

**CHILD NUTRITION AND HEALTH: REVIEW OF THE BENEFITS, CRISIS AND
CHALLENGES IN INDIA**

By

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Dissertation submitted in partial fulfilment of the requirements of the degree

MBA Pharmaceutical Management

Academic year, 2020-2021



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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled “**CHILD NUTRITION AND HEALTH: REVIEW OF THE BENEFITS, CRISIS AND CHALLENGES IN INDIA** ” submitted by Sushil Raghunath Mokashi Enrolment No. 0213 under the supervision of **Mr. Rahul Sharma** for award of MBA in Pharmaceutical Management of the University carried out during the period from March 22, 2021 to June 19, 2021 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

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I would first like to thank my mentor Mr. Govind Sharma, Nutrition Executive, Nestle India Ltd. He was always open whenever I ran into a trouble spot or had any question. He consistently allowed this project to be my own work but steered me in the right direction whenever she thought I needed it.

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Sushil Raghunath Mokashi

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LIST OF SYMBOLS AND ABBRIVIEATION:

SDG	Sustainable Development Goals
BMI	Body Mass Index
SES	Socio-Economic Status
GHI	Global Hunger Index
NFHS	National Family Health Survey
ICDS	Integrated Child Development Services
EER	Estimated Energy Requirement
BMI	Body Mass Index
LCPs	Long-Chain Polyunsaturated Fatty Acids
DHA	Docosahexaenoic Acid
AA	Arachidonic Acid
HMOs	Human Milk Oligosaccharides
DNA	Deoxyribonucleic Acid
MDG	Millennium Development Goals
SDG	Sustainable Development Goals
SAM	Severe Acute Malnutrition
ECD	Early Childhood
GNR	Global Nutrition Report
WHO	World Health Organization
DALY	Disability Adjusted Life Years
NNM	National Nutrition Mission

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ABSTRACT

CHILD NUTRITION AND HEALTH: REVIEW OF THE BENEFITS, CRISIS AND CHALLENGES IN INDIA

Mentor: Mr. Rahul Sharma

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Background –

Government of India is working very hard to get the nutrition on track by rolling out several community nutritional programmes to tackle with biggest healthcare burden that is malnutrition in India. Based on the data that is given in the past two decades, despite of enormous challenges present, India is doing considerable progress in combating hunger and undernutrition especially in rural areas of India. But the pace that this considerable change is going, has been unacceptably slow, uneven and many has been left behind. But with sustained prioritization, increased resource allocation, adopting comprehensive, coordinated, and holistic approach with good governance and with the help of civil society, it is very clear and crisp that India has the potential to combat and end the biggest healthcare burden that is malnutrition in all its forms and turn the ambition of the Sustainable Development Goals (SDG) into a reality for everyone.

Many children younger than 5 years in developing countries are exposed to multiple risks, including poverty, malnutrition, poor health, and unstimulating home environments, which detrimentally affect their cognitive, motor, and social-emotional development. There are few national statistics on the development of young children in developing countries. We therefore identified two factors with available worldwide data—the prevalence of early childhood stunting and the number of people living in absolute poverty—to use as indicators of poor development. We show that both indicators are closely associated with poor cognitive and educational performance in children and use them to estimate that over 200 million children under 5 years are not fulfilling their developmental potential. Most of these children live in south Asia and sub-Saharan Africa. These disadvantaged children are likely to do poorly in school and subsequently have low incomes, high fertility, and provide poor care for their children, thus contributing to the intergenerational transmission of poverty.

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INTRODUCTION:

Poor nutrition (substandard diet quantity and/or quality resulting in under- or overnutrition) and lack of early learning opportunities contribute to the loss of developmental and academic potential and lead to lifelong health and economic disparities in more than 200 million children aged. ECD typically refers to early childhood with a strong focus on the first 2–3 y of life and describes the gradual unfolding of children’s sensory-motor, cognitive-language, and social-emotional capacities shaped by interactions between the environment, experience, and genetics. The 2007 Lancet series on child development in developing countries reported that programs with multiple components, including health, nutrition, and psychosocial stimulation, might be most successful in promoting children’s early development. Thus, recommendations currently advocate for the development and testing of integrated nutrition and ECD interventions. The scientific basis and theoretical framework for integrating nutrition and ECD interventions is discussed in the corresponding review, and over the last decade, a substantial number of studies have been undertaken to evaluate the effect of integrated interventions on children’s nutrition and development outcomes. In this review, we summarize the current state of knowledge related to the effectiveness of integrated nutrition and ECD interventions, the theoretical and practical benefits and challenges of their implementation, and the emerging evidence for best practices and the cost-benefits. We conclude by identifying the current research gaps that need to be addressed to further evidence-based policy and practice for integrated nutrition and ECD programs.

Childhood is the stage in a human’s life associated with growth and development. Growth proceeds rapidly in early life, slows down in middle childhood and accelerates at puberty before linear growth ceases. With increasing age there is also physical and psychomotor maturation, which influences activity, body composition, feeding skills and food choices (Geissler, 2011). Adequate nutrition is essential for growth, health, and development of children. Poor nutrition increases the risk of illness and is responsible directly or indirectly for one third of the estimated 9.5 million deaths that occurred in 2006 in children less than 5 years of age. Inappropriate nutrition can also lead to childhood obesity.

IMPORTANCE OF BALANCE DIET

Your child needs all the essential vitamins, minerals and other nutrients from food that is required for their growth and development which ensures and secure the happy life of your child. To ensure the required growth and development of your child it is very important to give

a healthy balanced diet for your child. For ensuring growth and development of your child, certain nutrients are required for variety of reasons.

These essential nutrients can be of two types i.e., macronutrients and micronutrients. Macronutrients consists of carbohydrates, fats and protein, and micronutrient includes vitamins and minerals. As the name indicates micro means small and these nutrients need relatively small in your child's diet to meet the daily requirements.

Macronutrients provide energy to the rapidly growing infant. Infants require significant amounts of energy owing to their considerable growth and development during the first year of life. Except for the gestational period, infants exhibit greater growth during this time than at any other stage of life. By 6 months of age, most infants have doubled their birth weight. The estimated energy requirement (EER) during infancy is defined as the average dietary energy intake needed to sustain various body functions, enable deposition of tissues, and support growth at rates consistent with good health. The energy requirement for infants in this age group is determined by body weight, which in turn is related to gender.

Protein intake is important for growth, repair, and maintenance of body tissue. Dietary protein also provides amino acids required for the synthesis of body proteins. Mature breast milk has a low total protein concentration (approximately 10–12 grams per litre). This is important as high levels of dietary protein and electrolytes can result in a high renal solute load, which places stress on the infant's developing kidneys. Despite its low concentration, mature breast milk protein is of high nutritional quality and is digested and absorbed more efficiently than cow's milk proteins. A high-quality protein is highly digestible and contains essential amino acids in amounts that closely meet human needs. Breast milk contains two types of proteins: whey and casein. The whey-to-casein ratio in breast milk is variable and ranges from 90:10 to 50:50 during the normal course of lactation.

Fat provides about half of the calories in breast milk. The fat in breast milk is structured to facilitate its digestion and absorption. About 90% of breast milk fat is digested, partly because of the presence of bile salt-stimulated lipase, a fat splitting enzyme.

FAT IS AN ESSENTIAL COMPONENT OF THE DIET BECAUSE IT:

- Serves as a carrier for other nutrients, such as fat-soluble vitamin.
- Produces hormones and contributes to satiety.

- Contributes a concentrated source of energy and provides the body's most economical means of storing energy.
- Promotes growth when optimally absorbed.

The pattern of fatty acids in breast milk is unique because its composition includes the long-chain polyunsaturated fatty acids (LCPs) docosahexaenoic acid (DHA) and arachidonic acid (AA). Although term infants can synthesize AA and DHA from their respective precursors (linoleic acid and alpha-linolenic acid), research indicates that the infant's immature systems preferentially make use of preformed LCPs.

CARBOHYDRATES:

Carbohydrates contribute to growth and development during infancy. Their primary role is to provide energy to cells throughout the body. Although relatively little carbohydrate is needed in the diet, carbohydrates spare protein and fat from being metabolized for calories.

The main carbohydrates found in breast milk are lactose and human milk oligosaccharides:

- Lactose is the predominant carbohydrate in breast milk. Because lactose is found only in milk and not in other animal and plant sources, its high level in breast milk indicates its significance.
- Human milk oligosaccharides (HMOs) are carbohydrate polymers that enhance the growth of certain bifidobacterial.

MICRONUTRIENTS:

Vitamins are essential components of cofactors, small organic or inorganic substances that work with an enzyme to facilitate a chemical reaction, in a wide range of metabolic reactions.

Vitamin A is a fat-soluble vitamin that has many functions, including:

- Roles in growth, immune function, and maintaining cellular differentiation throughout life.
- Especially important in maintaining healthy vision.

Vitamin C, a water-soluble vitamin, functions as a cofactor for enzymes involved in:

- Biosynthesis of collagen
- Fatty acid metabolism

- Iron absorption, transport, and storage It also functions as a highly effective antioxidant.

Vitamin D is a fat-soluble vitamin:

- Plays a special role in bone growth by maintaining blood concentrations of calcium and phosphorus.
- Necessary for bone mineralization and growth. Vitamin D deficiency is associated with rickets, which still afflicts some children and causes growth retardation and skeletal abnormalities.

Vitamin E is a fat-soluble vitamin:

- Functions within an “antioxidant network” to help protect cells from adverse effects of free radicals.
- Appears to stabilize the cell membranes in the lenses of the eyes.

Vitamin K is a fat-soluble vitamin:

- Important for biological reactions such as blood coagulation and bone metabolism.
- Participates in synthesis of bone proteins.

Choline is an essential nutrient:

- Important for brain development related to memory.
- Necessary for synthesis of phosphatidylcholine, an important component of cell membranes.

NUCLEOTIDES

Nucleotides account for a significant portion of the non-protein nitrogen found in breast milk. As new-borns have reduced capacity to synthesize or salvage them, nucleotides are considered semi-essential nutrients. Nucleotides are precursors for the synthesis of DNA, and have critical functions as shown on the right. Research suggests that the nucleotides in breast milk confer health benefits by having a favourable effect on the gastrointestinal microbiota. In vitro studies have suggested that nucleotides may enhance the growth of bifidobacterial. Nucleotides have also been linked with the enhanced immunity of breastfed infants, and supplementation has resulted in a modest improvement in some antibody responses.

CAROTENOIDS

Carotenoids are natural antioxidants with possible immune-enhancing effects; they help protect healthy cells against damage from free radicals. The carotenoid group consists of over 600 compounds that are found in fruits and vegetables. Certain carotenoids may have a positive immunomodulatory action. Breast milk contains a variety of carotenoids, including:

- Provitamin A carotenoids, such as alpha-carotene and beta-carotene
- Lutein, which is a major carotenoid also found in the macular pigment of the human retina.

INFANT FEEDING CONSIDERATIONS:

Feeding recommendations for term infants from 0–6 months

Infants thrive when they are nursed on demand around the clock. During the early weeks of breastfeeding, infants should be encouraged to have 8–12 feedings at the breast every 24 hours. After breastfeeding is well established, the frequency of feeding may decline to about 8 times per 24 hours with the frequency increasing during growth spurts or when an increase in milk volume is desired. Breast milk supplies all the vitamins that an infant requires. However, due to the changes in certain parenting and medical practices, it is recommended that:

- All breastfed infants receive 400 IU vitamin D per day beginning within the first few days of life.
- In the United States, all infants receive an intramuscular injection of vitamin K within the first 6 hours of life to help prevent haemorrhagic disease.
- In Europe, healthy newborn infants should receive one of the following:
 - 1 mg vitamin K1 by intramuscular injection at birth
 - 32 mg vitamin K1 orally at birth, at 4–6 days and 4–6 weeks
 - 2 mg vitamin K1 orally at birth and a weekly dose of 1 mg orally for 3 months

Infant formula as a substitute when infants are not breastfed.

In the absence of breast milk, iron-fortified infant formulas are the most appropriate substitutes for feeding healthy, full-term infants during the first year of life. When used as the sole source

of nourishment during the first 6 months of life, infant formulas meet all of the energy and nutrient requirements of healthy term infants. As the gold standard, breast milk is the basis for designing the composition of infant formula. However, modelling infant formula after breast milk is difficult as its composition varies among women, and therefore, there is no single nutrient profile for it. Furthermore, factors such as the bioavailability and the physiologic effect of nutrients must also be taken into account in infant formula composition. While infant formula cannot entirely duplicate the composition of breast milk, infant formula development is focused on achieving the growth, physiologic, and developmental outcomes closer to those of breastfed infants.

KEY WORDS

Childhood, Nutrition, Breast feeding, Growth and Development, Serving sizes

PROBLEMS

Feeding difficulties are one of the most common developmental disturbances in otherwise healthy infants and young children, often resulting in poor growth. Although an estimated 25%-50% of children experience transient feeding problems under two years of age, most feeding issues resolve by the end of early childhood. However, an estimated 3-10% of children present with more severe forms of feeding problems which put children at risk for impaired growth, chronic illnesses and behavioural developmental problems. As well, a large percentage of children with special needs, children with developmental disabilities and children born prematurely have severe and chronic feeding problems where families need support in resolving the feeding issues. At the clinical level, the mother (and her paediatrician) is often not aware of the underlying reasons for problematic feeding behaviours. Thus, the mother's reactions to a poor feeder may be exposed to covert or overt family criticism, which often lead to internal doubt about her own ability to nurture. At the policy level, there is a lack of education of professionals and young parents about feeding as a highly complex developmental skill, motivated by hunger and conditioned by parental reactions. Furthermore, professionals are still not trained to recognize that when either feeding skills or motivation or both are impaired, problematic feeding behaviours, stressed mealtime interactions and family conflicts are likely to result.

RESEARCH CONTEXT

Earlier cross-sectional clinical studies examined the relationship between feeding difficulties and attachment, maternal characteristics, family dynamics and feeding practices. These studies were conducted prospectively, that is, after the children were diagnosed with poor growth. Several observational studies focused on feeding interactions and problematic feeding behaviours. The development of feeding and patterns of food acceptance have been studied by numerous psychologists. More recently, few researchers started to focus on possible pathophysiology (heart rate variability, hormonal balance) of poor growth and problematic feeding behaviours. Other studies were conducted in the context of primarily behavioural interventions for problematic feeding behaviours in medically ill and very premature infants.

RESEARCH OBJECTIVES

- To understand factors contributing to childhood obesity and food insecurity and their effect on child health
- To understand the role of health professionals, health systems and community in advocacy
- To understand how developing shared values leads toward collective impact and action
- To mobilize the paediatric health professional community to a convergence of thinking and action to improve child nutrition

KEY RESEARCH QUESTIONS

The extensive research in feeding problems and poor growth can be divided along the following three research questions:

1. How do maternal (family) characteristics (cognitive abilities, personality disorders, psychological status, and early attachment history) influence feeding behaviours and growth?
2. How do infant characteristics (feeding skills, appetite, temperament, and other physiological characteristics) influence feeding behaviours, mealtime interactions and growth?
3. How effective are behavioural and other forms of intervention for severe problematic feeding behaviours in medically ill infants?

LITRETURE REVIEW:

Grantham-McGregor S, Cheung YB, Cueto S, Glewwe P, Richter L, Strupp B. summarised that, children in the developing countries who are younger than 5 years of age exposed to multiple risks which specially includes poverty, malnutrition, poor health, and unstimulating home environments which adversely impacts their cognitive, motor, and social-emotional development. They have further identified two factors in their research article **“Developmental potential in the first 5 years for children in developing countries”** based on the availability of the worldwide data- the prevalence of early childhood stunting and the number of people who are living in the absolute poverty which can be further used as an indicator of poor development. They further shown that both the indicators are closely related with poor cognitive as well as educational performance in adults. Most of these adults with poor cognitive as well as educational performance are likely to do poorly in school and consequently have very low incomes, very high fertility rate, and in future they will provide poor care for their children and thus they are contributing to the intergenerational spread of poverty in the country (Prof Sally Grantham-McGregor, 2007).

Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, Ezzati M, Grantham-McGregor S, Katz J, Martorell R discussed maternal as well as child malnutrition in low-income and middle-income countries in their research article **“Maternal and child undernutrition and overweight in low-income and middle-income countries”**. In this study they have found that the prevalence of maternal overweight has had a steady increase since 1980 and exceeds compared to the overweight in all regions. They also estimated that, the undernutrition in the aggregate including fetal growth restriction, stunting, wasting and deficiencies of vitamin A and zinc including optimum amount of breastfeeding to the newborns is a leading cause of 3.1 million child deaths annually or 45% of all child deaths in the country. With the higher rate of disease burden in present as well as future which is caused by malnutrition in woman of productive age, pregnant woman, and the children with the first two years of life should lead to interventions focused on these groups (Black RE, 2013).

Grantham-McGregor SM, Fernald LC, Kagawa R, Walker S. conducted a systematic review on the topic of interventions that are linking a child development component with nutritional aspect, in few cases of these studies nutrition intervention also contains health-promotion interventions. They found that combining nutritional as well as child development activities is going to have so much supplementary added benefits for the young children.

Synergy between childhood nutrition with child development intervention, although hypothetically reasonable, has rarely been proven in their research article **“Effects of integrated child development and nutrition interventions on child development and nutritional status”**. In their article they also found that there is an urgent need to assess various quality of programmes as well as to establish some quality-control mechanism. In this study they were also unable to locate any programme where effects of integrating encouragement into the segment of health as well as other nutritional services based out of children’s growth and development were examined. They also found that children growth and development intervention in this kind of segment mainly benefit developmental consequences of nutrition where on the other side nutrition of child can benefit both developmental as well as nutritional status of the child. (Grantham-McGregor SM, 2014)

Hurley KM, Cross MB, Hughes SO reported considerable relation between parental feeding and child BMI Z-score, weight status, or adiposity. In this study, the most valuable result was the relationship between parental feeding practices as well as child weight gain status of newborn. They also examined various potential mechanism in relation to linking feeding to child weight status of the baby in their systematic review **“A systematic review of responsive feeding and child obesity in high-income countries”**. These results are very much dependable to others who reported that intake of soda sweets was completely related with generous feeding practices. Additional research on this particular topic is needed to know the co-relationship between responsive feeding practices and child weight status in higher income group. Furthermore, randomized controlled trial in this field are required to examine the efficacy of responsive feeding interventions to combat and to treat childhood obesity in early stages. (Hurley KM, 2011)

Harder, T., Bergmann, R., Kallischnigg, G. and Plagemann, A. shown in the study that, a long term breastfeeding practices with the newborn is related with the substantial decrease in the risk of overweight in the newborns in their research article **“Duration of breastfeeding and risk of overweight: a meta-analysis”**. In summary they found that, the long term duration of exclusive breastfeeding practices is inversely as well as linearly correlated with the risk of overweight in children. With the exclusive breastfeeding, the risk of overweight was found to be significantly reduced. (Harder, 2005)

Parsons TJ, Power C, Logan S found no clear association between socio-economic status (SES) in early life of adults and childhood fatness. But a very strong association between low

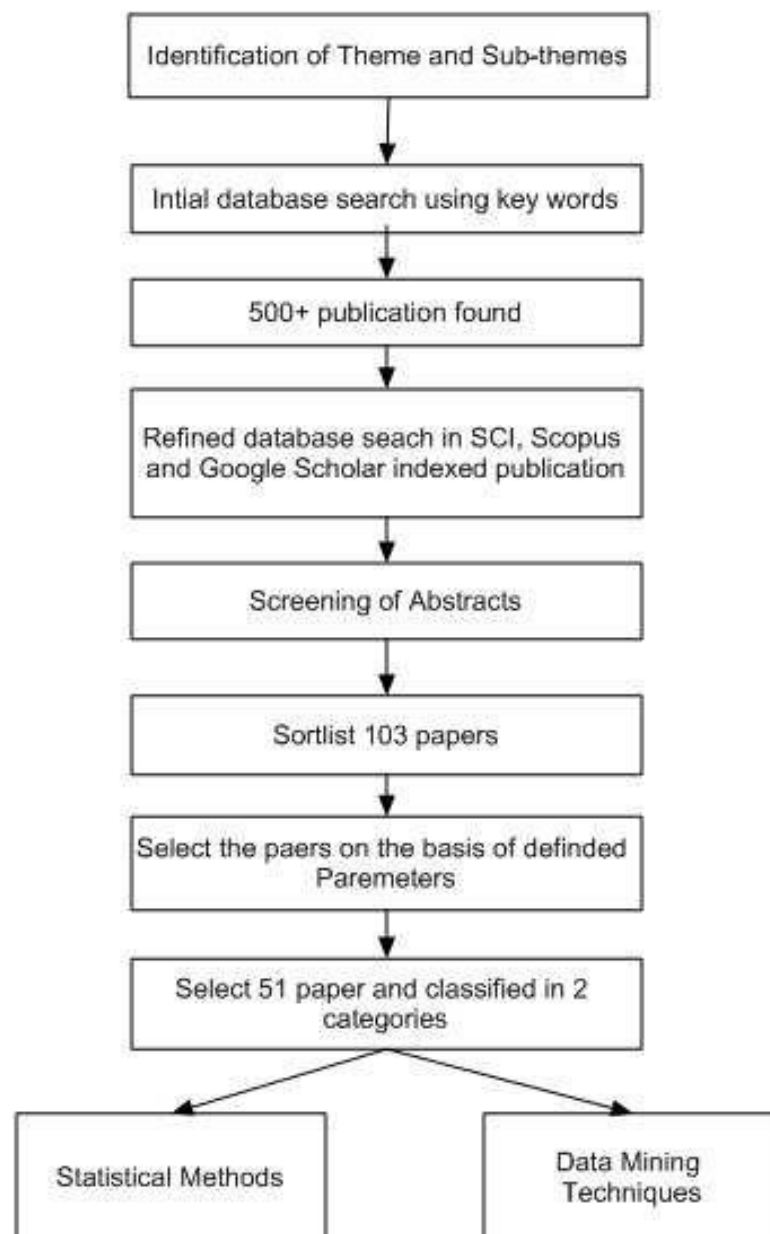
SES in early stages of life and childhood fatness is found in their systematic review **“Childhood predictors of adult obesity: a systematic review”**. In their study, there was almost no findings for an influence of action in the period of infancy and in the lateral stage of life on later fatness. The basic objective of this study is to identify the various factors in early childhood which is going to influence the progress the process of obesity in later stage of life. They also found that offspring of obese parents either mother or father or in case both the parents, it is seen that the risk of fatness is significantly increased. The relative impact of genes into the risk of fatness given by obese parents and several inherited lifestyle factors in relation to the parent-child fatness relation found to be unknown. (Parsons TJ, 1999)

CONCLUSION OF LITERATURE REVIEW

From the literature review it is concluded that, the undernutrition in the aggregate including fetal growth restriction, stunting, wasting and deficiencies of vitamin A and zinc including optimum amount of breastfeeding to the newborns is a leading cause of child in the country. It is also concluded that, the long term duration of exclusive breastfeeding practices is inversely as well as linearly correlated with the risk of overweight in children. With the exclusive breastfeeding, the risk of overweight was found to be significantly reduced. Children growth and development intervention in this kind of segment mainly benefit developmental consequences of nutrition where on the other side nutrition of child can benefit both developmental as well as nutritional status of the child.

RESEARCH METHODOLOGY:

For getting the relevant literature for my review project I had gone through PubMed, Google search engine. Further, for getting more appropriate result based on out title **“Child Nutrition And Health: Review Of The Benefits, Crisis And Challenges In India”** I have searched reference list of all primary and review articles that we have shortlisted on the key words such as ‘childhood nutrition, determinants, diarrheal diseases, crisis, problem burden, intervention strategies and existing policies’. For getting more information on child nutrition and health, I have also studied critical review and analysis of these programmes and related published books apart from the database of government based nutritional programmes. After that, all shortlisted were thoroughly studied and relevant data was collected, summarized, and analysed.



IDENTIFICATION OF THEMES AND SUB-THEMES

It is important to recognise that themes in qualitative research are not hiding in the data, waiting to be 'discovered' by the researcher. As such, they are pragmatic tools to help the researcher produce their account of the data.

Before starting to select of topic, I have gone through different themes that can match my field or the job profile. As infant or child nutrition is the stage in a human's life associated with growth and development, I have selected Infant Nutrition as my theme. Again, in Infant nutrition there are several more sub-themes which can be taken into consideration like infant malnutrition, undernutrition, obesity, child stunting, wasting and so more. So, in sub-themes I have selected Child nutrition and their health as a concern with the above-mentioned topics are selected.

INITIAL DATABASE SEARCH USING KEYWORDS

Keywords are important because they tell search engines about the content of your website's page. "Keyword" is also a term that's used to refer to the words and phrases that people enter into a search engine to find information that they're looking for. After selecting themes and sub-themes, there is one more important point to consider is searching for more appropriate database with using matching keywords to the themes and sub-themes selected. So, different keywords such as Childhood, Nutrition, Breast feeding, Growth and Development, serving sizes, Breastfeeding, Baby Friendly were selected as it is matching perfectly to the themes and sub-themes that I have selected.

KEYWORD SERACHING

Keywords searching are a tool to help indexers and search engines find relevant papers. If database search engines can find your journal manuscript, readers will be able to find it too. This will increase the number of people reading your manuscript, and likely lead to more citations. Keyword search is again important for getting more appropriate results for your paper that matches your themes and sub-themes.

After selecting the keywords that can show the more appropriate match, I have searched the topic on SCI, Scopes and Google scholar with the keywords Childhood, Nutrition, Breast feeding, Growth and Development, serving sizes, Breastfeeding, Baby Friendly. After searching I have got more than 500 different articles that can match my themes and sub-themes.

SCREENING OF ABSRACT

Abstracts are meant to highlight key elements from the document's primary sections and to explain what the study is about. Effective abstracts contain enough information for readers to quickly classify the paper as relevant (or not) to their clinical or research interests. Abstract screening is a method of determining whether or not the study reported satisfies any of the exclusion criteria by reviewing article titles and abstracts. The title/abstract is deleted if it meets a single exclusion condition.

Following a keyword search that yielded over 500 articles, I combed through the abstracts of these articles to find more specific articles that would fit my themes and sub-themes better. After screening the abstracts, I've narrowed down the field to 103 papers.

DATA MINING

The technique of looking at vast databases of data in order to generate new data is known as data mining. You would think that data mining entails extracting new data, but this isn't the case; rather, data mining entails extrapolating patterns and new information from data you've already gathered.

Data mining specialists have committed their lives to better understanding how to process and derive conclusions from massive amounts of data, relying on techniques and technologies from the convergence of database management, statistics, and machine learning.

EXISTING POLICIES AND INFRASTRUCTURE:

While addressing India's child malnutrition challenge, Integrated Child Development Services (ICDS) perform a most important task. This Integrated Child Development Services performs various task from mid-level to very high level in child malnutrition aspect. It modulates and organizes supplementary nutrition programme, growth monitoring and promotion, nutrition, and child education, immunisation, health check-ups and health referrals, along with pre-school education for child.

Children who are below five years of age, pregnant women and a lactating woman are the important beneficiaries to this service. For having a successful implementation of this service, it runs a connection of about 1,012,374 Anganwadi Centres all around India and is successfully connected to 8.36 crore beneficiaries.

In 2017, India launched the POSHAN Abhiyaan, with the goal to improve the overall quality as well as quantity of nutrition among newly born infants, pregnant woman, and the lactating mothers. The prime goal of this POSHAN Abhiyaan is to end hunger, achieve food security among children and to improve quality of nutrition among newly born infants.

As per the child public administration is concerned, child nutrition is one of the chronic burdens as well as a long lasting challenge in India. In 1992-93, first national family healthcare survey was found that India was one of the worst performing countries as per the child health indicators. As per the NHFS data, more than half of the children were underweight and stunted and one in every six children in survey was found to be excessively thin (wasted).

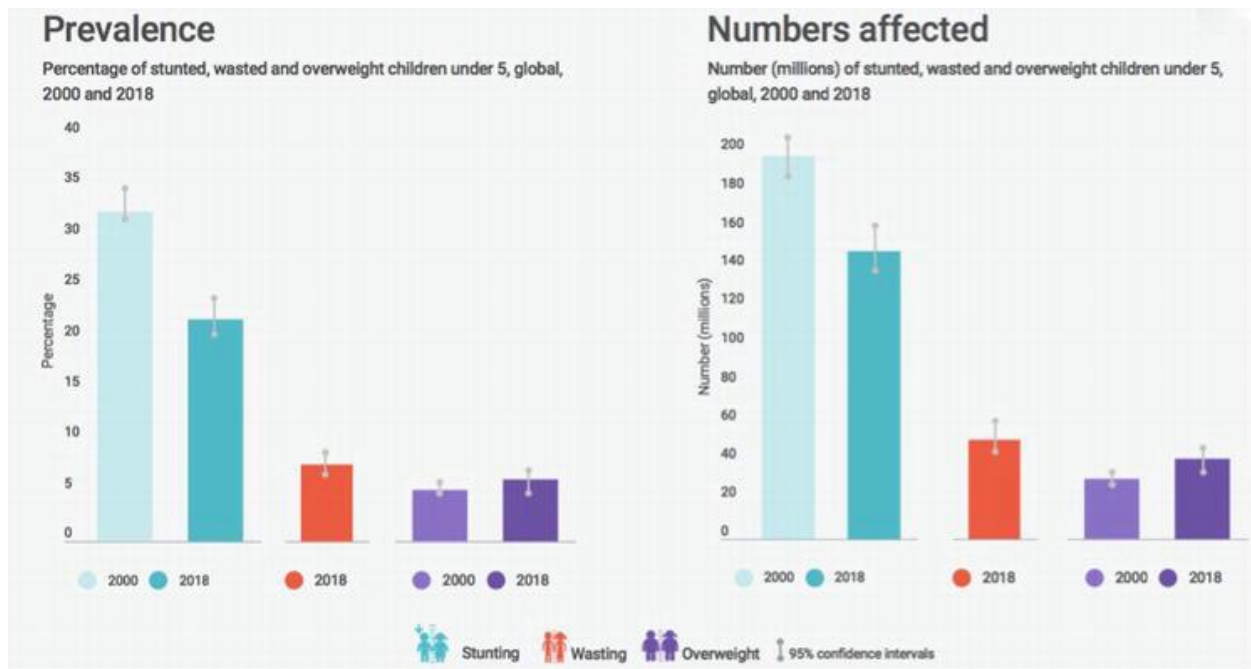
Taken NHFS data in mind, all these conditions could be relatable with the prevalence of chronic malnutrition in infants.

Regardless of so much investment in dealing with the prevalence of chronic malnutrition in India, India's child malnutrition rates are still one of the most alarming chronic burden in the world. Also, the Global Hunger Index (2020) places India at 94th place amongst 107 countries in the world. It is calculated on the basis of total undernourishment of the population, child stunting, wasting and child mortality.

As per the NFHS survey conducted in 2015-16, the prevalence of underweight, stunted and wasted children under

GLOBAL SCENARIO

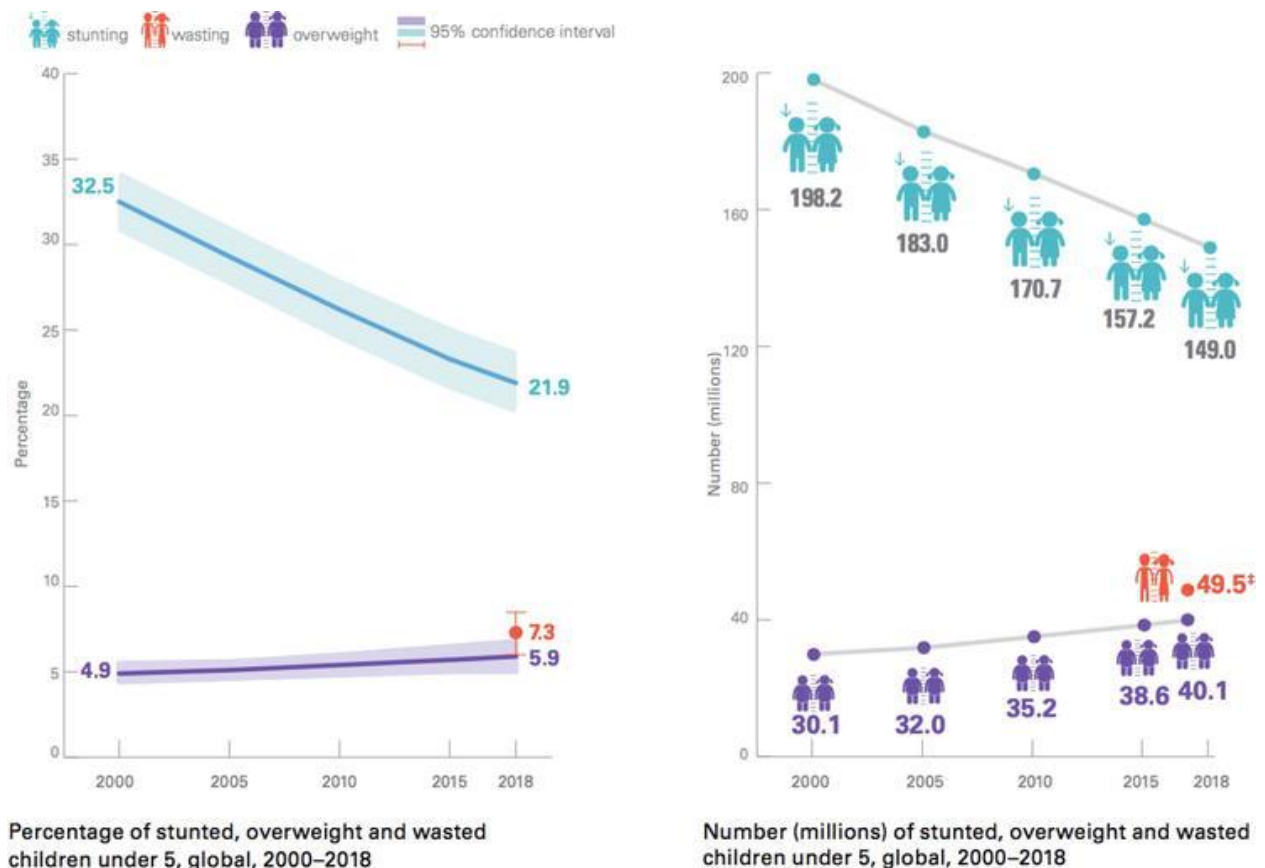
Globally, around 149 million children who are under the age of 5 suffer from stunting. Approximately 49 million children were found wasted under the age of 5 and about 17 million children were found severely wasted in 2018. Since 2000, there are about 40 million children are overweight globally. So, by the reference of the data taken in 2018, it is predicted that, about 25 million more children than today will be malnourished by 2050.



(Source: <https://www.intechopen.com/media/chapter/71300/media/F1.png>)

Figure 1.

Malnourished children under the age of 5 globally.



(Source: <https://www.intechopen.com/media/chapter/71300/media/F2.png>)

Figure 2.

Trends of malnourished children under the age of 5 globally.



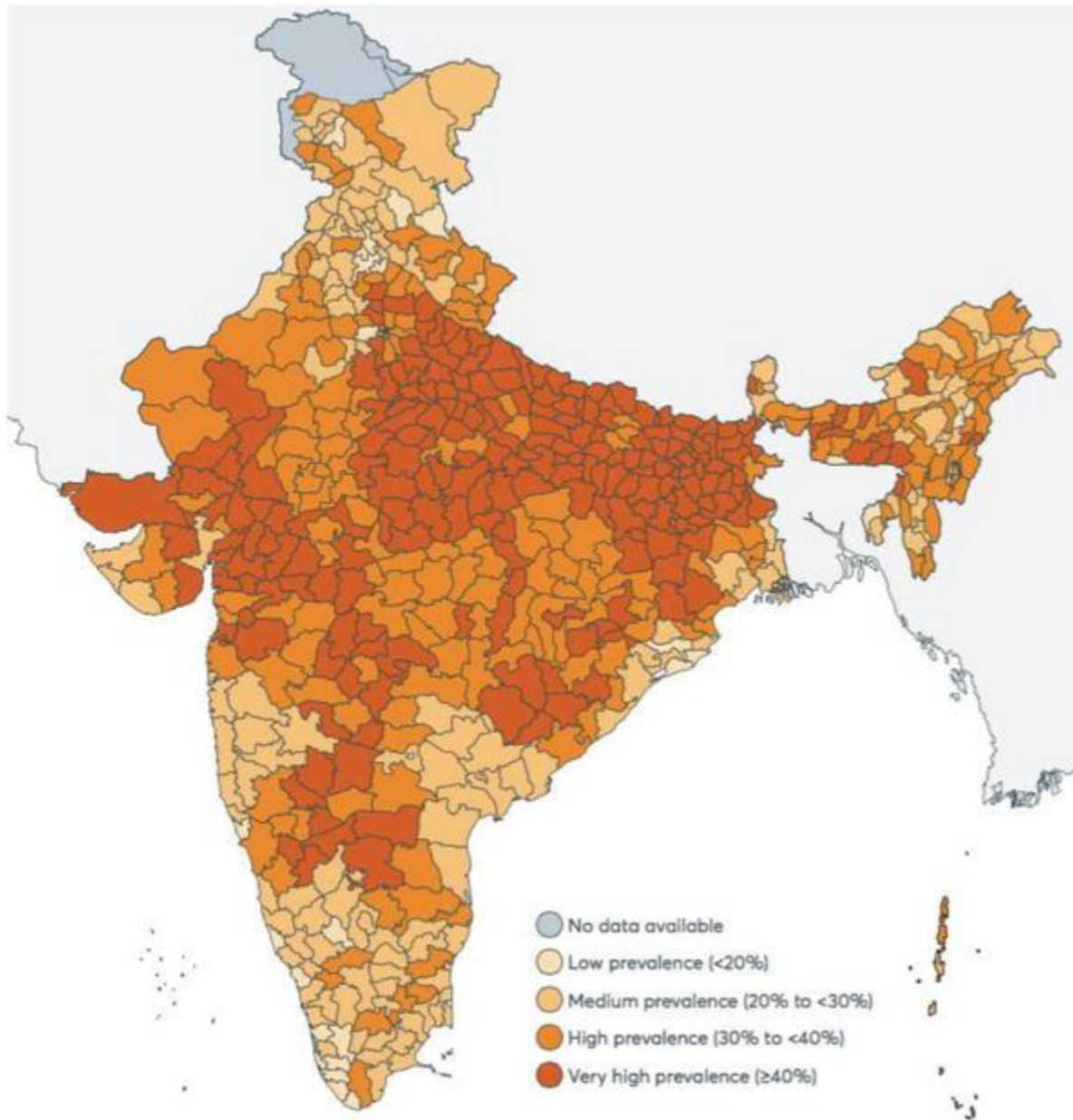
(Source: <https://www.intechopen.com/media/chapter/71300/media/F3.png>)

Figure 3.

Comparative analysis of malnourished children under the age 5 between Asia and Africa.

INDIAN SCENARIO

In India, like many of the other countries, child undernutrition is one of the major nutritional burden leading to underlying cause of child mortality in India. Stunting prevalence pattern is shown in Figure 4. Among Indian districts.



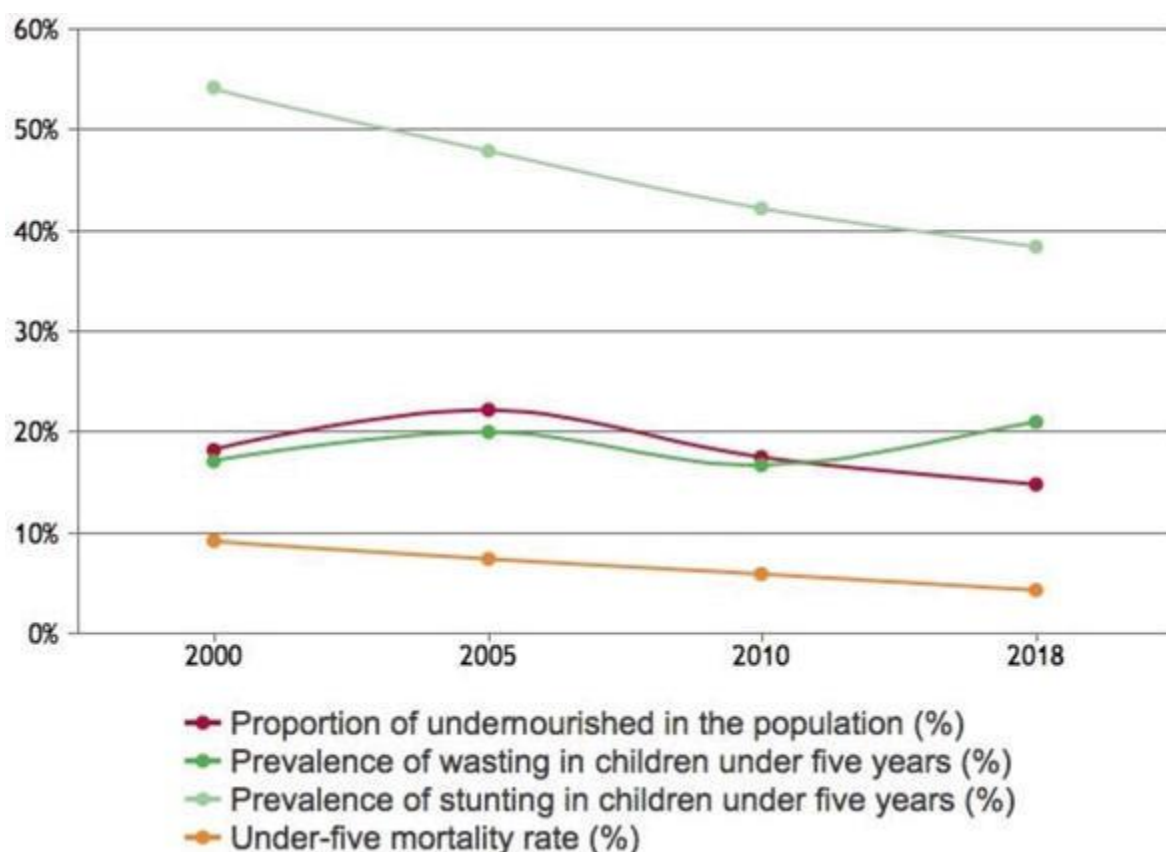
(Source: <https://www.intechopen.com/media/chapter/71300/media/F4.png>)

Figure 4.

Stunting prevalence pattern among Indian districts.

To measure the progress towards MDG (Millennium Development Goals), the prevalence of underweight children under the age 5 was a useful indicator. At the same time Sustainable Development Goals (SDG) give emphasis on end hunger, achieves food security, improves nutrition, and promotes sustainable agriculture. According to recently released Global Nutrition Report, showed that the prevalence of stunting, wasting and overweight at national level as 37.5, 20.8 and 2.4% respectively.

As per the National Family Health Survey (NFHS) V (2014-15), 38.4, 21, 35.7% of children below the age of 5 years suffer from stunting, wasting and underweight, respectively. Whereas, as per NHFS III (2005-06) percentage of stunting, wasting and underweight were found to be 47.9, 19.8 and 42.5% respectively. Also, the prevalence of Severe Acute Malnutrition (SAM) was found to be 7.5% in India. The following figure shows the trends in various nutritional values and mortality rates from 2000-2018 in India.

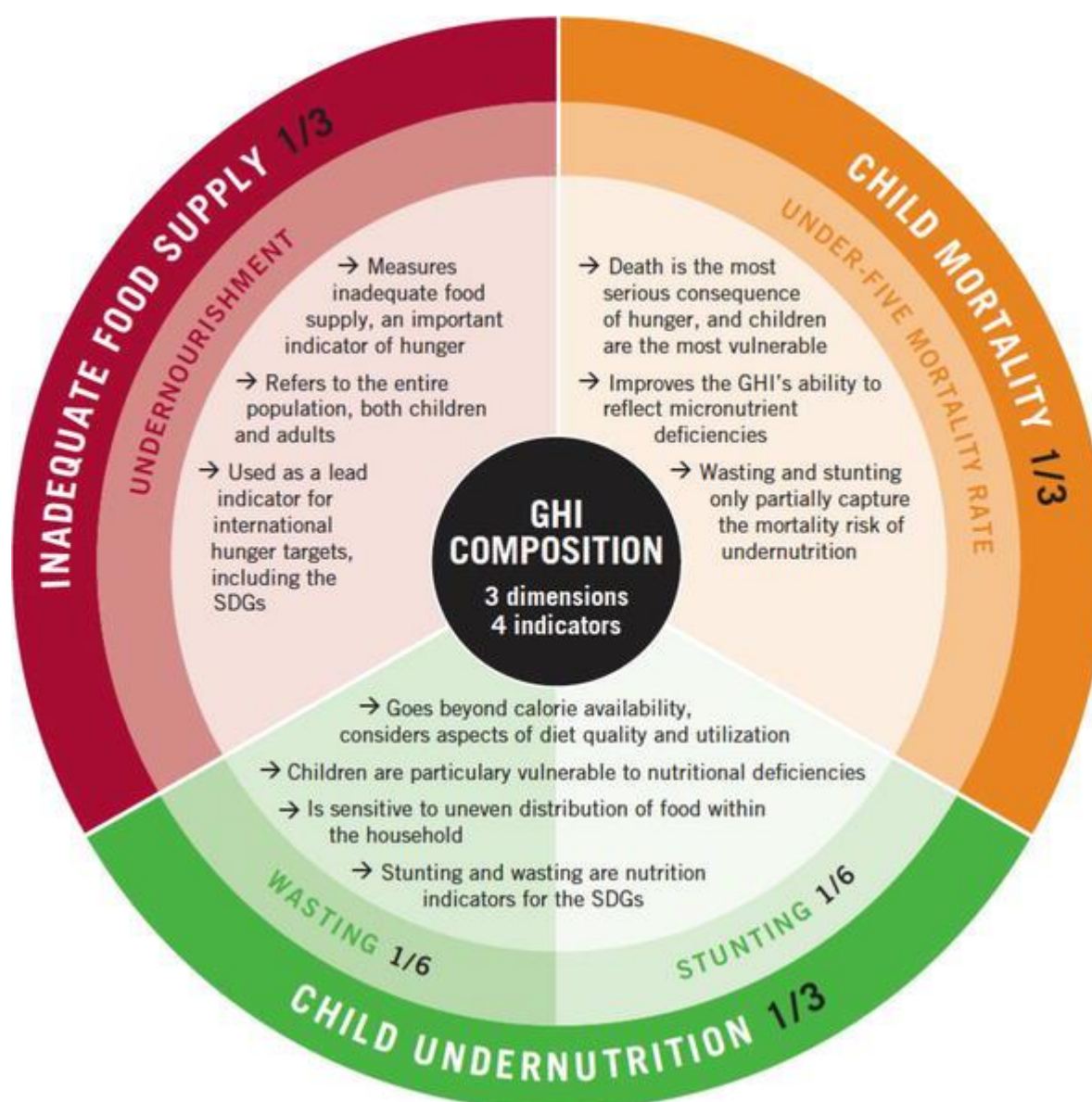


(Source: <https://www.intechopen.com/books/perspective-of-recent-advances-in-acute-diarrhea/childhood-malnutrition-in-india>)

Figure 5.

Trends in various nutritional values and mortality rates from 2000-2018 in India.

As per the Global Hunger Index 2018, India spaces 103rd rank between 119 countries. Form the data given by Global Hunger Index, India suffers from a level of hunger which is very much serious concern with the score of 31.1. The following figure shows the dimensions and indicators of Global Hunger Index in relation to child malnutrition.



(Source: <https://www.intechopen.com/books/perspective-of-recent-advances-in-acute-diarrhea/childhood-malnutrition-in-india>)

Figure 6.

Dimensions and indicators of Global Hunger Index in relation to child malnutrition.

HIGHLIGHTS OF THE MALNUTRITION CRISIS IN INDIA

India has world's one-third stunted children: Stunting or low height of age which is caused by insufficient nutritional supply to a baby for a long time and with frequent acute or severe infections. Out of 150.8 million of stunted children in world, India is home to 46.6 million of stunted children according to Global Nutrition Report 2018.



(Source: <https://w.ndtvimg.com/sites/3/2019/09/01003258/Malnutrition-National-Nutrition-Week-2019.png>)

Highest level of child wasting in India: Wasting or low weight for height, is a strong predictor of mortality in India among the children who are under the age 5. The only reason behind this mortality is the significant food shortage as well as disease conditions. As per the data of Global Hunger Report 2018, out of 50.5 million of children 25.5 million children in India who are wasted globally.

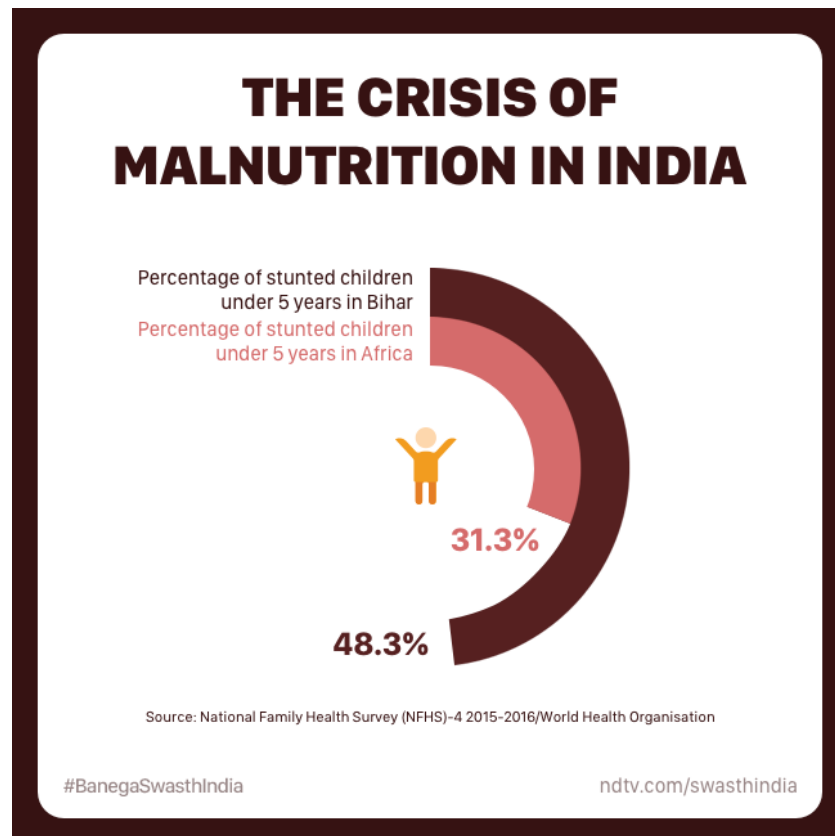


(Source: <https://w.ndtvimg.com/sites/3/2019/09/01003249/Malnutrition-national-nutrition-week-2019-7.png>)

More than a million overweight children in India: Apart from having malnutrition as a biggest healthcare burden in India, it also finds a space in the list of countries that has more than a million overweight children. The other nations with a million of overweight children along with India are China, Indonesia, Egypt, US, Brazil, Pakistan which is stated by the Global Nutrition Report 2018. A joint study which is done by Assocham and EY shows that, along with undernutrition as a biggest healthcare burden, Urban India is also facing with undernutrition as another healthcare challenge. The “Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systemic analysis for the Global Burden of Disease Study 2013” report states that India has the third most obese children in the world after US and China. As per the data given by World Health Organization (WHO) 2015, India is the diabetes capital of the world, with above 69.2 million of people suffering from it.

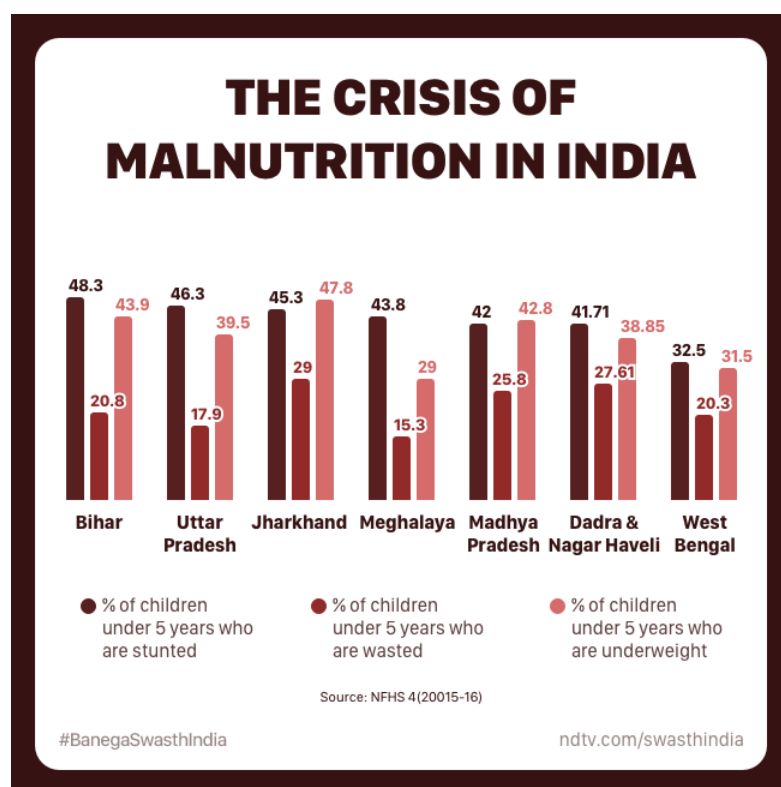
Increasing number of child stunting in India: India’s biggest healthcare survey, the National Family Health Survey (NFHS)-4 2015-2016 shows that above 48% of the children in the Bihar who are under the age 5 are stunted leading to poor nutrition status of the state. It clearly shows that half of the number of the children living in Bihar are stunted. By taking this number into

consideration, as per the data given by WHO, only 31.3% of children living in Africa are found to be stunted. Moreover, World Health Organization (WHO) also reported that more than 43 countries have a lower prevalence rate of stunted children that are present in Bihar's Muzaffarpur. It is not in case of stunting only, even in wasting among children in Muzaffarpur, Africa outperforms.



(Source: <https://w.ndtvimg.com/sites/3/2019/09/01003838/Malnutrition-in-India-Bihar-and-Africa-Comparision.png>)

Five major states of India having most malnourished children in India: National Family Health Survey (NFHS)-4 2015-2016 further reported that, Bihar, Madhya Pradesh, Meghalaya, Jharkhand, Uttar Pradesh, and Dadra & Nagar Haveli, shows that 40% of their children of the total are stunted.



(Source: <https://w.ndtvimg.com/sites/3/2019/09/01003948/Malnutrition-in-India-State-Wise-Data.png>)

Cases of Malnutrition in West Bengal have increased: From the data that is given by National Family Health Survey (NHFS)-4 2015-2016 West Bengal has more “wasted” and “severely wasted” children who are under the age of 5 in relation to the survey held in 2005. In specific, more than 20% of children living in Bihar are found to be “wasted” and about 6.5% children under the age of 5 found to be “severely wasted” according to the NHFS-4 data. Based on the data given by NFHS held in 2005 it is found that 16.9% children in the same age bracket were found to be “wasted” and 4.5% of children who are under the age of 5 were found to be “severely wasted”.

Only 54.9% infants are exclusively breastfeeding, which is helpful to prevent malnutrition:

According to the data given by National Family Health Survey (NHFS) -4 2015-2016, only 54.9% of infant are found to be exclusively breastfeed. It is found that, breastfeed is most important to cure malnutrition. Also, it is found that only 41.6% of infant are breastfed in the first hour of birth as the milk in this specific period contains colostrum which helps the newborn baby to fight against pathogens. The above stated survey also shows that, less than 10%

children able to receive adequate nutrition that is required for the baby to fight against pathogens.

Anaemia in pregnant women will be leading cause of malnutrition in children: According to the report given by United Nations, around 51.4% of women who are pregnant are anaemic which can be a leading cause of the malnutrition in infants after pregnancy. The woman who found to be anaemic in their period of pregnancy find a significant impact on the nutritional status of the new-borns which leads to stunting and underweight in the lateral period.



(Source: <https://w.ndtvimg.com/sites/3/2019/09/01003241/Malnutrition-national-nutrition-week-2019-5.png>)

OBSERVATION AND RESULT:

In low- and middle-income nations like India, strengthening evidence to support health policies is critical. The study attempts to identify malnutrition risk factors by rigorously triangulating data from national household surveys, dietary and nutrition surveys, and other epidemiological studies, estimating population attributable fractions and disability adjusted life years (DALYs) for malnutrition risk factors, assessing prevalence and changes between 1990 and 2017, and stratifying by state Socio-demographic Index. Four major points stand out as having consequences for India's nutrition policies and where nutrition policy initiatives should be directed.

In addition, India accounted for 25.4 percent of worldwide DALYs in 2017 due to child and maternal malnutrition. Second, there is variance across and within states for major malnutrition indicators (total malnutrition in children under the age of 5, low birthweight, stunting, underweight, and anaemia). The Socio-demographic Index (based on income, education, and fertility rate) was used to quantify state disparities in nutrition indicators, which showed a macro income or development effect. Because malnutrition varies by state, governments should establish and guide malnutrition programmes that are tailored to their own conditions within a broad framework, rather than relying solely on national policies. Third, while India achieved progress in lowering the burden of malnutrition between 1990 and 2017, as shown in this study, it is projected to fall short of the nutrition targets established by the National Nutrition Mission (NNM) for 2022, as well as WHO and UNICEF for 2030. Gains and lags in progress differ by state and across time, emphasising the importance of ongoing indicator tracking and periodic assessments driven by ground assessments.

Finally, while undernutrition remains a severe task, the rise in childhood obesity (almost 12 percent) is alarming and risks diverting attention away from India's unfinished business of addressing undernutrition. India has implemented a range of nutrition programmes delivered through schools and community-based institutions (eg, Mid-Day Meals and Integrated Child Development Services) that combine decades-old programme knowledge, along with population-focused approaches (eg, the national adolescent health strategy), and the National Nutrition Mission. Despite these efforts, research suggests that India will fall short of its nutrition targets. To understand why critical malnutrition indicators with long-term effects (such as stunting and anaemia) have remained high, and what underlying reasons remain

ignored by present policy approaches, more reflection and investment in rigorous nutrition science is required.

The fact that the burden of malnutrition varies by state is an important finding in this study, and more research into state-specific factors is needed. Greater decentralisation, state-specific approaches guided by knowledge sharing among researchers and programme implementers, and state think-tanks could be a good place to start. Reflection is also required to comprehend what is working within states and why, as well as to move away from a-theoretical evaluations, with a knowledge of the data on mechanisms and the theory of change. Despite the fact that several programmes have reporting and evaluation processes in place, they frequently lack adequate measurements of malnutrition and its drivers that can provide useful insight into the situation.

FACTORS THAT ARE CONTRIBUTING TO CHILDHOOD OBESITY AND FOOD INSECURITY AND THEIR EFFECT ON CHILD HEALTH

Increase in fast food consumption is directly related to increase in obesity in early stages of life in infants. There are many families around us where both the parents are working all the day even their infant is one year of age, opt for these places as they are often favoured by their family members as well as they convenient and expensive too.

These increased fast-food consumption at various restaurants tend to provide very high number of calories in comparison to nutritional values provided.

Sugary beverages

Sugary beverage use raised BMI by minor amounts over time in children aged 9–14, according to a study conducted between 1996 and 1998. [18] Another element that has been investigated as a possible contributor to obesity is sugary drinks. Sugary drinks are frequently assumed to be restricted to soda, although they also include juice and other sweetened liquids.

Snack foods

The use of snack foods has also been researched as a possible contributing factor to childhood obesity. Chips, baked goods, and candy are examples of snack foods. Many research have been carried out to see if these foods are to blame for the rise in childhood obesity. Despite the fact

that snacking has been demonstrated to increase overall calorie consumption, no studies have been conducted.

Portion size

In the last ten years, the average size of a portion has climbed dramatically. Excessive caloric intake is a result of eating large portions and snacking on high-calorie items frequently. Weight growth and, as a result, obesity can result from this energy imbalance.

Activity level

Sedentary behaviour is one of the most major variables connected to obesity. Obesity prevalence increased by 2% for every additional hour of television watched every day. [18] In recent years, television viewing among young children and teenagers has risen considerably. [18,27] The quantity of time spent in sedentary behaviours has increased, while the amount of time spent in active activities has dropped.

Environmental factors

While excessive television consumption and other electronic media have led to sedentary lifestyles, other environmental issues have diminished physical activity chances. Physical activity opportunities and safe locations to be active in have declined in recent years.

Socio-cultural factors

Obesity development is also influenced by socio-cultural variables. Food is frequently used as a reward, a tool of controlling others, and as part of socialising in our society. These uses of eating can stimulate the formation of unhealthy food connections, raising the risk of obesity.

Family factors

Family factors have also been linked to an increase in obesity cases. The foods that youngsters eat are influenced by the sorts of food available in the house and the culinary preferences of family members. Furthermore, the sort of food consumed and the amount consumed might be influenced by family mealtimes. Finally, the child is influenced by the family's habits, whether they are sedentary or physically active.

Psychological factors

Depression and anxiety

According to a recent study, the majority of studies show a link between eating disorders and depression in the long run. [30] However, this link is not one-way; obesity can be both a cause and a result of depression. [31] Furthermore, compared to non-obese controls, obese adolescents had a higher lifetime prevalence of anxiety disorders.

Self-esteem

In terms of self-esteem, research findings comparing overweight/obese children to normal-weight youngsters have been inconsistent. [34] Obese children exhibit decreased self-esteem in some research, while non-obese youngsters do not. [35,36,37] There is some agreement in the research that using a global approach to self-esteem measuring with overweight/obese children is misleading because the physical and social factors are different.

Body dissatisfaction

At all ages, research has consistently demonstrated that guys are more satisfied with their bodies than females. [39] Gender disparities in attractiveness may reflect westernised cultural norms of beauty, in which thinness is the only culturally defined ideal for girls, whereas males are pushed to be both slender and muscular. For girls, there is a linear association between body dissatisfaction and increased BMI; however, for boys, there is no such relationship.

Eating disorder symptoms

Characteristics linked to eating disorders tend to be prevalent in teenage obesity populations, especially among girls. [42] Obese children/youth have a higher prevalence of eating-related pathology (such as anorexia, bulimia nervosa, and impulse regulation), according to a number of studies.

Emotional problems

A review of 10 published studies with sample sizes greater than 50 over a 10-year period (1995-2005) revealed that all participants reported some level of psychosocial impact as a result of their weight status in one of the few studies to investigate the psychological impact of being overweight/obese in children. [45] Being younger, female, and having a greater sense of loss of control over food.

Consequences of childhood obesity

Obesity in children has a significant impact on their physical health, social and emotional well-being, and self-esteem. It's also linked to poor academic achievement and a decrease in the child's quality of life. The following sections delve more into these potential implications.

Medical consequences

Obesity in children has been linked to a variety of medical issues. Fatty liver disease, sleep apnea, Type 2 diabetes, asthma, hepatic steatosis (fatty liver disease), cardiovascular disease, high cholesterol, cholelithiasis (gallstones), glucose intolerance and insulin resistance, skin conditions, menstrual abnormalities, impaired balance, and orthopaedics are just a few of the conditions that can affect your health.

Socio-emotional consequences

In addition to being linked to a slew of physical issues, childhood obesity has a negative impact on children's and adolescents' social and emotional well-being. Obesity has been called "one of the most stigmatising and least socially acceptable paediatric conditions." [38] Children who are overweight or obese are frequently mocked and/or bullied because of their weight.

Academic consequences

Obesity in children has also been linked to poor academic performance. According to a study, overweight and obese youngsters were four times more likely than their normal-weight counterparts to report having troubles at school. [38] They're also more likely to miss school, especially if they have chronic illnesses like diabetes or asthma, which can hinder academic performance.

Roles of Community Health Workers

Community health workers (CHWs) have functions and responsibilities that are tailored to the specific needs of the communities they serve. The job of a community health worker (CHW) is determined by characteristics such as education, training, life experience, and experience working with certain populations. CHWs can take on the following responsibilities:

- Make links between people who are vulnerable and healthcare providers.
- Assist patients in navigating the health-care and social-services systems.
- Manage vulnerable populations' care and transitions.
- Patients' social isolation should be reduced.

- Determine eligibility for health insurance coverage and enrol persons in it.
- Ensure that healthcare providers serving vulnerable communities are culturally competent.
- Provide information about community health needs to healthcare practitioners and stakeholders.
- Provide culturally relevant health education on chronic disease prevention, physical exercise, and nutrition.
- Advocate for underserved people and communities to obtain health-related services and resources.
- To inform programmes and policies, collect data and transmit it to stakeholders.
- Informal counselling, health exams, and referrals are available.
- Increase community capacity to deal with health challenges.
- Take steps to address the socioeconomic determinants of health.

Studies have found that feeding problems frequently co-occur with sleeping and behavioural disturbances (irritability, poor self-calming, and intolerance to change) in infants and young children, implying that these are symptoms of a common underlying constitutional "regulatory disorder" in infants and young children. A significant portion (36%) of the 47 children identified with failure to thrive at one year of age were found to have oral motor difficulties in a large whole-population survey of children's growth and development, suggesting that these children were biologically more vulnerable to poor eating from birth. (Wolke D, 1994)

Another study found that young infants with gastroesophageal reflux were considerably more likely than controls to have delayed feeding skills and solids ready behaviour. Newborns with ineffective sucking, as determined by tracings on a polygraph at one week and two months, were considerably more likely to have moles in a prospective study of 330 healthy term infants (n=330). Children under the age of three eat predominantly in reaction to hunger or appetite cues, according to several studies, whereas older children's eating is impacted by a combination of environmental (additional food available) and social factors. In addition, children with stunted growth were found to refuse food more frequently and feed themselves much less frequently than children with normal growth. (Mathisen B & J, Feeding problems in infants with gastro-oesophageal reflux disease: a controlled study., 1999)

In response to the third question, the literature reflects the fact that we are currently better at detecting factors contributing to feeding difficulties of any degree than we are at treating them.

While treating feeding difficulties in primary or secondary school is ideal, it is not always possible for parents.

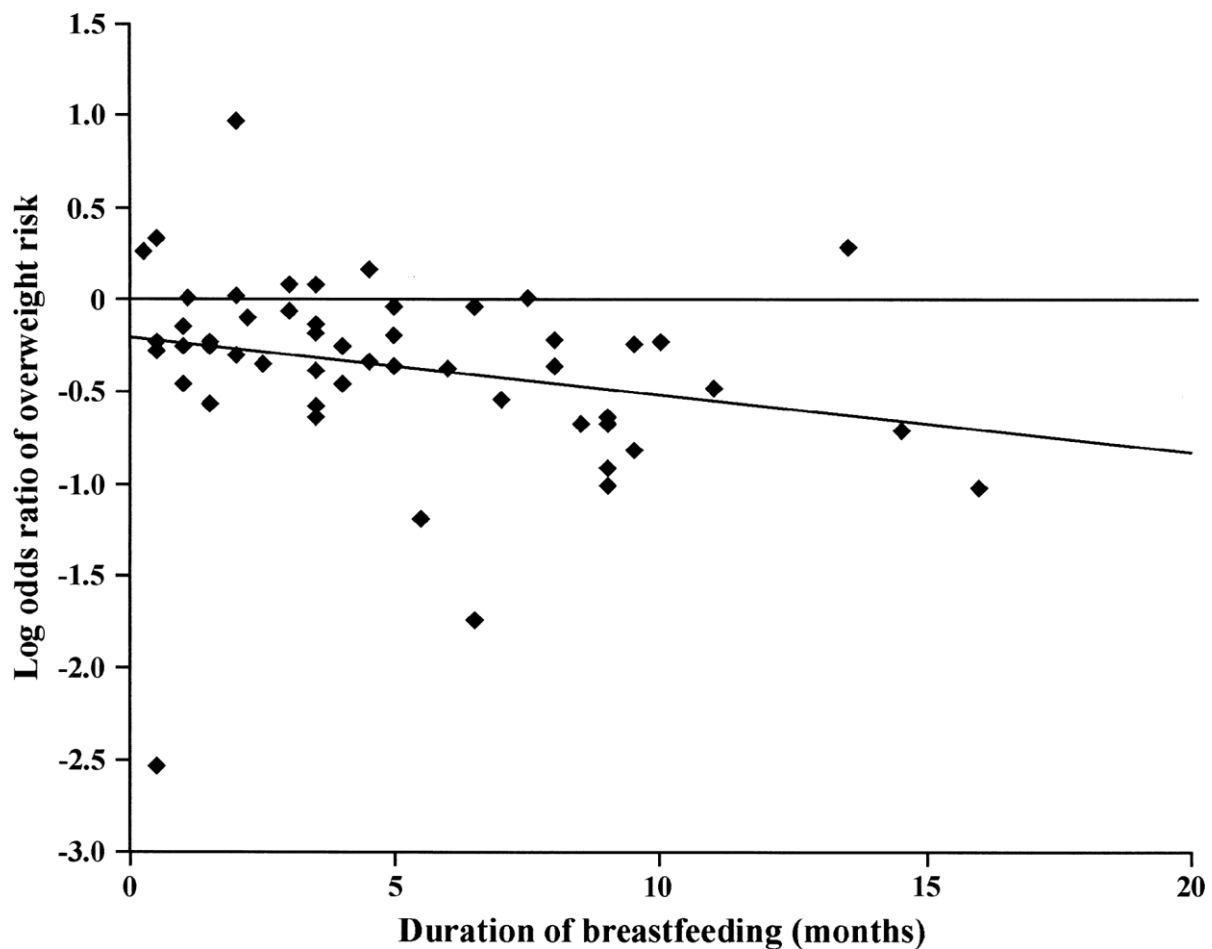
For a good outcome, multidisciplinary teams must collaborate to treat feeding difficulties linked with serious medical conditions, developmental disabilities, and gavage feedings. Finally, studies have indicated that appetite suppressant drugs promote weight gain, making intervention more effective. (Al-Yaarubi S, 2004)

DISCUSSION

Using three independent methodologies, we show that nursing for a longer period of time is linked to a lower risk of becoming overweight. Each of the three strategies employed in our research has its own set of benefits and drawbacks. The form of the dose-response relationship is known to be highly variable in meta-regression research. However, because the duration-specific estimates from one study use the same referent category in each case, the results may be skewed. This disadvantage can be mitigated to some extent by categorising breastfeeding duration into distinct categories. The statistical power, however, is limited in some areas due to the smaller sample sizes. The "pool-first method" is quite versatile in terms of the shape of the dose-response relationship, and it ensures that all included estimates are completely independent. However, because the log-linear model requires a minimum of three categories to calculate the study-specific regression coefficient, the use of this technique in our meta-analysis has to be limited to studies from which study-specific regression coefficients could be calculated. Nonetheless, all three techniques yielded the same result: an inverse linear connection between the two variables. However, it must be remembered that all previous studies on nursing and the risk of becoming overweight were secondary analyses of health surveys or studies aimed to address specific concerns.

The shift in the definition of overweight over time is a crucial methodological difficulty to overcome in a meta-analysis of breastfeeding and obesity risk. We included any definition of overweight and evaluated the probable repercussions of this technique using subgroup analysis, as suggested by the Meta-analysis of Observational Studies in Epidemiology group. In fact, the overweight criterion had a modest impact on the pooled estimate.

Eight of the studies, some only for sections of the data, provided duration-specific, confounder-adjusted estimates. We did not compute a pooled estimate of the confounder-adjusted odds ratio due to the limited sample size and the fact that the type and quantity of confounders varied greatly between these studies. Surprisingly, only three of the 17 studies provided some basic information on ethnicity, usually by claiming the population to have a "mixed" ethnic background. As a result, it's unclear whether the effect of nursing on the risk of being overweight is limited to specific ethnic groups or if it's influenced by social class.



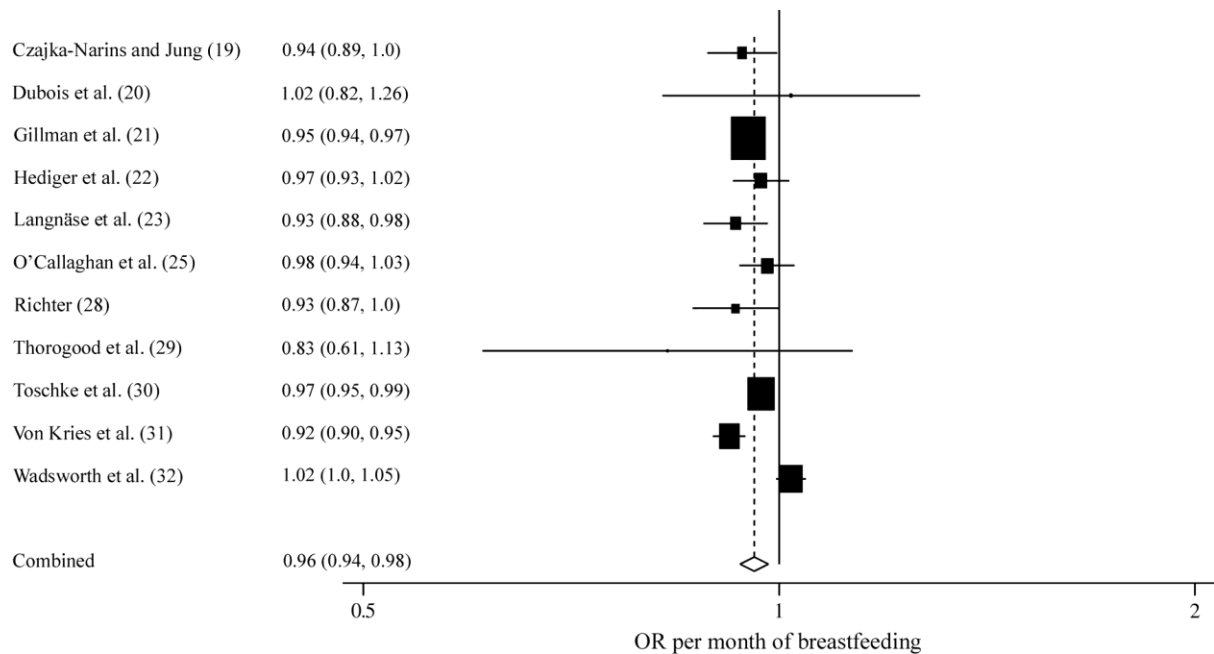
(Source: <https://doi.org/10.1093/aje/kwi222>)

Scatterplot and meta-regression line of log odds ratio of risk of overweight/obesity associated with breastfeeding, according to duration of breastfeeding. A total of 17 studies provided 52 estimates of duration of breastfeeding and overweight. Weighted meta-regression revealed a significant inverse linear relation between the duration of breastfeeding and the risk of overweight (regression coefficient = 0.94, 95% confidence interval: 0.89, 0.98).

Overall, the data could not be used to make a statistically sound judgement about the role of confounding. However, according to Savitz, the presence of a dose-response relationship diminishes the possibility that an association is entirely due to confounding, because increasingly implausible scenarios are needed for the exposure-confounder association to overstate the dosage.

The processes through which nursing reduces the risk of becoming overweight are unknown. Breastfeeding leads to decreased body weight gain during the critical neonatal period, owing to a lower mean calorie intake in breastfed newborns versus formula-fed neonates. Reduced risk of obesity in adolescent and adolescence has been linked to a reduced body weight gain throughout newborn life. The kind of neonatal feeding was demonstrated to alter the

development of neuroendocrine circuits in the mediobasal hypothalamus that regulate appetite control and body weight in animal tests, with long-term implications for obesity risk (refer to reference). These pathways could also explain why breastfeeding for a longer period of time is linked to a greater reduction in risk of overweight in later life.



(Source: <https://doi.org/10.1093/aje/kwi222>)

Odds ratios (with corresponding 95% confidence intervals in parentheses) for overweight, per month of breastfeeding. Studies are ordered alphabetically by first author. The pooled or “combined” odds ratio (OR) was calculated by a random-effects model.

In conclusion, we discovered that breastfeeding time is inversely and linearly related to the chance of being overweight. Each month of nursing reduced the risk of becoming overweight by 4%. This impact was independent of the definition of overweight and age at follow-up and lasted up to 9 months of nursing. Even though the link is viewed as being of minor magnitude, if it is causal, it may be significant for the general population. Because the bulk of the research reviewed here utilised partially breastfed patients, it's possible to conclude that, in addition to exclusive breastfeeding, extended partial breastfeeding up to 9 months leads to a lower risk of obesity later in life, which could be beneficial.

CONCLUSION:

From the facts and discussion that we have seen above, shows the disturbing insufficiently higher prevalence rate of child mortality and acceptance of increased malnutrition all over in the Indian communities. But at the same time, it is very clear that it is preventable as we all treatable. Apart from health as a concern, malnutrition is affecting the overall social as well as economic development of the nation. In Indian point of view, several factors such as poverty, maternal health illiteracy, low birth weight, diseases like diarrhoea, home environment, dietary practices for the newborn, hand hygiene practices as well as poor hygiene are some of the important parameters which are responsible for very high prevalence of malnutrition in India.

The Government of India is trying extremely hard to get nutrition back on track by implementing a number of community nutritional programmes to address India's biggest healthcare burden, malnutrition. Based on data from the past two decades, India has made significant progress in addressing hunger and undernutrition, particularly in rural regions, despite great hurdles. However, the rate at which this significant transformation is occurring has been excessively slow and uneven, leaving many people behind. However, with continued prioritisation, improved financial allocation, and a complete, coordinated, and holistic approach combined with solid governance and the assistance of civil society, India has the ability to confront and end the world's largest healthcare crisis.

LIMITATIONS

There are some limits to consider: First, omitting factors may cause estimates to be skewed. Better maternal health indicators, campaigns/programs/other structural improvements, public health service availability, and environmental factors that may have influenced children's nutritional status were not included in the study due to a lack of data. Finally, as we have shown in this study, child malnutrition varies greatly among India's geographical regions. We are unable to investigate what causes these spatial heterogeneities of undernutrition at a state or district level due to data limitations (most notably small sample sizes).

RECOMMENDATIONS

In India, child malnutrition is a complicated issue that necessitates a systematic overhaul of the public administration and service delivery institutions, as well as community participation. It is critical to invest in the infrastructure of the ICDS and Anganwadi centres, as well as their coverage.

This has been the focus of certain district-level efforts. For example, in Odisha's Angul district, which has a significant geographically isolated tribal population, grievance redressal camps are set up on a regular basis in locations far from Anganwadi centres to provide ICDS services.

There is also a need to address gaps and inefficiencies in the current system through public awareness, community engagement, and empowerment; such an intervention would help the community realise their rights and entitlements, and thus act as a deterrent to inefficiencies and gaps; it would also aid in developing community-based solutions to malnutrition, relieving the burden on the already overburdened public sector.

Such community-based remedies have been found to be beneficial in relieving the situations of children suffering from severe acute malnutrition in India, according to studies.

It's also critical to improve inter-departmental coordination and resource allocation using real-time data. In this sense, Bangladesh's strategy has shown to be effective and reproducible in India.

To tackle child malnutrition, Bangladesh's National Plan of Action for Nutrition 2016-2025 is built on a multi-sectoral convergence strategy that includes health, education, agriculture, fisheries, and livestock, environment, social protection, women empowerment, and disaster management.

Some of the tenets in the policy framework of POSHAN Abhiyaan and Mission POSHAN 2.0 include improving the infrastructure and reach of Anganwadi Centres and ICDS, developing community-based solutions, facilitating interdepartmental convergence, and revamping the now defunct real-time data monitoring system.

However, far more administrative and political determination is required to bridge the gap between what has been accomplished and what is needed.

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