



NUTRITION: A PUBLIC HEALTH CHALLENGE**MISHRA D¹, OZARDE Y^{2*} AND LIMAYE D^{1,2}**

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Received 16th Aug. 2021; Revised 20th Sept. 2021; Accepted 08th Dec. 2021; Available online 1st Aug. 2022

<https://doi.org/10.31032/IJBPAS/2021/11.8.6266>

ABSTRACT

Nutrients are components of food in form of chemical compound that helps in proper functioning and health maintainance of an individual. Nutrients helps to fulfills biological and physiological process of our body which is commonly known as Nutrition. It plays an important role to maintain growth, reproduction, overall health and increase immunity to fight against the deadly microorganisms. The condition of imbalance, deficiency or excess of nutrition is known as Malnutrition, which may results in underweight, overweight, low birthweight, under five stunting & wasting, obesity, diabetic, etc. In India, total undernourished population exceeds 14% of the entire population. Among that one in every five children is under weight, one in every three is stunted. Anemia affects more than half of all women of reproductive age. As per Global Nutrition Report 2020, India has 4,66,00,000 children stunted, which places it 3rd in the World. Half of population of children below the age of five years die as result of malnutrition. The nutritional well-being of a population is a reflection of the performance of its social and economic sector and this issue of Malnutrition needs to be taken care properly. There are multiple programs, policies and schemes currently in place by government as well as non- government organizations to address these issues. This review article elaborates on nutritional needs, sources, Malnutrition and disorders associated with it. It also throws light on Nutritional status of India and major schemes introduced by the Government of India to fight Nutrition as a public health challenge.

Keywords: Challenges, India, Malnutrition, Nutrition, Public health, Schemes

INTRODUCTION:

Antoine Lavoisier, known as the "Father of Nutrition and Chemistry," discovered the concept of metabolism at 1770. This concept helps to understand that how the body generates energy from the food that people eat. Elements containing carbon, nitrogen, hydrogen and oxygen were also determined to be the main components of food in the early 1800s, which was subsequently linked to health [1, 2]. Nutrition is the consequence of a well-balanced diet; it encompasses the processes of ingestion, absorption, assimilation, biosynthesis, catabolism, and excretion, all of which provide energy to living organisms. Adequate nutrition is necessary for the healthy growth and development of a living entity. Nutritional deficiencies can result in disorders such as blindness, anemia, scurvy, premature delivery, stillbirth, child stunting, and so on; on the other hand, nutrient excess can result in health-threatening conditions such as obesity, diabetes, and so on [3].

Energy and/or nutritional shortages, surpluses, or imbalances in a person's diet are all examples of malnutrition. India ranks 94th out of 107 countries as per Global Hunger Index 2020 [4]. According to the 2020 Global Nutrition Report, malnutrition is still one of India's most serious problems. This article emphasis on various plans and policies the Indian

government has put in place, including total number of recipients, amount of development, and other details. It would help the reader to know the Nutritional status of India, Challenges faced by Indian population in availing proper nutrition in spite of various government and non-government schemes launched to overcome and improve the Malnutrition state.

Nutrients Types:

There are seven form of nutrients used by the body namely, carbohydrate, protein, fat, vitamin, mineral, fiber and water. These seven nutrients should be consumed on a regular basis by everyone to help in the growth, develop & have a healthy body. It's critical to eat a well-balanced, nutritious diet to be healthy, especially as people get older. Food such as seafood, fruits, nuts, veggies, and seeds are high in antioxidants and anti-inflammatory components, it helps to prevent cognitive decline as people get older, as well as the risk of developing certain neurodegenerative diseases [5, 6].

1. Carbohydrate includes as rice, wheat, cereals, potato, milk, and sugar. These are the body's primary sources of energy.
2. Lipids are often known as fat, which comprises oil, butter, nuts, and seeds, among other things. It is the body's energy source.

3. Protein is necessary for the growth, repair, and maintenance of healthy bodily tissues. Meat, fish, dairy products, beans, nuts, and seafood are all examples.
4. Vitamins which can be found in fruits, vegetables, grains, and cereals, among other things. They are found in a variety of food groups and have a role in a variety of biological processes, involves the maintenance of healthy skin and hair, the development of bones, and release and absorption of energy from food.
5. Minerals including salt, calcium, iron, iodine, and magnesium, among others. It controls a variety of bodily functions, including fluid balance, muscular contraction, and nerve impulse transmission.
6. Fibers aid in constipation prevention, blood sugar control, and gastrointestinal health. Whole grains, legumes, nuts and seeds, as well as fruits and vegetables, are all included.
7. Water is the most important component of human body and a vital nutrient for good health. The regulation of body temperature, the creation of body fluids, the transfer of nutrients, and the removal of

waste products are all key roles of water [7].

Despite the fact that each nutrient serves a different purpose in our bodies, they all work together to keep us healthy.

There are some severe health complication caused by malnutrition, such as

1. Acute Malnutrition-it is the inadequate nutrition in human body which can result into severe & rapid weight loss or failure in weight gain which is also referred to as wasting or thinness [8, 9].
2. Chronic Malnutrition is defined as insufficient nutrition in the human body throughout the course of a long period, resulting in failure of leaner growth, sometimes known as stunting or shortness [10, 11].
3. Acute and chronic malnutrition - a mix of the two, it is caused by being underweight and can result in stunting, wasting, or both [12, 8].

The major health challenges related to malnutrition in India.

1. In India, protein energy malnutrition is one of the severe problem in public health that has an impact on the child during a critical stage of development, and can result in permanent damage later in life. Underweight, stunting, and wasting are all names used to describe PEM. These problem are highly common in India, and it is one of the

- greatest in the world. Children who are malnourished are more sensitive to infection and have a higher risk of dying. The four major areas of PEM determinants are environmental variables such as the physical, social, environmental, behavioral, and biological factors [13, 14].
2. Vitamin A insufficiency - Of the South Asian countries, India has the highest prevalence of clinical and subclinical VAD, with 62 percent of preschool children being vitamin A deficient. These startling findings pointed to a high mortality rate, with 330,000 children dying each year. Night blindness, exophthalmia, and preventable childhood morbidity are all symptoms of VAD. According to a countrywide survey done by the National Nutrition Monitoring Bureau (NNMB), 61 percent of people have subclinical VAD. Night blindness was common among women of reproductive age, with 5% of pregnant women having subclinical VAD. Approximately 12% of these 5% were badly affected by night blindness during pregnancy. Despite massive efforts at all levels to reduce VAD, India continues to be one of the world's leading incidences of subclinical VAD [15].
 3. Anemia due to iron deficiency was prevalent among all women in India. Overall, 32.4 percent of female suffered from mild anemia i.e. is 100-109.99 g/l for pregnant women & 100-119.99 g/l for non-pregnant women, 14.19 percent from moderate anemia i.e. is 70-99.99 g/l and 2.2 percent from Acute anemia i.e. is less than 70 g/l. Women from low-income urban regions had the highest anemia rates and risks. Anemia was identified in 52% of slim women, 50% of women with a normal BMI, and 41% of obese women. [16, 17]
 4. Iodine Deficiency Disorder: All of India's population is vulnerable to iodine deficiency disorder due to a shortage of iodine in the subcontinent's soil and as a result the food produced by that. In India, an estimate of 350 million people consume insufficient iodized salt, putting them at risk of developing iodine deficiency disorder. These figures are based on home coverage of correctly iodized salt, as reported in the 2009 Coverage Evaluation Survey [18].
 5. Higher rate of adult malnutrition, with one-third of the country's adults suffering from it [19].
 6. Severe child malnutrition, which affects about every second kid.

7. Maternal malnutrition, which results in low birth weights.
8. Inappropriate and sub-optimal feeding and caring methods for infants and young children
9. Issues linked to disease prevention and healthcare access.
10. Low nutrition understanding and usage of locally nutritious foods, including nutrient sources [20]
11. Inadequate attention to adolescent females' health and nutrition
12. Inappropriate sanitation and access to safe drinking water [20]

Nutritional status of India

India is the world's second-largest producer of milk and pulses, as well as rice, wheat, sugarcane, groundnut, vegetables, fruits, and cotton as per the United Nations' Food and Agriculture Organization. Despite this, according to the report by The State of Food Security and Nutrition in the World, 2020, [21] 14% of India's population is malnourished. As per the research, India has 189.2 million are undernourished and stunted children account for 34.7 percent of children below the age of five. According to the survey, 20% of India's children under the age of 5 are wasting, which means their weight is very much low as for their height. [22, 23]. The percentage of children who are anemic has reduced from 69.4 percent to 58.6 percent when comparing the nutritional health of India in the National

Family Health Study 2015-2016 to the previous edition of the survey. Children below the age of five who are severely wasted has increased from 6.4 to 7.5 percent, while child stunting has increased from 48 percent to 38.4 percent [24].

Under the age of five, 35% of children in the country are malnourished, according to the incidence of wasting, stunting, and underweight among children under the age of five in each of the examined states. Below 2 standard deviation refers to wasting, stunting, or underweight that is the WHO Child Growth Standards median is two standard deviations behind. Similarly, 3 standard deviation denotes a result that is three below the median standard deviations, indicating that person is malnourished. There is a higher percentage of children with 2 SD wasting, stunting, and underweight in all states than 3 SD of the comparable parameters. Uttar Pradesh has the highest rate of stunting among the nine AHS states (62.0 percent). Stunting rates are similar in Bihar, Madhya Pradesh, and Jharkhand, at 52 percent, 51.5 percent, and 50.5 percent, respectively. Jharkhand has the highest rate of underweight children (45.7 percent). Chhattisgarh had the greatest percentage of wasting in both 2SD and 3SD, at 32.4 percent and 11.5 percent, respectively. While Uttarakhand has the lowest rates of wasting, stunting, and

underweight, these rates are not much lower than those in other states [25].

Schemes and policies to fight against the Nutritional Challenges in India-

To overcome the challenges, the Government of India has made many efforts to fight malnutrition, multiple schemes and policies such as

- Total Sanitation Campaign/Nirmal Bharat Abhiyan (1999-2000)
- Rajiv Gandhi Scheme for the empowerment of adolescent girls (2002-2003)
- National Rural Health Mission (2005-2006)
- Rajiv Gandhi National Creche Scheme (2006-2007)
- Midday Meals (2008-09)

- Integrated Child Development Service Scheme (2008-2009)
- National Rural Drinking Water (2009-2010)
- Pradhan Mantri Maatri Vandana Yojana (2017-2018)

All of these plans are having the ability to alleviate one or more nutritional issues, either directly or indirectly. The Government has given under nutrition a high priority and is executing a number of programs from various Ministries/ Departments through State Government/UT Administration that have the ability to enhance India's existing nutritional situation [26].

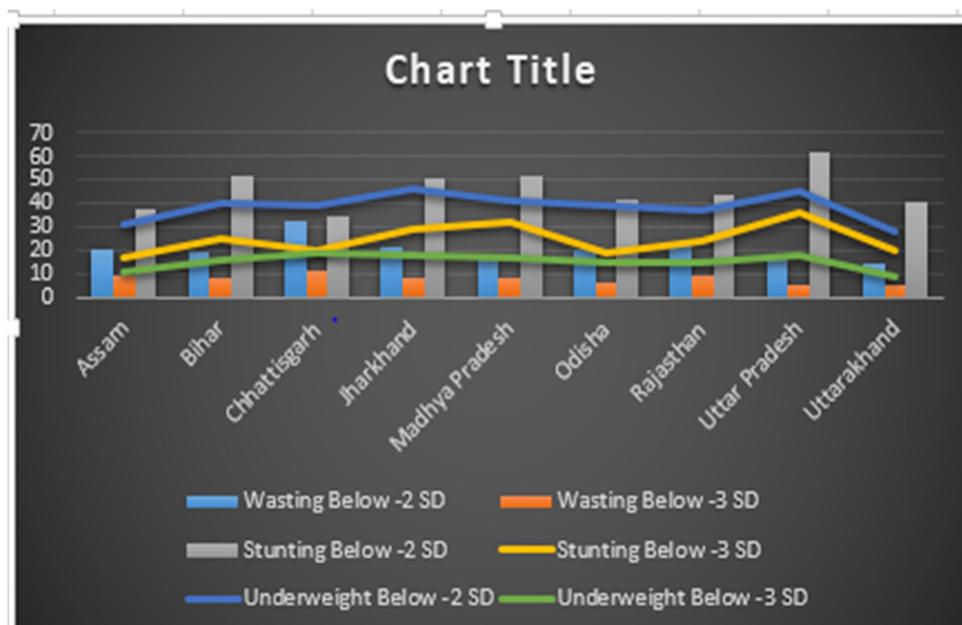


Figure 1 [24]

Total Sanitation Campaign or Nirmal Bharat abhiyaan (1999-2000)

Total Sanitation Campaign was established by the Government of India in 1999 for expediting coverage of sanitation across the country, notably in rural areas. This placed a strong emphasis on public awareness and education in order to raise demand for sanitary facilities, particularly in schools. The Centre started a new nationwide sanitation program in 2012. The Nirmal Bharat Abhiyan (NBA) campaign aimed by 2022, all families in rural areas would have access to toilets. It was also the first program to be merged with the Swachh Bharat Abhiyan [27, 28].

Rajiv Gandhi Scheme for empowerment of adolescent girls

“Sabla” is a government of India-sponsored program that was established on 1st April 2011, under the Ministry of Women and Child Development which is also the other name of Rajiv Gandhi Scheme for Adolescent Girl Empowerment. It was implemented in 205 districts throughout all states and union territories. This program strives to empower teenage girls in between teen age years by providing nutritional healthcare services, and educating about life skills [29]. The main goal of this scheme is to educate about self development and empower, to improve their health and nutritional status, to raise awareness about hygiene, teenage sexual

and reproductive health and also about child care & family. It also helps to upgrade home-based skills integrated by the National Skill Development Program. During 2014-15, Rs 61021.36 lakhs in funds were released under the SABLA initiative, with Rs 58498.58 lakhs being used. Since 2015-16, a total of Rs 27486.79 lakhs has been released to states under SABLA, with Rs 7844.49 lakhs being used. The scheme benefited a total of 10228911 people in 2014-15 and 4868553 people in 2015-16 thus far [30].

National rural Health Mission

The aim of the program is to ensure accessible, inexpensive, and good quality health care facilities to the rural population, particularly disadvantaged groups. On May 1, 2013 The Union Cabinet approved the establishment of the decision, the National Urban Health Mission (NUHM) and the National Rural Health Mission (NRHM) were designated as a Sub-mission of the overall National Health Mission (NHM) [31]

Rajiv Gandhi National Creche Scheme

This Scheme was established in 2006-2007. The creche is a place where parents can leave their children when they go to work. It helps develop physically, emotionally, socially, and spiritually in a stimulating atmosphere. Creche are made to provide group health care and nutritional support to the children aged six and above who

require care, direction, and supervision while they are away from home throughout the day [32, 33].

The scheme's main objectives were to provide childcare for working parents where they can leave their child in between the age of 6 months to 6 years old, it also take care for mothers in the community, to improve nutrition and health status of children as well as themselves. It helps to promote physical, cognitive, social, and emotional development of children and to educate and empower parents. It also aims to ensure a comprehensive service packages that includes day care facilities to sleep, early health examination for children under the age of three. Pre-school Education for children in between the age of three to six years, nutritional supplement (sourced locally), monitoring growth, health check-ups, and immunization. The program is available all over India. Poor children and children with severe nutritional needs would be given priority. This scheme is for both rural and urban areas [34].

The Mid-Day Meal Program

Mid-Day Lunch Program of the Government of India is a meal program aiming at increasing the nutrition status of school going children throughout the country. On week days, children in junior classes enjoy free lunches in Government as well as semi-Government schools, local

body and other innovative educational center [35]. At India, the meal provided by the program is a nutritious, freshly prepared food offered to students at government and schools run by government authorities. It was ordered by the Supreme Court of India said on November 28, 2001 to the local government to execute the Mid-Day Meal Scheme by giving a prepared free lunches to every child in every Government and Government-assisted school. The major goal of Mid day Meal Program is to prevent classroom hunger, boost school enrollment and attendance, improve caste socialization, treat malnutrition, and empower women through work [36]. The Mid-Day Meal Guidelines guarantee that children get enough protein, carbs and micronutrients like iron and folic acid in their meals. At the local level, cooked rice or wheat is blended with lentils or jaggery and topped with oil, vegetables, fruits, nuts, eggs, or dessert, depending on the local staple.

Integrated Child Development Services Scheme (2008-2009)

Anganwadi Services, or the Integrated Child Development Services, was established by Indian government. This program offers meal to preschool children, healthcare at primary level, immunization, free health check-ups & services to kids under the age of six and their mothers [37]. Children below 6 years of age, pregnant ladies & breastfeeding moms are among the

Scheme's beneficiaries. The Scheme's main goal is to improve nutritional status of children below 6 years of age, to help to develop a child's proper mental, physical, and social development and to reduce the numbers of child mortality, morbidity & malnutrition and to attain implementation of policies & its effectiveness & coordination among the various departments [38]. Approximately 3011295 infants in-between 6 months to 3 years of age, 3080374 children in between the age of 3 to 6 years, and 1113572 pregnant ladies and breastfeeding mother are among the ICDS's beneficiaries through April 2020 [39].

National Rural Drinking Water

In 2009, National Rural Drinking Water Program was established. Its purpose was to offer safe drinking water to every rural resident and sufficient water for cooking, drinking and other domestic requirements for long-term period. This essential necessity must meet water quality standards and be easily accessible at all times and under all circumstances. Nirmaan Bharat was developed by the government of India in 2005 as an initiative to rebuild infrastructure in rural area. The first phase of the program ran from 2005-06 to 2008-09, while the second phase ran in between 2009-2010 to 2011-2012. One of Bharat Nirmaan six components is rural drinking water [40].

Pradhan Mantri Maatri Vandana Yojana

This is an Indian government-run maternity benefit program. It was first adopted in 2017 by the department of Ministry of Women and Child Development. It provides a conditional transfer of cash to pregnant ladies and breastfeeding mothers above the age of 19 years and also who give birth to their first child. Its goal is to compensate women for lost wages due to childbirth and childcare, as well as to create normal delivery conditions and good nutrition and breast feeding practice [41]. The program was established in 2013 under the act of National Food Security in 2013. This act implement that option of a cash as a maternity bonus of Rs. 6,000. The main goal of this program is to promote healthy practice, utilization of institutional service during pregnancy delivery and lactation. It also encourages women to follow nutritional and healthy practices, such as early breastfeeding for first six months, and provides cash benefits to pregnant & lactating mothers who improve their health and nutrition [42].

CONCLUSION

Nutrition is extremely important in an individual, society, and community level. When nutrition is insufficient, a country's progress can be jeopardized. People with proper nutrition in a country can learn better, be more productive, and provide

better possibilities to break the cycle of poverty and hunger over a time .Many program and schemes have been developed by the Indian government and many other non-governmental organizations to address these issues. The struggle against poverty and hunger in India is a big task. Despite repeated initiatives by the government as well as non-government organizations, the wrath of starvation continues to loom big in our country. More involvement in both Policy making and Ground level execution of those policies is required. More and more population is needed to be made aware about the importance of nutrition, ways to ensure proper nutrition and develop healthy habits. Infrastructure improvement & upgradation is much needed in order to be more inclusive, and have a better execution of all the schemes to be proposed in future.

Though India have come a long way from what it has started several years back, the battle for Nutrition is still not won, It is needed to make huge strides in form of policies, schemes, welfare works etc., to make sure our country wins this war for nutrition and this looming problem is handled once and for all.

Acknowledgements

The authors are thankful to the Dean and management of School of Public Health, Dr. Vishwanath Karad MIT World Peace University, Pune- 411038, India and School

of Pharmacy, Dr. Vishwanath Karad MIT World Peace University, MIT Campus, Kothrud, Pune-411038, Maharashtra, India for their encouragement and availing the internet and library facilities for this review.

Conflict of interests

The authors report no declarations of conflict of interest regarding publication of this article.

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