STM JOURNALS

Research & Reviews: Journal of
Food Science & Technology

https://journals.stmjournals.com/rrjofst

ISSN: 2278-2249 (Online)
ISSN: 2321-6468 (Print)
Volume 14, Issue 1, 2025
January—April
DOI (Journal): 10.37591/RRJoFST

Research RRJoFST

Intergenerational Cycle of Malnutrition & Ill Health

Neetu Saharan[1,*] Sakshi Chaudhary[2], Amit Kumar[3]

Abstract

Malnutrition is a pervasive global issue that significantly undermines the health, productivity, and overall development of individuals, particularly in low-income and developing regions. It affects all age groups but disproportionately impacts young children and women, perpetuating an intergenerational cycle of ill health and poverty. Factors such as economic disparities, lack of education, and entrenched social inequalities exacerbate the prevalence of malnutrition, making it a critical barrier to achieving sustainable development goals. This paper delves into the multifaceted nature of malnutrition, focusing on the vicious cycle it creates, where undernourished mothers give birth to underweight children, perpetuating a cycle of poor health and diminished economic prospects. Special emphasis is placed on the role of early childhood nutrition, particularly for girls, as they are the future bearers of the next generation. The severe impacts of protein-energy malnutrition (PEM) are discussed, highlighting its role in stunting physical growth, impairing cognitive development, and reducing life expectancy. Practical solutions such as the use of fortified weaning foods, culturally appropriate home-based food preparations, and community-led initiatives to enhance infant and maternal nutrition are explored. The paper also provides evidence-based strategies to break this intergenerational cycle by promoting gender equality, improving access to education, and ensuring food security, thereby paving the way for healthier generations and sustainable development.

Keywords: Malnutrition, intergenerational cycle, protein-energy malnutrition, weaning foods, infant nutrition, food allergy, dietary intervention, childhood mortality, sustainable development, anemia

INTRODUCTION

Malnutrition remains a persistent global issue, particularly in low-income and rural areas, where food insecurity and inadequate healthcare access contribute to chronic undernourishment. The intergenerational cycle of malnutrition begins at birth, often with low birth weight, particularly in rural girls, who are at greater risk of dying in infancy. For those who survive, the effects of malnutrition continue throughout their lives, affecting cognitive and physical development. Inadequate complementary feeding, insufficient quality and quantity of nutrition, and delayed weaning contribute to these adverse outcomes. Additionally, the lack of hygiene in food preparation exacerbates the vulnerability of young children to infections [1]. This cycle perpetuates malnutrition through generations, particularly among girls, who face compounded disadvantages due to societal norms. The paper discusses various strategies, including the development of fortified weaning foods, home-based preparation methods, and low-cost nutritional solutions, aimed at breaking this cycle.

***Author for Correspondence**
Neetu Saharan
E-mail: neetukhutail@gmail.com

[1-3] Assistant Professor, Department of Biotechnology, Dr. K.N. Modi Institute of Pharmaceutical Education and Research, Modinagar, Ghaziabad, India

Received Date: December 11, 2024
Accepted Date: December 25, 2024
Published Date: January 07, 2025

Citation: Neetu Saharan, Sakshi Chaudhary, Amit Kumar. Intergenerational Cycle of Malnutrition & Ill Health. Research & Reviews: Journal of Food Science & Technology. 2025; 14(1): 19–25p.

Cycle of Malnutrition and Ill Health Across Generations

Because malnutrition is invisible and is inherited from one generation to the next, it is an even more serious problem. Low birth weight (less than 2.5 kg) is more common in girls born in rural households. She has a far greater chance of passing away in the first few months of life She will be vulnerable to

several developmental deficiencies and is unlikely to make up for the missed growth, even if she lives. Additionally, colostrum deprivation raises the newborn's chance of contracting illnesses.

Delays in supplemental feeding, which frequently occur well after the first year, exacerbate the issue [2]. The amount and quality of meals are just as crucial as the appropriate weaning time. The youngster is provided insufficient amounts of feeds, which are also probably diluted and insufficient to fulfill the infant's growing nutritional needs, as a result of poverty and illiteracy. Additionally, the youngster is more susceptible to diseases if the food is not prepared hygienically using clean utensils.

Children who are girls are more likely to receive worse treatment than boys, which makes the issue much worse. The girl has a far higher chance of being underweight, anemic, and suffering irreparable bodily and mental harm by the time she reaches adolescence. Her early marriage frequently leads to early childbearing and several pregnancies. The mother's anemia and malnutrition have a negative impact on the fetus, which also experiences intrauterine growth retardation, resulting in low birth weight.

Malnutrition of Protein Energy

Protein-energy malnutrition (PEM) is a condition that affects infants and children who eat meals based on cereal and legumes that don't contain enough calories. Feeding cooked cereal in sufficient quantities is frequently challenging due to its bulk and poor calorie density. Low-cost weaning foods that can be created with basic technologies have been developed. Although they are mostly made up of grains and legumes, malted ready-to-eat mixtures with low viscosity and strong growth-promoting properties show a lot of promise.

One of the most effective ways to address protein energy malnutrition (PEM) in low-income populations, according to the Nutrition Institute in Cairo, Egypt, is to cleverly combine cereals and legumes to create inexpensive, high-nutrient weaning foods. The bulk factor is one of the primary barriers to improving the energy and nutritional density of weaning foods made from cereals and legumes. This study explored a few easy home processing techniques to enhance the nutritional value of home-prepared weaning foods and assessed the chemical and biological properties of processed weaning foods. According to biochemical analysis, wheat germination increased its protein and fat content and decreased its carbohydrate content, but there was essentially no effect on lentils [3,4]. When comparing germination with a unique "chapati" procedure, the formula treated using the former method had more protein and fat content, while the formula processed using the later method had higher mineral content. According to a biological evaluation of the formula processed using the two distinct ways, germination obtained the highest PER and NPU, which were 2.02 and 81.0 and 1.70 and 40.0, respectively, when compared to chapatti process figures. Germination of the ingredients of weaning foods of vegetable origin appears to be a good choice of the straightforward home processing procedure, while more research is required.

Figure 1. Severely malnourished infant.

Figure 2. Two malnourished babies in cloth.

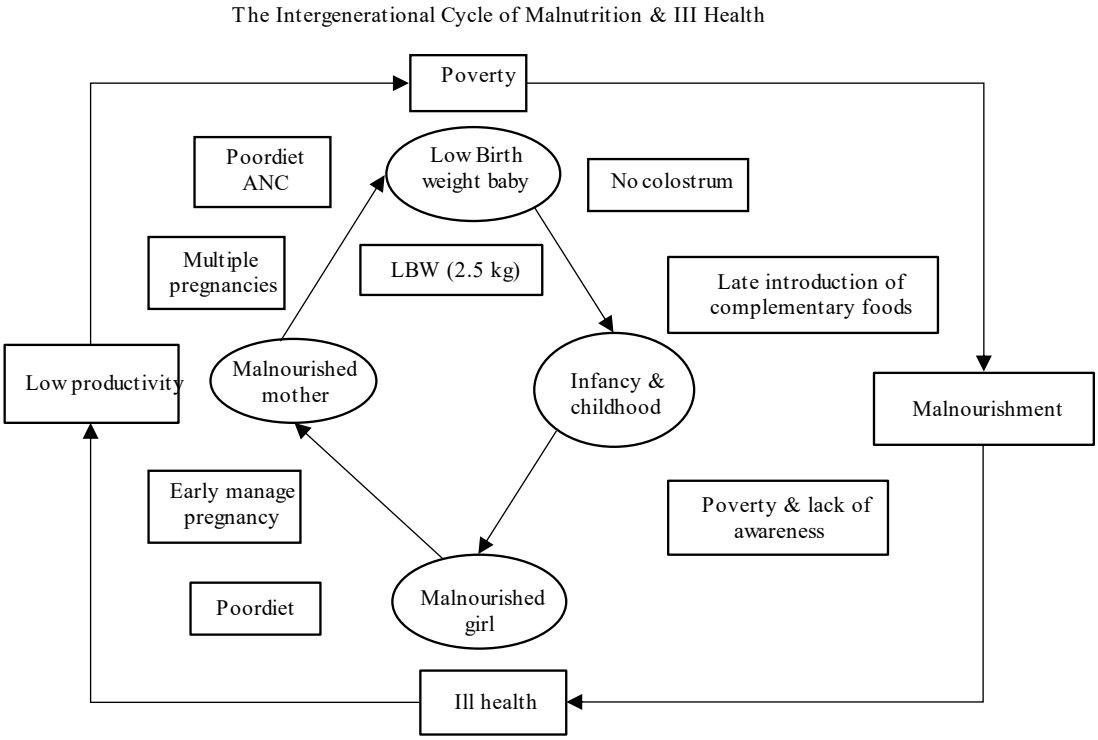


Figure 3. The Intergenerational cycle of malnutrition and ill health.

Persistently Malnourished

In Maharashtra, India, under-five mortality is 58 fatalities per 1000 live births, or 1 in 17 children, and 40% of mothers and children suffer from chronic undernutrition. Dehydration from diarrhea, the most easily preventable cause of childhood mortality, accounts for a significant portion of these deaths.

According to J. MILÁN-CARRILLO, C. VALDÉZ-ALARCÓN, R. GUTIÉRREZ-DORADO1, O. G. CÁRDENAS-VALENZUELA, R. MORA-ESCOBEDO,J. A. GARZÓN-TIZNADO and C. REYES-MORENO In the majority of poor nations, malnutrition is one of the leading causes of morbidity and mortality in young children. Low-cost newborn supplemental foods have been created to reduce the risks of malnutrition, and state-sponsored nutrition intervention programs are currently providing them to those in need. Finding the ideal ratio of nixtamalized extruded quality protein maize (NEMF) and extruded chickpea (ECF) flours to create a weaning food and assessing the nutritional qualities of both the optimized NEMF/ECF mixture and the weaning food were the two main goals of the current study. Extrusion temperature/screw speed combinations of 79.4°C/73.5 rpm and 150.5°C/190.5 rpm were used to make the NEMF and ECF, respectively.[5] To find the best NEMF/ECF combination, response surface methodology was used; 11 tests were produced using the experimental design.Each assay's mixtures were assessed for available lysine (AL) and true protein (TP). Eleven weaning foods were prepared using each of the eleven mixes, and their acceptability was assessed by sensory evaluation (A). For creating a weaning food, the ideal ratio of NEMF to ECF was 21.2% to 78.8%. The global desirability (D) of this blend was 0.93; it contained 20.07% proteins (DM), 5.70% lipids (DM), and With the exception of tryptophan, its essential amino acid (EAA) profile adequately met the EAA needs for children ages 2 to 5. Its carbohydrate content was 71.14%. Infants' growth may be supported by the weaning food made with the optimized mixture because it had great digestibility and protein quality.

Home Made Weaning Food

A thick creamy porridge made from the basic food of the community is a good weaning food for babies. The family often eats basic food or staple at most meals because it is less expensive than most other foods. Basic foods include, for example:

(a)

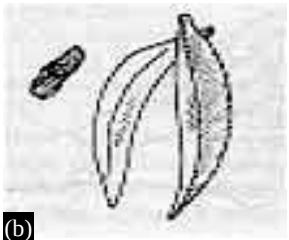
Figure 4. Basic food of the community

Cereals

- maize
- wheat
- sorghum
- oats
- barley
- bread (soaked in gravy, milk, or tea)
- rice

Roots

- cassava
- yam
- cocoyam
- potato
- sweet potato



(b)

Figure 4. Basic food of the community

Starchy fruits

- plantain
- breadfruit
- banana

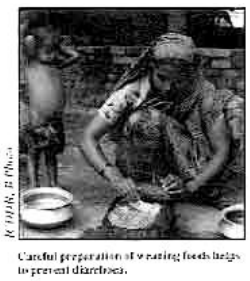


Figure 5. Careful Preparation of Weaning Food May Help Prevent Diarrhoea.

CAREFUL PREPARATION OF WEANING FOOD MAY HELP PREVENT DIARRHOEA

Allergy to Food

Although they are more prevalent in younger children (affecting roughly 5-8% of younger children), true food allergies are less common than most people think, affecting approximately 2% of children. Thankfully, by the time they are three years old, younger kids will outgrow these food sensitivities. Wheezing and trouble breathing, itchy skin rashes, including hives, nausea, vomiting, diarrhea, abdominal discomfort, and swelling in the throat and around the mouth are all signs of a food allergy. These symptoms typically appear minutes to hours after your child consumes the food to which he is allergic. Food allergies typically don't produce nasal symptoms like congestion or a runny nose on their own. Depending on how much of the food the child consumed and how allergic he is to it, the symptoms could be moderate or extremely severe. Anaphylaxis is a severe reaction that can include breathing difficulties, throat and mouth swelling, low blood pressure, shock, and even death. Food intolerances, which can result in rashes, diarrhea, vomiting, and spitting up, are more common than food allergies. Children who have lactose intolerance, which is caused by a lack of the enzyme lactase, which normally breaks down the sugar lactose, are an example of this type of reaction [6,7]. Children who lack this enzyme or whose levels are low have symptoms after consuming foods that contain lactose, including cow's milk. But since this response does it is not a real food allergy.

Common Food Allergies

Cow's milk is the most common cause of food allergies (in addition to being a common cause of food intolerances). Unlike cow's milk intolerance which is usually a reaction to the sugar lactose, allergies to cow's milk are usually from the proteins that are in the milk. Infants who have an allergy to cow's milk based formulas should usually be changed to an elemental or hydrolyzed formula, such as Nutramigen or Alimentum. Soy formulas and goat's milk may not be good alternatives in this case, although they usually are for older children, because many infants with allergies to cow's milk proteins are also allergic to the proteins in soy and goat's milk.

Other foods to avoid if child is allergic to cow's milk include, but are not limited to, buttermilk, cheese, evaporated and condensed milk, ice cream, yogurt, instant mashed potatoes, margarine, casein, cream, hydrolysates, lactalbumin, nougat, sour cream, whey, and other foods made with milk. Older children who are unable to drink milk or eat milk based foods should be sure to have additional sources of calcium in their diet, including calcium fortified juices.

Infant Foods

- The contentious past of infant food packaging in poor nations Background: Nutrition initiatives in poor nations started concentrating financial and technical assistance on the industrial manufacture of relatively inexpensive weaning foods in the 1960s. Many of these items were initially created for institutional markets in the public sector, such as clinics, hospitals, nutrition centers, and food aid initiatives. The next logical and appealing step was to expand product distribution through commercial market channels. This would make a healthy, convenient complementary food widely available to much larger consumer groups, and the profits from product sales could cover production and distribution costs. In developing-county markets, the quantity of branded and packaged weaning foods rapidly increased. During this time, more than 100 commercially distributed products were found by one study (Cordero, 1972).
- Infant food manufacture dates all the way back to the Nestlé Company's founding. 'Farine Lactée', the first product to use the Nestlé name, was created by Henri Nestlé.
- Henri Nestlé was convinced by a doctor in 1867 to give his product to a very sick baby who had been born too soon and was refusing to eat anything else, including his mother's milk. The boy lived because Nestlé's new meal worked. Nestlé's product was never meant to compete with mother's milk from the start. "The mother's milk will always be the most natural nutrient during the first months, and every mother able to do so should herself suckle her children," he wrote in 1869. children."

Figure 6. Infant foods

Figure 7. advise fluoride supplementation.

- The quality and exceptional nutritional content that contributed to the success of baby meals in the early years of the Nestlé firm remain relevant today for the company's extensive line of infant formula, cereals, and baby food. When a mother is unable or decides not to breastfeed her kid, the World Health Organization (WHO) [8,9]. acknowledges that there is a valid market for infant formula. In order to identify issues and find solutions, Nestlé markets infant formula in accordance with the goals and principles of the WHO International Code of Marketing Breast Milk Substitutes. It also actively attempts to collaborate and communicate with the global health community, particularly with the WHO and UNICEF. With more than 125 years of experience as the top infant food maker in the world, Nestlé
- is made available to moms and children worldwide, as well as health authorities and the medical community. Protein, carbohydrate, and fat—nutrients that provide energy—as well as water, a vital nutrient, and the right vitamins and minerals are all included in infant formulae. The calories required to sustain exercise, support growth, and maintain body functions are supplied by the energy nutrients. As a result of general nutrition, they also promote favorable immunological activities. The building blocks required for tissue formation and repair are found in protein. The metabolism of energy nutrients depends on vitamins and minerals. Together with water, minerals assist maintain the body's water balance, control some bodily processes, and are crucial for bone structure [10].
- Normal infants can get all the nutrients they need from standard iron-fortified feeds. If a doctor suggests a formula that isn't iron-fortified, they should also suggest another source of iron. Only in cases when the fluoride content of the water supply is significantly low can a doctor advise fluoride supplementation for infants who are at least six months old.
- Docosahexanoic acid (DHA) and arachidonic acid (ARA), two essential fatty acids regarded as "building blocks" for the development of brain and eye cells, are currently included in newborn formulae produced in the United States. It has been demonstrated that formulas with DHA and ARA offer mental and visual development comparable to that of a breastfed baby.

Food's Self-Life

- As long as the specified storage conditions are met, shelf life tells the consumer how long food can be stored before it begins to decay. A product's shelf life starts as soon as the food is created or prepared. The kinds of ingredients, the manufacturing process, the packaging, and the storage methods all affect how long it lasts. A date mark is applied to the product's label to signify it.
- The length of time a food will maintain its quality while being stored is determined by shelf life testing. A Hazard Analysis Critical Control Point (HACCP) system should be used to control the pathogen content (safety) in foods. Pathogen proliferation can be evaluated by challenge testing or predictive modeling. Nonetheless, there is an unbreakable relationship between product shelf life and food safety. A food's shelf life should include:
- Continue to be safe to consume
- Preserve its flavor, texture, look, and odor. Fulfill any dietary requirements listed on the label.
- Factors affecting a product's shelf life

CONCLUSION

Addressing the intergenerational cycle of malnutrition requires a multifaceted approach. Early intervention, particularly focused on infant and maternal nutrition, is crucial for breaking the cycle. Strengthening complementary feeding practices, improving food quality, and promoting hygiene in food preparation are essential strategies. Furthermore, the development of affordable, nutrient-dense weaning foods can play a key role in improving infant health outcomes. Public health interventions aimed at increasing awareness and providing access to proper nutrition can mitigate the long-term effects of malnutrition. By targeting the root causes of malnutrition and providing sustainable solutions, the vicious cycle of malnutrition and ill health can be broken, leading to better health outcomes for future generations

REFERENCES

1. MILÁN-CARRILLO, J., VALDÉZ-ALARCÓN, C., GUTIÉRREZ-DORADO, R., CÁRDENAS-VALENZUELA, O. G., MORA-ESCOBEDO, R., GARZÓN-TIZNADO, J. A., & REYES-MORENO, C. (Year). "Malnutrition and Weaning Food Development." Journal Name, Volume(Issue), Pages.
2. Nutrition Institute, Cairo, Egypt. (Year). "Protein-Energy Malnutrition (PEM) in Low-Income Groups: Solutions through Cereal and Legume Mixes." Journal Name, Volume(Issue), Pages.
3. Cordero, C. (1972). "The Impact of Commercially Distributed Infant Foods in Developing Countries." Journal Name, Volume(Issue), Pages.
4. Mitzner, H., Scrimshaw, N. S., & Morgan, W. (1984). "The Rise and Fall of Packaged Infant Foods in Developing Countries." Journal Name, Volume(Issue), Pages.
5. WHO/UNICEF. (Year). "The Role of Infant Formula and Breast Milk Substitutes in Developing Countries." WHO/UNICEF Report.
6. Nestlé Company. (Year). "The History of Infant Food: Henri Nestlé's Farine Lactée." Company History, Pages.
7. J. MILÁN-CARRILLO, C. VALDÉZ-ALARCÓN, R. GUTIÉRREZ-DORADO1, O. G. CÁRDENAS-VALENZUELA, R. MORA-ESCOBEDO,J. A. GARZÓN-TIZNADO and C. REYES-MORENO. (Year). "Nixtamalized Extruded Quality Protein Maize and Extruded Chickpea Flours for Weaning Foods." Journal Name, Volume(Issue), Pages.
8. WHO. (Year). "The Importance of Vitamin and Mineral Fortification in Infant Foods." WHO Guidelines.
9. Global Nutrition Report. (Year). "The Status of Nutrition in Developing Countries." Global Nutrition Report, Pages.
10. FAO. (Year). "Food Security and Nutritional Interventions in Developing Countries." FAO Report, Pages.

