



## Review Article

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### REVIEW ON ETIOLOGY AND MANAGEMENT OF KARSHYA (MALNUTRITION) IN CHILDREN

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#### ABSTRACT

Childhood period is considered as the foundation of better future life and every incidence has influence on the further life. The Childhood malnutrition is an enduring problem in developing countries. Malnutrition is a physical condition or process that results from the interaction between inadequate diet and infection and characterized by poor infant growth, reduced cognitive development, anemia, and blindness. According to UNICEF nearly half of all deaths in children under 5 are attributable to under nutrition. The most common cause of deaths in malnutrition children is infectious diseases and poor immune function. Malnutrition may be correlated to Karshya disease in Ayurveda due to similarly, disease such as Parigarbhika, Phakka, Balashosha, and Shuska Revati describe clinical features in different Ayurvedic texts. Prevention and management of Karshya in Ayurveda by improve immune power of child through proper nutritious diet (food management) and use of herbal medications. This review article highlights of various etiology and management of Karshya (malnutrition) in children through Ayurveda.

**Key words:** Karshya, Malnutrition, Ayurveda, Immunity, Panchkarma, Rasayana.

#### INTRODUCTION

Childhood malnutrition is still one of the major public health problems today due to its magnitude and disastrous consequences on children's development and survival. Maximum number of patients suffering from malnutrition is found in developing countries. Growing children in particular are most vulnerable to its consequences. According to World health organization the incidence of low weight at birth estimates that more than 20 million children, every year<sup>1</sup> and approximately 150 million children younger than 5 years have low weight patterns for their age.<sup>2</sup> According to National Family Health Survey (NFHS)-3, carried out in 2005-06, 40% of India's children under the age of three are underweight, 45% are stunted and 23% are wasted.<sup>3</sup> The nutritional status of women and children is particularly important, because it is through women and their off-spring that the pernicious effects of malnutrition are propagated to future generations. A malnourished mother is likely to give birth to a low birth- weight (LBW) baby susceptible to disease and premature death.

**Definitions of malnutrition:** The term malnutrition refers to both Under nutrition as well as Over nutrition and it's defined by low weight-for-age (underweight), length-for-age (stunting), or weight-for-length (wasting).<sup>4</sup> The prevalence of stunting, wasting and underweight under five years of children's 48%, 20% and 43% are respectively.<sup>5</sup> The majority of children suffering from under nutrition (80%) are the mild and the moderate forms which go unnoticed.<sup>6</sup> Malnourished children's are more prone to systemic infection because infections aggravate malnutrition by decreasing appetite, inducing catabolism, and increasing demand for nutrients.<sup>7</sup>

The following diseases can be categorized as malnutrition disorders in Ayurveda in pediatrics age group:

Malnutrition can be correlated to Karshya disease in Ayurveda due to similarly, disease such as Parigarbhika, Phakka, Balashosha, and Shuska Revati describe clinical features in different Ayurvedic texts.

**Karshya:** It is under nutrition condition due to reduce food intake of baby resulting from less intake, if mother use Vata vardhak ahar-vihar and baby take Vata dushit stanya,<sup>8-9</sup> ultimately babies become malnourished. According to Ayurvedic texts the Alpashana (reduced intake of food) and Vishamashana (false habit of intake) are two important predisposing factors which play a major role in pathogenesis of Karshya disease.

**Etiology & impact of malnutrition:** In Ayurveda Karshya is Apararpana Janya Vyadhi and etiological factors are described such as:

**Ahar janya factors:** Following factors play a major role in the pathogenesis of Karshya such as: i.e. Ruksha annapana (food which causes dryness), excessive intake of Kashaya (Astringent), Katu (spicy) and Tikta (Bitter) Rasa,

**Vihar janya factors:** Alpa bhojana (in adequate food), pramitashana (intake of nutritionally deficient food), anashana (absolute no food intake), langhana (Fasting), ativyayam (excessive exercise), malamutradi nigraha (Suppression of natural urges), vatasevana (excessive exposure to wind), atapa sevana (Excessive exposure to sunlight), atibhargamana, ati chinta (worry), ati krodha (anger), and atibhaya (fear) are causative factor for malnutrition.<sup>10-12</sup> According to Acharya Charaka over lean (Atikrushya) persons are described under eight despicable persons (Ashtau-ninditiya Purusha) along with over obese (Medasvi) person.<sup>13</sup>

Etiological factors according to modern medicine described by Figure 1 as:

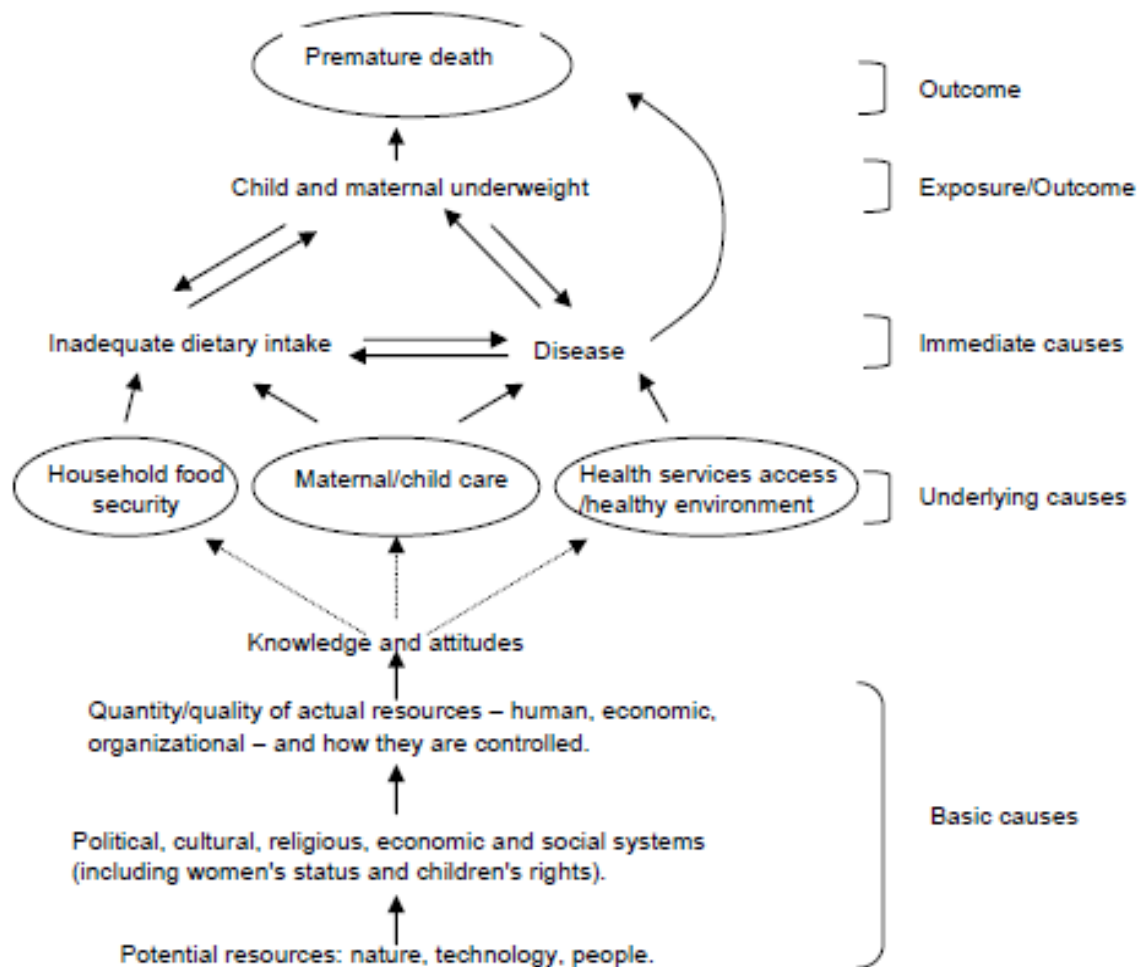


Figure 1: Causal framework for child malnutrition adapted from UNICEF (1990)

**Signs and symptoms of karshya:** Acharya Charka has been described the lean person has Shushka-sphic, udar, greeva (Dried up buttocks, abdomen, neck), Dhamanijala santataha (Prominent vascular network) Twagasthi shesho, Ati krusha (Remnant of skin and bone), Sthoola parva ( Thick joints ), Vyayam Atisauhityam (The over lean does not tolerate physical exercise, over saturation), Kshutpipasamay-aushadham (dose not tolerate high in toxicity of hunger, thirst, disease, drugs ), Ati-shitoshna-maithunam (Too much of cold, heat and sexual intercourse).<sup>14</sup>

**Balashosha and kshiraja phakka:** In modern medicine Balashosha and Kshiraja Phakka are near to nutritional deficiency. The cause of Balashosha is Shlaishmika anna sevana (Excessive energy dense food), Shitambupana (drinking cold water) and Diva swapna (excessive day sleep), drinking breast milk vitiated by Slesma-by these channel of Rasa (first fluid liquid) gets block by Kapha. Clinical features are Arochaka (Reduced digestive capacity) Pratishaya (running nose) Jwara (fever) and Kasa (cough), these condition if not detected early may lead to Shosha (emaciation) with its eyes being unctuous (grassy) and white.<sup>15-16</sup> In the Kshiraja Phakka, wet nurse having breast milk vitiated by Kapha is known as having Phakka causing milk. The child consuming milk suffers from so many diseases thus, due to emaciation attains state of Phakka (marasmic state).<sup>17</sup>

**Parigarbhika:** Parigarbhika roga occurs if baby feed breast milk of mother, who becomes pregnant in quick succession,

highly lacks nutrient values besides quantitative reduction and then the baby who is exclusively dependent on such milk remains weak and progressively develops the manifestations of under nutrition followed by malnutrition and baby developed clinical feature of Parigarbhika roga such as cough, impaired digestive capacity, vomiting, fever and anorexia.<sup>18</sup>

**Sushka revati:** Sushka Revati is a type of Bal Grahas in children and manifests as progressive emaciation of all body parts, diarrhea, anorexia, skin changes, abdominal nodular swellings and geographic tongue.<sup>19</sup>

**Complication of Karshya disease:** Acharya Charka has been described many complications of Karshya they are: The lean person becomes a victim of spleen (enlargement), cough, wasting, dyspnea, gaseous tumor, piles, abdominal disease, and the disease of Ghrahani (Gastro-intestinal track).<sup>20</sup>

The major diseases in modern medicine which are more near to Karshya in Ayurveda:

- **Failure to thrive (FTT)**
- **Protein Energy Malnutrition (PEM)**

**Failure to thrive:** Failure to thrive (FTT) is a descriptive term rather than diagnosis and is used for infants and children up to five years of age whose physical growth is significant less than their peers same age and sex. Failure to thrive usually refers to weight below 3rd or 5th centile, failure to gain weight of time or a change in rate of growth that has crossed two major centile, e.g. 75th to 50th, over a period of time. The children present

with poor growth, often associated with poor development and cognitive functioning. The degree of Failure to thrive (FTT) is usually measured by calculating weight, height and weight-for-height as percentage of the median value for based on appropriate growth chart.<sup>21</sup>

**Protein Energy Malnutrition (PEM):** PEM is a range of pathological condition arising from in adequate proportion of protein and calories, occurring most frequent in infants and young children, and commonly associated with systemic infection.<sup>22</sup>

**IAP classification of malnutrition:** This classification is based on weight for age values.<sup>23</sup>

Grade of malnutrition Weight-for-age of standard (%):

Normal > 80

Grade 1 71-80 (mild malnutrition)

Grade 2 61-70 (moderate malnutrition)

Grade 3 51-60 (severe malnutrition)

Grade 4 < 50 (very severe malnutrition)

Moderate to severe malnutrition is associated with one of the classical syndrome, namely, Marasmus, Kwashiorkar, and Marasmic-Kwashiorkar.<sup>24</sup>

**Marasmus:** It is characterized by marked wasting of fat and muscle as these are consumed to make energy. The main sign is severe wasting the child appears very thin (skin and bones) and has no fat. There is severe wasting of shoulder, buttocks and thighs. The loss of buccal pad of fat creates the aged or wrinkled appearances that have been referred to as monkey faces. Baggy pants appearances refer to lose skin of the buttocks hanging down. Axillary pad of fat may also be diminished, Affected children may to alert in spite of their condition. There is no edema.

**Kwashiorkar:** It usually affects children aged 1-4 years. The main sign is pitting edema. Child may have a fat sugar baby appearance. Edema ranges from mild to gross and may represent up to 5-20% of the body weight. Muscles wasting always present and child unable to stand or walk. The skin lesion consists of increased pigmentation, desquamation and dyspigmentation may confluent resembling flaky paint or in individual enamel spots. Petechiae may be seen over abdomen. Smooth tongue, cheilosis and angular stomatitis, Herpes simplex stomatitis also be seen in kwashiorkar. A flag sign which are the alternate bands of hypopigmented and normally pigmented hair pattern is seen when the growth of child occurs in spurts. Hairs lose their luster and are easily pluckable. Mental changes include unhappiness, apathy or irritability with sad, intermittent cry. Anorexia, vomiting, abdominal distention, and stool may watery or semisolid, bulky with low pH and may contain unabsorbed sugars. Anemia present as in mild PEM but with greater severity. Prolong circulating time, bradycardia, diminished cardiac output and hypotension is seen in kwashiorkar. Glomerular filtration and renal plasma low are diminished.

**Marasmus-Kwashiorkar:** It is a mixed form of PEM and manifests as edema occurring in children who may or may not have others signs of kwashiorkar and have varied manifestation of marasmus.

**MANAGEMENT:** The management protocols are following:

1. Avoidance of etiological factors because this Nidana Parivarjana has two fold benefits.
2. Samshodhana (Purification therapy), Samshamana chikitshiya (Conservative therapy), along with diet and

lifestyle are helpful in preventing controlling as well as eradication of the Karshiya.

3. It is a Agnimandya disorders that's why principles of treatment shall be on the lines of Agnidipana, Brimhana, Dhatusara vardhana.
4. Achariya Charka has been described the line of treatment of Karshya through diet management e.g. Light and nourishing diet is prescribed for the nourishment of the Karshya patients.<sup>25</sup> In case of an emaciated person, light and nourishing diet (like old shali rice) should be given so as to bring about proper nourishment in them. Such diets being light serve as stimulants of digestive power and bring about nourishment due to their nutritive property. Sleep, joy, comfortable bed, contentment, tranquility of mind, abstinence from anxiety and physical exercise, pleasant sights, intake of freshly harvested rice, fresh wine, meat soup of domestic, marshy and aquatic animals, well prepared meat, curd, ghee, milk sugarcane, shali rice, Phaseolus radiates, wheat, sweet preparations, enema consisting of unctuous and sweet herbs, regular oil massage, use of scents and garlands, use of white apparel, elimination of doshas in time and administration of rejuvenating and Brimhana (nutritive) drugs cure as well as prevent of emaciation and nourish to the child.<sup>26</sup>
5. Absorption and digestion of food items mainly depend on liver function and in some case of malnutrition liver functions reduced, so in such condition liver function boosting medicine play a major role for increase appetite and absorption some examples of liver boosting herbs such as:

**Cichorium intybus:** Traditionally used for hepatic conditions and liver rejuvenation.

**Boerhaavia diffusa:** For hepatic disorders and for poor digestions of food.

**Picrorhiz kurroa:** Traditionally in Ayurveda for centuries as a general liver tonic.

**Phyllanthus niruri:** The fresh root is traditionally given in jaundice and a liver for rejuvenating from.

6. **Brumhana therapy:** In case of malnutrition brumhana therapy may be more effectively because Karshya is a Apatarpana Janya Vyadhi and brumhana dravya promotes healthy growth of Dhatus, particularly Kapha (type of biohumor), Mamsa (muscles) and Meda (fat) leading to proper development and enhancement of different body parts.
7. **Samsnshodhan therapy:** According to Ayurvedic texts Vata Dosh being a prime responsible factor along with Agni in the pathogenesis of Karshya disease,<sup>27-28</sup> that's why Basti Karma is choice of Panchkarma procedures in malnourished children.
8. **Immune therapy:** Malnourished children more prone to infection due to poor immune function, most common site of infection are the skin, the alimentary tract, the respiratory tract and the urinary tract.<sup>29</sup> Hence in such condition immunotherapy play a major role for protect the child from serious infection which may be fulminant when hypoglycemia and hypothermia associated with infection. In Ayurvedic texts, various Acharays described countless useful dravya, formulations (yogas), mode of conducts for enhance immunity (bala or vyadhikshmatva). Some examples are:
  - **Lehana karma:** The lehana karma a play major role in enhance immune function of malnourished child due to its properties of enhances growth & development by providing sufficient nutrition, promote health, complexion and strength (immunity) and protect from various infections.<sup>30</sup>

- **Swarna Prasana:** It is a type of Samskara which play a major role for an ancient technique to modulate the immunity and improve quality of life. One pharmacoclinical study, done on the Madhu Ghrita-Swarna-Vacha combination given to neonates showed a significant effect of humoral antibody formation and it acted on immunological system, which was evident by triggering the response of immunological system arise in the total protein and serum IgG level.<sup>31</sup>
- **Rasayana therapy:** Rasayana therapy also immune booster due to proper uptake, growth and improvement of essential saptadhatu (seven vital tissues). Some examples are: Immuno stimulatory effect of *Curculigo orchioides*,<sup>32</sup> macrophage activation property of *Tinospora cordifolia*,<sup>33</sup> effect of some Indian herbs (*Asparagus racemosus*, *Tinospora cordifolia*, *Withania somnifera* and *Picrorhiza kurroa*) on macrophage functions in mice,<sup>34</sup> immune protection by *Withania somnifera*, *Tinospora cordifolia* and *Asparagus racemosus* during cancer chemotherapy.<sup>35</sup>

## DISCUSSION

The term malnutrition refers to both under nutrition as well as over nutrition. However, sometimes the terms malnutrition and protein energy malnutrition (PEM) are used interchangeably with under nutrition. Malnourished children's are more susceptible to infection, especially sepsis, pneumonia and gastro-enteritis along with deficiency of Vitamin, minerals and trace elements. About 35% of all deaths among children under five and 21% of total global disability adjusted life years lost among less than 5 children.

In different Ayurvedic texts so much description is found regarding Karshya especially in Children. Acharya Kashyapa has been described Vyadhi Sambhavaja Phakka and it is similar to malnutrition. Balashosha and Kshiraja Phakka are nutritional deficiency disorder mentioned by Acharya Vagbhata and Acharya Kashyapa respectively. Similarly, Parigarbhika and Garbhaja Phakka are caused by child on feeding breast milk of pregnant mother which has Alpa Poshakansha (poor nutrients). Shuska Revati is a type of Bal-Graha (demon) affecting the child represents infections spectrum of disease resulting Sarvanga Kshaya (emaciation) and child becomes emaciated even though consuming balance diet.

All the disease described in Ayurveda texts is related to each other and possible to correlate to malnutrition like protein energy malnutrition (PEM). Dosha like Alpashana and Vishamashana; Vihara Dosha like Atishrama and Manasika Bhava like Shoka, Bhaya, Krodha are the main etiological factors for Karshya. Karshya is including whole of diseases which are undertaken malnutrition. The poor immune function is responsible for diseases produced in previous healthy child. The immunomodulation could provide an alternative or complement to conventional chemotherapy for a variety of diseased conditions i.e. especially the case when host's defense mechanisms have to be activated under the conditions of impaired immune responsiveness.

### Prevention of malnutrition.<sup>36</sup>

1. Mothers should be advised to initiate breast feeding within one hour of delivery.
2. Importance of exclusive breast feeding for the first 6 months of baby's life and proper weaning thereafter should be properly explained to mother.
3. Nutritional education has to be imparted to the people regarding consumption of cost effective nutritious diet.

4. Special efforts have to be made to improve acceptance of family planning methods for limiting the family and to give adequate spacing between children.
5. Environmental sanitation has to be promoted in reducing infection and breaking the vicious cycle of infection leading to under nutrition.
6. Socio-economic development among the rural masses needs to be ensured which is the important factor to tackle malnutrition, mainly under nutrition.
7. Government should allot more money in health sector for integrated health packages and should ensure proper functioning of health programs.

## CONCLUSION

In the developing countries malnutrition (Karshya) is a major problem in children. This problem is mainly related to improper uptake, digestion and absorption of various Vitamins, minerals and trace elements in growing children. Ayurveda suggest balance (Daily diet should include all components of diet; protein, fat, carbohydrates and minerals.) intake of Aahar to fulfill the various nutritional requirements of body which are essential for proper growth and development of children along with enhance immune function in early age.

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