IAMJ

INTERNATIONAL AYURVEDIC MEDICAL JOURNAL

Review Article ISSN: 2320-5091 Impact Factor: 6.719

THE ROLE OF NUTRITION IN CHILDREN'S COGNITIVE DEVELOPMENT:

Sirsat Rohit[1], Wankhede Prashant[2], Deodas Madhavi[3], Singh Sudha[4]

[1]Pg Scholar department of Kaumarbhritya,[2]Assistant Professor department of Kaumarbhritya,[3]Professor and HOD department of Kaumarbhritya,[4]Associate Professor department of Kaumarbhritya PDEA's College of Ayurveda and Research Centre, Nigdi, Pune- 411044

Corresponding Author:rohitsirsat25@gmail.com

https://doi.org/10.46607/iamj0812102024

(Published Online: October 2024)

Article Received:08/09/2024 - **Peer Reviewed:** 29/09/2024 - **Accepted for Publication:** 13/10/2024.

ABSTRACT

Nutrition plays a crucial role in cognitive development across the lifespan, particularly during the critical periods of Growth and Development. A well-balanced diet is necessary for optimal brain function and development. Due to a higher basal metabolic rate, the nutritional requirement is higher in children than in adults. A balanced diet can provide the necessary nutrients for cognitive development. The evidence from observational studies suggests that micronutrients play an essential role in children's cognitive development. Most traditional Indian meals are rich in vegetables, legumes, grains, and spices, focusing on balance and nutrition. *Ayurveda*, India's ancient system of medicine, plays a significant role in guiding dietary choices and recommending foods based on individual body types, seasons, and health conditions. This holistic approach to nutrition aims to maintain balance in the body and promote overall well-being.

Keywords: Nutrition, Cognitive development, Holistic Approach

INTRODUCTION

Aim and Objective

The role of Nutrition in cognitive development and its significance in understanding human growth and learning. To elaborate on the healthy diet (Ahara) for different age groups of children in *Ayurveda*.

Materials and Methods

This paper utilised classical *Ayurveda* texts, such as *Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha, Ashtanga Hridaya, Kashyapa Samhita*, etc., and modern textbooks, including digital media, Ayush Research Portal, PubMed, Google Scholar, and other websites on the Internet regarding the subjects.

A well-balanced diet provides the necessary building blocks for brain growth and function, while a diet lacking essential nutrients can hinder cognitive development.

The World Health Organization (WHO) defined human health in a broader sense in its 1948 constitution as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". From Infancy to childhood, different types of balanced diets are explained for cognitive development. In early infancy (from 0 to 6 months), only breast milk is sufficient; after six months, along with breast milk, weaning food is also required. Malnourishment is due to a lack of adequate Nutrition, which can ultimately affect the growth and development of children.

According to *Ayurveda*, food influences how our brains function and develop.

According to *Ayurveda*, food influences how our brains function and develop.

Ayurveda has some key concepts. *Rasa* (taste), mentioned in *Ayurvedic* classics as sweet, sour, salty, spicy, bitter, and astringent, balances the three Doshas and nourishes the brain.

Ayurveda emphasises the nutrition of children to maintain their health. It has classified children based on diet into three categories viz. *Ksheerapa* (from birth to 1 year), who take breast milk predominantly; *Ksheerannada* (from age 1 to 2 years), who take both breast Milk and food; and *Annada* (above two years of age), who take food similar to an adult (1).

Ayurveda recommends breastfeeding up to 6 months of age and complementary feeding thereafter (after six months)in the form of *Annaprashana*/*Phalaprashana samskara*(a first-time food/fruit-eating ceremony in children). Early initiation of breastfeeding, exclusive breastfeeding, avoiding bottle feeding, hygiene, and appropriate complementary feeding are essential factors for maintaining the nutritional well-being of children.

***Ahara* for First 6 Months Duration:** For a newborn, breast milk *(Stanya)* is considered Amrita, and Ayurveda praises breastfeeding, i.e., *Stanyapana*. Mother's milk contains the exact proportion of fat, cholesterol, protein, and carbohydrates to fulfil the baby's needs during the first six months. Mother's milk is not only a perfect nutritional choice; it also protects against several diseases. So, it is exclusively advised at the early age of the child. The mother should start feeding the child from the first day [(2)].

Piyush or colostrum is secreted during the first three days, which is necessary to develop immunity in children. According to *Acharya Kashyapa*, breastfeeding results in good growth, strength, longevity, and good health and does not cause any trouble or disease to the child [(3)].

***Ahara* for six months- 2 years:** A rapidly growing baby needs extra energy and calorific food; only breast milk can't suffice this need. Failure to do so may lead to definite nutritional problems. Therefore, Breast milk should be continued dasha main food along with complementary food in the beginning. A minimum of three complementary foods along with breastfeeding and five complementary foods should be given to non-breastfeeding children. *Phalaprashana* and *Annaprashana* Samskara are the special procedures explained in *Kaumarbhritya*. Initially, the baby was given fruits and solid food prepared with milk as the base. Both *Samskaras* explain the concept of weaning in Ayurveda.

***Ahara* for 2 Years—10 Years Duration: In *Annada Avastha* (4), a child from the age of 2 is considered**. At this age, the child should be shifted to cereals. All types of food with all forms, i.e., *Lehya*, *Peya*, *Bhojya*, etc., can be given during this age of life. Children should be fed well-cooked food made at home. Vegetables of all kinds, milk, nuts and seeds, whole grains, lentils, beans, and berries, among other foods, should be consumed.

***Ahara* for Above 10 Years:** There must be a minimum of three meals (breakfast, lunch, and dinner)per day, separated by at least two and a half hours. Whole wheat bread and starches, fruits, vegetables, ghee, lentils, eggs, fish, meat, milk, and dry fruits should all be included in a daily serving [(5)].

Modern Research has shown that adequate nutrition, particularly in early childhood, is crucial for optimal brain development [(6)]. Essential nutrients such as protein, healthy fats, complex carbohydrates, vitamins, and minerals support cognitive function and development.

Health is dependent upon food, and the food looks for proper methods. [7]

Acharya Charak has described eight specific factors of dieting in a very systematic and scientific manner which is known as *Ashta Ahara Vidhi Visheshayatana*. [8]

These are eight particular factors that influence the method of dieting. [9]

1. *Prakriti/Swabhava*- Nature of food/ Quality of food.
2. *Karan* – Processing of food.
3. *Samyoga* – Combination of food.
4. *Rashi* – Quantity of food.
5. *Desha* – Habitat of food.
6. *Kala* – Time and seasonal variation.
7. *Upayoga Samstha* – Rules for dieting
8. *Upayokta* – The person who consumes the food.

Many *Ayurvedic* formulations, like *Medhya rasayana*, act on the brain to enhance brain development. Medhya Rasayanas such as *Brahmi*, *ashwagandha*, *Shankhapushpi*, and *ghee* play essential roles in brain development. *Ahara*, a whole food including Grains, Legumes, Fruits and vegetables, nourishes the body and mind. *Vihara*: Healthy lifestyle habits such as regular exercise, stress management and adequate sleep support cognitive development.

*Here are some essential nutrients and their roles in cognitive development:

1. **Omega-3 fatty acids**: Support brain structure and function, particularly in attention and memory [10].

2. Iron: Essential for healthy red blood cells, which carry oxygen to the brain, supporting focus and attention [11].

3. Zinc: Involved in neurotransmitter function and synaptic plasticity, crucial for learning and memory [12].

4. Vitamin D: Important for overall brain health and development, with deficiencies linked to cognitive impairments [13].

5. Fiber: Supports healthy gut bacteria, which produces neurotransmitters and hormones influencing mood and cognition [14].

Table1: Showing Recommended Daily Dietary Allowances for Different Age Groups[15].

Group	Particulars	Body weight(kg)	Net Energy (Kcal/d)	Protein(/d)	Visible Fat (g/day)	Calcium(mg/d)	Iron(mg/d)
Infants	0-6 months	5.4	92Kcal/kg/d	1.16g/kg/d	-	500	46µg/kg/day
	6-12 months	8.4	80Kcal/kg/d	1.69g/kg/d	19		5
Children	1-3 years	12.9	1060	16.7	27	600	9
	4-6 years	18	1350	20.1	25		13
	7-9 years	25.1	1690	29.5	30		16
Boys	10-12 years	34.3	2190	39.9	35	800	21
Girls	10-12 years	35.0	2010	40.4	35	800	27
Boys	13-15 years	47.6	2750	54.3	45	800	32
Girls	13-15 years	46.6	2330	51.9	40	800	27
Boys	16-17 years	55.4	3020	61.5	50	800	28
Girls	16-17 years	52.1	2440	55.5	35	800	26

Key Nutrient	Source	Deficiency
Omega 3 fatty acid	Fatty fish, nuts & seeds, fortified food, algal oil supplement	Poor brain function and cognitive impairment, Risk of heart disease, Joint pain and inflammation,
Zinc	Nuts & seeds, red meat, Poultry, Seafood, Legumes, Whole grains	Impaired immune function, Impaired growth and development, slow wound healing,
Iron	Nuts& seeds, leafy vegetables, whole grains, red meat, poultry, fish.	Anaemia, Fatigue, Weakness, shortness of breath, poor immune function.
Vitamin D	Fatty fish, fortified dairy products, Mushrooms, egg yolks, Fortified cereals.	Rickets, osteomalacia, osteoporosis, increased risk of infection,
Fibres	Fruits, vegetables, legumes, whole grains, nuts& seeds.	Constipation, Diverticulitis, high cholesterol, blood sugar imbalance.

A diet rich in whole foods, fruits, vegetables, whole grains, lean proteins, and healthy fats provides these essential nutrients. Conversely, a diet high in processed and sugary foods can lead to cognitive impairment and an increased risk of attention deficit hyperactivity disorder (ADHD) [16].

According to the WHO Guideline for complementary feeding of infants and young children, 6-23 months of age shows nutrients and fortified food products which are essential for growth and cognitive development are:-

Nutrient supplements and fortified food products in some contexts where nutrient requirements cannot be met with unfortified foods alone, children 6–23 months of age may benefit from nutrient supplements or fortified food products. a. Multiple micronutrient powders (MNPs) can provide additional amounts of selected vitamins and minerals without displacing other foods into the diet (context-specific, moderate certainty evidence). b. Fortifying these cereals can improve micronutrient intake for populations already consuming commercial cereal grain-based complementary foods and blended flour. However, consumption should not be encouraged (context-specific, moderate certainty evidence). c. Small-quantity lipid-based nutrient supplements (SQ-LNS) may be helpful in food-insecure populations facing significant nutritional deficiencies. [17]

Children 6–23 months of age should be responsively fed, which is defined as "feeding practices that encourage the child to eat autonomously and in response to physiological and developmental needs, which may encourage self-regulation in eating and support cognitive, emotional and social development". [18]

DISCUSSION

Cognitive development is a complex and dynamic process. It encloses various aspects of mental functioning, including attention, memory, language, problem-solving and decision-making. A recent study has highlighted the critical role of Nutrition, sleep, and physical activity. Eating a balanced diet is therefore crucial for maintaining "*Samagni*". Balanced foods are essential throughout life; nutrition is vital to human survival, health, and development. Most incurable diseases are produced due to improper nutrition.

Ayurveda has a specific *Samskara* Described in late infancy to start weaning food because only breast milk is insufficient after six months. Along with breast milk, we must begin complementary food to develop the brain and body.

To prevent diseases and maintain good health, one should first eat food in the proper quantities. An intelligent and self-controlled person should take conductive food in the correct quantity and at the right time. According to *Ayurveda*, the quantity of food to be taken again depends on the pattern of digestion (i.e., Agni).

It is also observed that many diseases arise merely due to this faulty dietary habit. In this context, the *Ashta Ahara Vidhi Visheshayatana* concept is considered ideal in today's lifestyle. The powers of digestion and metabolism again vary according to the season and the age of the individual. With sufficient nu-

trition and environmental assistance, the long-term effects of undernutrition may be prevented or alleviated.

CONCLUSION

Nutrition significantly impacts children's cognitive development. A balanced diet with essential nutrients supports brain growth, function, and optimal cognitive development.

A child should only consume milk up to the age of one year, *Peya* and *LehyaAhara* up to the age of two years, and all other forms of *Ahara*, i.e., *Ashta Ahara vidhi*, which is crucial for a child's healthy growth and development, after the age of two.

REFERENCES

1. Venes D (2006) Taber's Cyclopedic Medical Dictionary. 20th(Edition.), Jaypee Brothers, New Delhi, India, pp: 2788.
2. Sushruta (2014) Sushruta Samhita. In: Shastri A (Ed.) Sutrasthana, 35/34, Chaukhamba Sanskrita Sansthana, Varanasi, India.
3. Charka (2013) Charka Samhita. In: Sastri SN (Ed.) Sharirasthana 8/46, Chaukhambha Bharati Academy Varanasi, India.
4. Sushruta(2018)Sushruta Samhita. In: Shastri A (Ed.) Sharirsthana.10/50,Chaukhamba Sanskrita Sansthana, Varanasi, India.
5. Paul VK, Bagga A (2019) Ghai Essential Pediatrics. 9th(edition.), CBS Publisher and Distributors New Delhi India, pp: 814.
6. World Health Organization. (2018). Nutrition and cognitive development in early childhood.
7. Kashyapa Samhita, Vrddhajivakiya Tantra, editor – translator- Prof. P.V. Tiwari, Chaukhambha Vishvabharati 2016, Khalistan chapter 5/9, page no.485.
8. Charak Samhita vol. 1, editor – translator – Prof. Priyavrat Sharma, Chaukhambha Orientalia – Varanasi 2004, Vimana Sthan chapter 1/21, page no. 305.
9. Charak Samhita part 1, pt. Kashinath Sastri, Dr Gorakhanatha Chaturvedi, editor – Pt. Rajeshwar Dutta Sastri, Chaukhambha Bharti Academy Varanasi 2013, Vimanasthana chapter 1- 21/3-page no. 681.
10. Richardson, A. J., & Montgomery, P. (2005).Omega-3 fatty acids in ADHD. Journal of Attention Disorders, 8(3), 167-174.
11. Lozoff, B., & Georgieff, M. K. (2006). Iron deficiency and brain development. Seminars in Pediatric Neurology, 13(3), 158-165.
12. Black, M. M. (2003).Micronutrient deficiencies and cognitive development. Journal of Nutrition, 133(11), 3927S-3931S.
13. Penckofer, S., et al. (2010).Vitamin D and cognitive function in adolescents. Journal of Adolescent Health, 46(6), 524-526.
14. Sonnenburg, E. D., & Sonnenburg, J. L. (2014).The gut microbiome at the interface of health and disease. Nature, 513(7518), 242-249.
15. Krishnaswamy K (2011) Dietary guideline for Indians.National Institute of Nutrition, ICMR, Hyderabad, India.
16. Johnson, R. J., et al.(2007). Attention-deficit/hyperactivity disorder: Is it time to reappraise the role of sugar consumption? Postgraduate Medicine, 119(3), 39-49.
17. WHO Guideline for complementary feeding of infants and young children 6–23 months of age, page 14.
18. WHO Guideline for complementary feeding of infants and young children 6–23 months of age, page 15.

Source of Support: Nil
Conflict of Interest: None Declared

How to cite this URL: Sirsat Rohit et al: The role of nutrition in children's cognitive development. International Ayurvedic Medical Journal {online} 2024 {cited October2024} Available from: http://www.iamj.in/posts/images/upload/1853_1857.pdf