. This diet has also proven to be appropriate and generally safe based on over 2000 years of Ayurvedic knowledge.

Key words: Ayurveda, malnutrition, diet, nutrition, pediatrics

INTRODUCTION

India has been touted as demographically most young country of the world with median age of 28.4 years compared to that of US having 38 and China 39.^[1] Almost 62% of the population comes under the working age group of 15–62. However, to reap and sustain the benefits of a demographically young population, we need to have a healthy child population base. According to NFHS-5, though India has shown improvement in many children health indicator as compared to the previous NFHS, yet these improvements are not sufficient.^[2] This is evident from the fact that India has been placed at 107th rank among 121 countries in Global Hunger Index 2022. GHI mainly is based on child health indicators such as child wasting, child stunting, and malnutrition which shows the gloomy situation prevailing among India's children.^[3]

Children are the future citizens of the country, they are the biggest resource for the country, and the healthy future of the country lies only in

these children of today.^[4] Not only Swaminathan, but many philosophers and scientists have also emphasized on this. In the context of India, if we talk about the health of children, then it is not just a matter of attention, but it appears to be a matter of concern. Most of the children in India suffer from malnutrition in some form or the other. Acute malnutrition among children is a terrible problem in our country, which despite many efforts, persists in a terrible form.

A steady decline in stunting has been observed since 2000; however, to achieve the 2030 target, we need comparatively faster progress. Wasting and overweight problem still need to be taken care of. Undernutrition causes almost half of the child deaths under 5 either directly or indirectly.

Address for correspondence:

Dr. K. Rama Chandra Reddy, Department of Rasa Shastra, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.
E-mail: krcreddy@bhu.ac.in

Received: 20-06-2023

Revised: 28-10-2023

Accepted: 12-11-2023

Undernourished or malnourished children are more vulnerable to infectious diseases; also it impairs their ability to recover quickly.

The combined impact of undernutrition and infection creates a vicious cycle of worsening sickness and decreasing nutritional status. Nutrition plays a major role during first 1000 days of a child's life. Poor nutrition during this period may lead to stunted growth, which causes impaired or decreased cognitive ability of the child, which ultimately leads to poor performance by child in school.^[5]

Although we have made significant progress since 2000, yet we are not close to anywhere to a world without malnutrition. According to UNICEF-WHO-World Bank Group Joint Malnutrition Estimates, stunting prevalence has shown a declining trend since the year 2000; however, more than one in five children under 5 were stunted in 2020 which is approximately 149.2 million and 45.4 million children were found to be wasted. On the contrary, the number of overweight children under 5 has increased from 33.3 million in the year 2000 to 38.9 million in 2020.

Prevalence of child malnutrition should be continuously monitored, which will enable us to know whether we are on right track to achieve the Sustainable Development Goal 2, particularly target 2.2. Target 2.2 is to “end hunger, achieve food security and improved nutrition, and promote sustainable agriculture.”

In 2020, three regions of the world including Indian subcontinent showed very high prevalence of stunting, with more than 30% of the children affected by stunting. On the other hand, regions such as North America, Central Asia, and Europe had very little prevalence of stunting. These data suggest vast inter-regional disparity. However, intra-regional disparity also exists, for example, in Latin America and Caribbean. This region overall has stunting prevalence of 11.3%; however, some countries are suffering with high and very high stunting prevalence.

According to the WHO, malnutrition can be defined as deficiencies or excesses in nutrients intake. It also includes imbalance of essential nutrients or inefficient nutrient utilization.^[6] The double burden of malnutrition includes undernutrition and obesity as well as diet related non-communicable diseases.^[7] The manifestations of undernutrition can be seen in four broad forms: Wasting, stunting, underweight and micronutrient deficiencies.

Wasting can be understood as a condition in which the body weight is low as a proportion to height. The major causes behind the wasting are inadequate food intake, intake of diets which are low in essential micronutrients and vitamins, prolonged and/or frequent illness. Wasting if not treated in time may lead to death of the children.^[8]

MATERIALS AND METHODS

The World Health Organization highlighted that stunting means low height for the age that means height is not what it should be according to the age of a healthy child. It is also one of the manifestations of malnutrition. The major causes of stunting are chronic or recurrent undernutrition, inappropriate feeding and care in early life, poverty, poor maternal health, frequent illness, and lack of proper treatment. Stunting adversely impacts the physical and cognitive development of a child. It hampers realizing the full cognitive and physical potential of a child.

Underweight means low weight-for-age. An underweight child may be suffering from stunting or wasting or both.

Micronutrient deficiency means the absence or lack of vitamins and minerals essential for proper and healthy functioning of body. These vitamins and minerals help directly or indirectly in production of enzymes, hormones, and other substances needed for a healthy growth and development.

Around 45% of child deaths below 5 years are directly or indirectly associated with malnutrition. In 2018, around 149 million children under the age of five were stunted, while the number of wasted children was 49 million. These children mostly belong to low- or middle-income countries. On the other hand, in these same countries, we find a large portion of children population overweight and obese, and the portion is still rising. Almost each country of the world is suffering from one or other form of the malnutrition. Today combating and eliminating all forms of malnutrition is one of the major challenges before the global community.

The groups more vulnerable to malnutrition are women, infants, children, and adolescents. Providing optimum nutrition since the conception to first 1000 days of life ensures the healthy physical and cognitive development of a child.^[5]

Poverty is one of the major causes of malnutrition. Poor people are more vulnerable to various forms of malnutrition, which ultimately make them poorer because of financial cost associated with malnutrition and related diseases. It also impacts their socio-economic status and ultimately perpetuates the vicious cycle of poverty and ill-health.

A study which was conducted in Kafafo district in Shebele River between last 2019 to starting of 2020 for 2 months (December to January). The study was based on 6–36 months severely acute malnourished children. The aim of this study is to learn about used to be to perceive the determinants of extreme acute malnutrition to discover contextual elements based on UNICEF conceptual framework, as there was no find out about executed in a comparable context in Ethiopia.

The finding of this work about exhibits the main determinants of severe acute malnutrition in riverine context are multi-level. In addition to this, negative childcare and polygamy recognized in qualitative finding. Decisive and multi-sectorial method is required to addressing Severe Acute Malnutrition in such kind of areas.^[9]

A study of 2015, Karnataka, India, mentioned that severe acute malnutrition is one of the main reasons for high rate of hospitalization, and this is also responsible for death. The study conclude that Nutrition Rehabilitation Centre used to be high fantastic in improving weight loss application in severe acute malnutrition. Nutritional Rehabilitation Centre used to be exceptional in bettering food plan in severe acute malnutrition, consequences have been no longer sustained in view of excessive defaulter expenses at follow-ups. There is a want to improvise health training to mothers/caregivers, hyperlink NRC facilities with community health facilities for better follow-ups and address modifiable socioepidemiological threat factors.^[10]

A study published in Food and Nutrition bulletin (2006) revealed the effectiveness of rehabilitating severely malnourished kids in the community in non-emergency situation. This study is summarized 33 community-based rehabilitation centers. The writer noted that there is a pressing want to grant additional resources to improve hospital treatment of humans with severe acute malnutrition and to established community-based programs for rehabilitation and prevention. They stated that the preference to transport machine for community rehabilitation programs should take nearby stipulation into account. Programs need to furnish a high energy and high protein plus micronutrients intake. The researcher stated that there is a need for future research to evaluate the cost-effectiveness of different methods of turning community-based rehabilitation, which includes the area of remedy and type of food, to consider the effectiveness of incorporating community-based rehabilitation programs into routine health services to decide the most nice variety of visits, to develop high quality transfer system between health center and clinics to identify the characteristics of children that fail to obtain weight rapidly.^[11]

According to Lancet published study, child health epidemiology is developing and increasingly can supply data useful for public fitness planning, monitoring, and evaluation. Ideally, records on causes and determinants of demise would be on hand for planning at country wide or subnational levels. According to study, our epidemiological profile shows the extent of version between predominant causes of dying even inside commonly used regional groupings, which emphasis on the need for disaggregation at regional and world tiers to permit public fitness intervention efforts to be targeted appropriately. The availability of valid epidemiological facts at united states level will be an important determinant of success in assembly and in measuring progress toward the millennium development goal for children survival.^[12]

After analyzing Aprameya *et al.* (2015, Tandon *et al.* 2019, Savadogo, Taneja *et al.* and many more studies which are based on Nutritional Rehabilitation Centre, it is found that Nutritional Rehabilitation Centre is working quite well. Furthermore, the treatment of children at this center which is done by special diet is very effective. Due to this, good results are seen in children. The center has a good percentage of children recovering from this treatment.

However, the shortcoming that comes to the fore is the defaulter rate and follow-up in children is not done properly and regularly. Because of this, the improvement in the health of the child by keeping it in the center has been seen falling again due to these irregularities.^[13-15]

Therefore, along with this treatment, it is very important to keep the children under regular supervision. For which it has been told in the study of 2020 that there is a need to connect Nutritional Rehabilitation Centres with small links of health facilities, efforts should be made to provide this facility at community and primary health Centres as well, so that this irregularity can be reduced.

In addition, some studies also emphasize the point that mothers or caregivers should be taught the correct way to prepare formula diets for children in Nutritional Rehabilitation Centres. Information about what other food should be given to the children should also be demonstrated to them and taught to them. So that when the children are sent from the center to their homes, they should be taken care of there as well. So that his health does not decline.

Similarly, when we study about Malnutrition, Nutrition Rehabilitation Centre, we get an idea of the reality of this situation. Even today the situation is alarming, so the efforts which are proving effective in this area, it is very important to expand, spread and spread its awareness among the people.

Along with this, it is also necessary to study other aspects of such efforts, what other steps can be taken related to them. How these efforts can be made more effective by getting cooperation from other areas is also necessary.

According to a study, which was conducted on 1223 preschool children in a development area of Tamil Nadu, whose age ranged from 2 months to 60 months, that is, 5 years. It was found in this study that 45% of those children were children with low weight according to their age, that is, underweight children. While 51% of the children were found to be of low height according to their age, that is, short and 21% of the children were found wasted. Thus, according to this survey, it can be clearly seen that malnutrition is proving to be a big hurdle in our development.^[16]

According to an annual report of the National Nutrition Monitoring Bureau in 1979, at that time, about 45% of

pre-school going children in India were malnourished according to the weight for height standard.^[17]

We all know that World Health Day is celebrated on April 7, but according to an article written by Kiran Pandey on World Health Day 2021 on the website “Down to Earth,” on April 7, 2021, the minimum age of a child born in India will be 69 years 4 months, also according to this report, it is less than the world’s average age rate which is 72.81 years. On the other hand, in relation to Chhattisgarh, it has been said that the life of a child born on April 7, 2021, is not more than 63 years and 7 months.^[18]

All this has been said keeping in view the nutritional status of the children. Based on NFHS-5 Data, Chakraborty, R says that there is no significant decline in number of stunted children.^[19]

In Participant Manual - Facility Based Care of Severe Acute Malnutrition (2013), Severe acute malnutrition is defined in these guidelines as the presence of edema of both feet or severe wasting (weight-for-height/length < -3SD or mid-upper arm circumference < 115 mm). No distinction is made between the clinical conditions of kwashiorkor or severe wasting because their treatment is similar.

Children who are < -3SD weight-for-age may be stunted (short stature) but not severely wasted. Stunted children who are not severely wasted do not require hospital admission unless they have a serious illness.

The main diagnostic features for severe acute malnutrition are:

- Weight-for-length/height < -3SD (wasted) or
- Mid-upper arm circumference < 115 mm or
- Edema of both feet (kwashiorkor with or without severe wasting).^[8]

Children with severe acute malnutrition should first be assessed with a full clinical examination to confirm whether they have any general danger sign, medical complications, and an appetite.

Children with severe acute malnutrition with loss of appetite or any medical complication have complicated severe acute malnutrition and should be admitted for inpatient care. Children who have a good appetite and no medical complications can be managed as outpatients.

The guideline in this section applies to children aged 6–59 months. For infants aged < 6 months follow specific guideline given in Section 8. Feeding is a critical part of managing severe malnutrition; however, feeding must be started cautiously, in frequent, small amounts.

Feeding should begin as soon as possible with Starter diet, the “starter” formula is used until the child is stabilized. Starter diet is specially made to meet the child’s needs without overwhelming the body’s systems at this early stage of treatment. Starter diet contains 75 kcal and 0.9 g protein per 100 mL. It is low in protein and sodium and high in carbohydrate, which is more easily handled by the child and provides much-needed glucose. When the child is stabilized (usually after 2–7 days) [Table 1], Catch-up diet is used to rebuild wasted tissues. Catch-up diet contains more calories and protein: 100 kcal and 2.9 g protein per 100 mL [Table 2]. This section of the module will focus on preparing the feeds, planning feeding, and giving the feeds according to plan. Prepare Starter diet as described below. The choice of recipe depends on the availability of ingredients, particularly the type of milk available, and the availability of cooking facilities. The principle behind the recipes is to provide the energy and protein needed for stabilization and catch-up.

Recipe for the F-75 Diets (Starter Diets)

Table 1: Recipe for F-75 diets

Content per 1lt	F-75 Diet (Non-cereal based)	F-75 Diet (Cereal based)
Cow’s milk or toned dairy milk	300 mL	300 mL
Sugar	100 g	70 g
Vegetable oil	20 g	20 g
Puffed Rice	-	35 g
Water to make	1000 mL	1000 mL
Energy/100 mL	75 kcal	75 kcal
Protein/100 mL	0.9 g	1.1 g
Lactose/100 mL	1.2 g	1.2 g

Adapted from Indian Academy of Paediatrics Guidelines 2006

Recipe for the F-100 Diets (Catch-up Diets)

It may take up to 7 days, or even longer, for the child to stabilize on Starter diet. When the child has stabilized, one can begin to offer Catch-up diet, the higher calorie, higher protein “catch-up” feed intended to rebuild wasted tissues. Eventually the child will be offered Catch-up diet freely. However, it is extremely important to make the transition to free feeding on Catch-up diet gradually and monitor carefully. If transition is too rapid, heart failure may occur.^[8]

DISCUSSION

In ancient times, India was a prosperous country, it was known by names like “Aryavarta,” “Golden Bird,” but in

Ayurvedic concept of ingredients of formula diet

S. No.	Name of the Material	Ayurvedic Name	Pharmacological properties as per Ayurveda	Nutritional Value/100 g
1.	Cow's Milk	Dugdha	The boiled milk cures neurological disorders and diseases accruing because of cold climate conditions. However cool milk will cure blood disorders. If water is added in equal proportion to milk and boiled till reduced to milk quantity is very light and beneficial to children. ^[20]	Energy: 67 Kcal Protein: 3.2 g Fat: 4.1 g ^[21]
2	Sugar	Sarkara	Sugar Enhances taste, improves strength, and cures Delusion, Burning sensation, Intoxication and Vertigo. ^[20]	Energy: 398Kcal Protein: 0.1 g Fat: 0 g ^[21]
3	Puffed Rice	Lāja	Puffed Rice is very light in digestion, cooling, strengthens and cures Vomiting, Diarrhoea, Burning sensation, Blood disorder, Obesity, Polyuria and Thirst. ^[20]	Energy: 325 Kcal Protein: 7.5 g Fat: 0.1 g ^[21]

modern times, there is a terrible problem like malnutrition in our country, which is mainly the effect of poverty and lack of nutrition.

Malnutrition is a serious problem in India. There are different levels of malnutrition in different areas, the level of malnutrition is found to be more serious in backward areas. Malnutrition can be seen as a combined effect of poverty, illiteracy, overpopulation, lack of family planning, and many other reasons. Many scientists believe that it is not the scarcity of food but its uneven distribution that is the major problem. This can also be confirmed that where malnutrition is a serious problem, on the other hand obesity is also emerging as a serious problem. While both these situations are opposite to each other.^[7]

If you pay attention to National Family Health Survey-1 to National Family Health Survey-5, there is improvement in the situation, but still this situation is worrying.^[2] Continuous efforts are still desirable to get rid of malnutrition completely.

Many steps have been taken to fight malnutrition in India and many efforts are going on at present. Different types of programs, schemes, and awareness campaigns are being conducted by various types of welfare agencies, societies, government, and non-government organizations for the welfare of mother and child.

In these efforts, Nutrition Rehabilitation Centre is one of them, which provides a proper mechanism to prevent malnutrition. It not only provides medical treatment to children in the age group of 0–5 years but also tries to improve their nutritional status through dietary treatment. The best thing is that this treatment is done naturally through the food items available within vicinity.

In this center along with the treatment, the child is given shelter, food, and mother's support.^[8]

Table 2: Recipe for F-100 Diets

Content per 1 Lt	F-100 Diet (Non-cereal based)	F-100 Diet (Cereal based)
Cow's Milk or Toned Dairy Milk	900 mL	750 mL
Sugar	75 g	25 g
Vegetable Oil	20g	20 g
Puffed Rice	-	70 g
Water to make	1000 mL	1000 mL
Energy/100 mL	100	100
Protein/100 mL	2.9	2.9
Lactose/100 mL	4.2	3

Studies on Nutritional Rehabilitation Centres show that it is a successful and effective effort. Therefore, there is a need for other such efforts.

The traditional medical system of our country India, which we know by the name of Ayurveda, is one of the ancient medical systems. Not only this, but Ayurveda is also considered a safe and reliable medical system in India. In this study, when we looked at the diet given to children from an Ayurvedic point of view, we found that Ayurveda also considers the components of the diet used in this treatment, such as cow's milk, sugar and puffed rice to be helpful in recovering from malnutrition. The evidence of this is clearly seen in the texts of Indian traditional medicine - Ayurveda, which was written thousands of years ago by our great Indian sages and learned schooler.

CONCLUSION

We have come to know from all kinds of studies, surveys, research, etc. that malnutrition is in an alarming condition in our country, but it is also known that efforts are being made in this field as well. The initiative we studied in our study - the Nutrition Rehabilitation Centre, it turns out to be

a very impressive Centre. The formula diet provided by the Indian Academy of Paediatrics, which is used at this Centre to cure malnutrition, has seen very good results. During our study, when we looked at the combination of this diet means formula diet, it was seen that no external substances of any kind are mixed in this diet, but this formula diet is completely combined with the foods available with us for thousands of years. Has only been created. In this way, if seen, we have been getting a detailed description of the properties and uses of the foods or herbs that we have in our books, on this basis, when we studied this formula diet, Ayurvedic “ancient and traditional medicine of India” In our study, we found that Indian medical system considers the elements used in this diet to be effective and capable in fighting malnutrition and ending its symptoms. However, this knowledge has not been widely spread due to limited area of application and lack of scientific presentation. Along with this, non-use of this type of knowledge at the practical level is also a big reason.

Today, miraculous works can be done in the health sector by giving theoretical form to the knowledge of Ayurveda for the treatment of other diseases.

REFERENCES

- Jha A. World Population Data: Average Indian 10 Years Younger than Chinese. India News; 2023.
- Ministry of Health and Family Welfare Government of India. National Family Health Survey (NFHS-5), Compendium of Fact Sheet, Key Indicators India and 14 States/UTs (Phase-II). India: Ministry of Health and Family Welfare Government of India; 2021.
- Singh P, Kurpad AV, Verma D, Nigam AK, Sachdev HS, Pandey A. Global hunger index does not really measure hunger-an Indian perspective. *Indian J Med Res* 2021;154:455-60.
- Swaminathan M. Handbook of Food and Nutrition. 5th ed. Bangalore: The Bangalore Printing and Publishing Co.; 2007.
- Ministry of Health and Family Welfare Government of India. Journey of the 1st 1000 Days Foundation of the Bright Future, Rastriya Bal Swasthya Karyakram. India: Ministry of Health and Family Welfare Government of India; 2018.
- World Health Organization. Malnutrition. WHO Fact Sheet. Geneva, Switzerland: World Health Organization; 2021. Available from: <https://www.who.int/health-topics/malnutrition#:~:text=malnutrition%20refers%20to%20deficiencies%20or,as%20diet%20related%20noncommunicable%20diseases> [Last accessed on 2023 Jun 18].
- Winichagoon P, Margetts BM. The double burden of malnutrition in low-and middle-income countries. In: Romieu I, Dossus L, Willett WC, editors. Energy Balance and Obesity. IARC Working Group Reports, No. 10). Ch. 2. Lyon (FR): International Agency for Research on Cancer; 2017. Available from: <https://www.ncbi.nlm.nih.gov/books/nbk565820>
- Ministry of Health and Family Welfare, Government of India. Participant Manual for Facility based Care of Severe Acute Malnutrition. India: Ministry of Health and Family Welfare, Government of India; 2013.
- Ahmed AT, Abas AH, Elmi A, Omer A. Determinants of severe acute malnutrition among children aged 6-36 months in Kalafo district (riverine context) of Ethiopia. *Sci Rep* 2022;12:5198.
- Aprameya HS, Kamath SP, Kini PK, Baliga BS, Shenoy UV, Jain A, *et al.* Socioepidemiological determinants of severe acute malnutrition and effectiveness of nutritional rehabilitation center in its management. *Int J Health Allied Sci* 2015;4:148-53.
- Ashworth A. Efficacy and effectiveness of community-based treatment of severe malnutrition. *Food Nutr Bull* 2006;27:S24-48.
- Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? *Lancet* 2003;28:2226-34.
- Savado L, Zoetaba I, Donnen P, Hennart P, Sondo BK, Dramaix M. Prise en charge de la malnutrition aiguë severe dans un centre de réhabilitation et d'éducation nutritionnelle urbain au Burkina Faso [Management of severe acute malnutrition in an urban nutritional rehabilitation center in Burkina Faso]. *Rev Epidemiol Sante Publique* 2007;55:265-74.
- Tandon M, Quereishi J, Prasanna R, Tamboli AF, Panda B. Performance of nutrition rehabilitation centers: A case study from Chhattisgarh, India. *Int J Prev Med* 2019;10:66.
- Taneja G, Dixit S, Khatri A, Yesikar V, Raghunath D, Chourasiya S. A study to evaluate the effect of nutritional intervention measures on admitted children in selected nutrition rehabilitation centers of Indore and Ujjain divisions of the state of Madhya Pradesh (India). *Indian J Community Med* 2012;37:107-15.
- Steinhoff MC, Hilder AS, Srilatha VL, Mukarji D. Prevalence of malnutrition in Indian preschool-age children: A survey of wasting and stunting in rural Tamil Nadu, 1983. *Bull World Health Organ* 1986;64:457-63.
- National Institute of Nutrition, Indian Council of Medical Research. National Nutritional Monitoring Bureau Annual Report 1979. Hyderabad: National Institute of Nutrition, Indian Council of Medical Research; 1980.
- Pandey K. World Health Day: If you are Born Today in India, Your Health Prospects Look Grim. *Down to Earth*; 2021.
- Chakraborty R, Devikrishna NB, Chauhan A, Mishra NL. Acute Malnutrition Worsened among Children: NFHS-5. *Down to Earth*; 2021.
- Reddy KR. Yogaaratnakara. Varanasi, India: Chaukhamba Orientalia; 2022.
- Gopalan C, Shastri BV, Balasubramanian SC. Nutritive Value of Indian Foods. Hyderabad: National Institute of Nutrition; 1985.

Source of Support: Nil. **Conflicts of Interest:** None declared.