

Review Article

A situation analysis on malnutrition by food-intake practices: link to maternal and child mortality in India

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ABSTRACT

Inadequate food and nutrition security affect malnutrition among women and children. This significant global public health issue increases the proportion especially towards maternal and child mortality. Malnutrition poses a grave danger to India's socio-economic progress and maternal and child health improvement. The aim of the study was to understand the linkages between inadequate food-intake practices and their contribution to maternal and child mortality in India. A situation analysis was done using relevant secondary data from National Family Health Survey reports for assessing nutritional status, sample registration system compendium for evaluating mortality reduction, and National sample survey report was used for assessing per-capita consumption of calories intake. Published and unpublished literature, documents were used to identify linkages of food-intake practices, which increase the proportion of malnutrition and mortality. Findings depict a scarce improvement i. e.; only 109 reductions in maternal mortality (SRS 2007-09 to 2017-19), 5.8 per cent and 8.1 per cent reduction in infant and under-five mortality (NFHS-4 and NFHS-5). They are also increasing consumption of low-nutritive-value food items both in rural and urban India pulling into micronutrient deficiencies, resulting in maximising maternal and child mortality. Policies to intervene in the nutrition issues, agri-organic growth, food accessibility and quality utility, and gender equality would play a vital role in changing the food-intake behaviour among women with a significant impact on maternal and child health in India.

Keywords: Malnutrition, Food-intake practices, Inadequate-dietary, Maternal and child mortality, India

INTRODUCTION

There are certain human values, fundamental to protecting people from the adversity of inadequate food intake and malnutrition, as the consequences of food insecurity.¹ Food security is one of the most complex sustainable development issues, directly linked to health and malnutrition, resulting in mortality.^{2,3} Maternal and child mortality have become a national and global public health issue spreading all over the world.^{4,5} The most challenging and sensitive indicator of a living and socioeconomic condition is malnutrition and hunger.⁶ As a result,

approximately 50 million and 40 million children fall at risk of acute undernutrition and overnutrition. Malnutrition results in overweight and obesity, causing about two-thirds (63 per cent) of adults to die globally as the leading contributors to mortality.⁷

As per the 2011 HANgAMA Report, India has the highest under-five mortality rate (42 per cent) due to undernourishment/food insecurity, around 44 per cent of underweight and 24 per cent die every day due to poor dietary-related illness and undernutrition.⁸⁻¹⁰ More than two-thirds of India's population is affected by

micronutrients and vitamin deficiency, a prime determinant of child health and nutrition.^{11,12}

Malnutrition is the situation of protein and micronutrient deficits (vitamins and minerals), which leads to poor health conditions and makes one vulnerable to diseases. The most challenging consequences of malnutrition are continuing to be shifted from one generation to another. Hence, malnutrition becomes an inter-generational phenomenon resulting in maternal and child mortality affected by poor food and nutrition intake.

The World Food Program (WFP) expresses that poor food develops hunger and malnutrition, a greater risk to health than AIDS, malaria, and tuberculosis.¹³ Malnutrition is associated with infectious diseases, overnutrition and undernutrition.¹⁴ This causes the situation to worsen in both urban and rural areas, as well as across all socioeconomic groups. It is a dual burden from pregnancy and early life among both rural and urban populations with high economic growth. Despite higher economic growth in India, improvements in maternal and child health indicators, particularly in nutrition levels, have been unacceptably slow. As a result, around half of Indian women are at risk of anaemia, and a large number of children and women are stunted, underweight, anaemic, and micronutrient deficient.¹⁵ It is due to low public health expenditure or unspent funds allocated to nutrition programmes. This restricts poor people's access to nutritious food, contributing to maternal and child mortality in India.

RESEARCH GAP

After a significant decline to 174 in maternal mortality from 215 in 2010, 41 and 50 per cent in infant and under-five mortality, India still holds the highest rank in maternal and child mortality because of a slow reduction in both the indicators.^{16,17} Thus, a question arises what is the reason behind the slow reduction in maternal and child mortality, even after many schemes and programmes have been initiated for the fulfilment of the necessary nutrition among women and children? The hypothesised answer, there is an inherent lacuna either in programme implementation or consumption pattern/nutrition intake or care by women. This meant, ultimately, food intake practises and inadequate nutrition intake resulting in malnutrition was responsible for making people chronically vulnerable to infectious diseases and mortality in India. Thus, food and nutrition security need prominent attention to improve maternal health and child health. In 2015, Naydenova mentions improving the nutritional value of available food to shape health status.¹⁸ Although there are several studies on the issue, they lack the importance of nutritional needs that can be met only through nutritious food. As a result, the study focuses on nutrition-related factors (particularly the relationship between nutrition and maternal and child health) in order to provide a plausible contribution to reducing maternal and child mortality, which is critical for India.

METHODOLOGY

This study reveals some salient points on nutrition-related factors for improving the health of mothers and children, aiming at reducing maternal and child mortality in India. The study is based on various literature reviews, collected from Google scholar, ScienceDirect, ProQuest, G-gate, Lancet, NCBI-PubMed, SAGE Journals, National Digital Library, ResearchGate etc. The information was gathered from government or non-government sources, published and unpublished reports and documents. Survey data was acknowledged to examine the nutrition-related issues contributing to maternal and child mortality in India. Inherent nutrition-related factors, which are the major contributors to maternal and child mortality, have been recognised. These factors would be given attention in order to bring about better maternal and child health in India.

Thus, this paper used the NSS report to reach into the depths of the level of per capita calorie intake in India (both in rural and urban areas). There was also more support and knowledge about calorie intake (recommended dietary allowance) among the Indian population. All rounds of NFHS Factsheets and reports to sensate the usage of government prescriptions and recommendations on nutrition consumption for children were used. Acceptance and utilisation of nutrition have been taken into consideration. The improvement indicator was the key factor in it. Improvements in Indian children's nutrition consumption have been significant. The NFHS factsheet and report have been used by using situation analysis to understand the present status of child mortality. The analysis was used to identify the positive improvement in bringing about good nutritional health among children. The total improvement was observed from NFHS-4 to NFHS-5 as the policy implication and policy concern for children's health care. Maternal mortality was comprehended in this paper through a Sample SRS special bulletin for the years 2004-06 to 2017-19. Maternal mortality levels have been explored and their trends have been identified. The improvements were scaled up and compared with maternal health and maternal mortality.

Several pieces of literature, reports, and documents have been used to identify nutritional factors that contribute to maternal and child mortality. This study followed the definition of child mortality as "the probability of dying between birth and under-five years of age expressed per 1000 live births per year".¹⁹ Similarly, maternal mortality also followed the definition as "the probability of dying of women during pregnancy or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to aggravated by the pregnancy and its management for per 100,000 live births, excluding accidental and incidental causes".⁴

DISCUSSION

India's improvement in maternal mortality by SRS from 2004-06 to 2017-19 is depicted poorly (only 109 maternal

death reductions) over one and a half decades.²⁰ It means maternal death is still high in terms of national health outcomes in India, even after a significant decline to 174 from 215 per 100000 live births in 2010.¹⁶ India's higher proportion of women in the reproductive age group of women is suffering from iron (Anaemia), vitamin A, and iodine deficiency.⁷ It is resulting in stunting, wasting, low weight, overweight and obesity as the key factors for maternal and child mortality.

The Government of India introduced the Reproductive Child Health (RCH) Program in 1997 to reduce child and maternal mortality.²¹ Since then, the public, private, and corporate sectors have been working on the issue. Still, the factsheet of NFHS-5, 2019-21 shows the status of infant mortality and under-five mortality as 35.2 and 41.9 per cent in India, a fall of only 5.8 and 8.1 per cent from NFHS-4, 2015-16.¹⁷ The improvement over the decade of the work-outcome is very poor. Hence, India still stands at the pick point of danger and questionable improvement.

THE TREND OF MATERNAL MORTALITY

Maternal mortality is a key performance indicator for health indicators. Maternal health is one of the major factors in child health. Thus, good maternal health and safety need to be observed before, during, and after childbirth. The maternal mortality rate in India is declining faster than the global target. The government of India also aims to bring it down to 100 by 2020 and has already reduced it to 103 maternal death reduction in 2017-19, down from 254 in 2004-06 per 100000 live births.²² This advantage has been achieved because of some important government interventions like the Janani Shishu Kalyan Karyakram (JSSK) Scheme, which incorporates "free maternal services for women and children" and "emergency referral system and maternal death audits" spread all over the nation. Besides, "governance and management of health services systems" have also been improved in India.

Thus, nutrition is taken into consideration as central to 12 of 17 Sustainable Development Goals (SDGs): equality of gender, healthy lives of people, free from hunger and good nutrition; reduction of poverty, good hygiene and sanitation, responsible consumption and production, affordable, decent work and economic growth; reducing inequality and education, etc. But India is still far away from achieving the target of MDG goal-1 to "eradicate extreme poverty and hunger", especially in rural/remote and urban slum areas. Thus, MDG goal 5; to improve maternal health, is having an effect on achieving the target of reducing maternal mortality. The pattern of food consumption reveals a general trend of declining nutrient intake such as calories, proteins, and iron, along with the level of fats, calcium, zinc, and vitamin A.²³

The improvement in maternal mortality over one decade is very low, i.e., only 109 maternal death reduction in India (Figure 1).²⁴

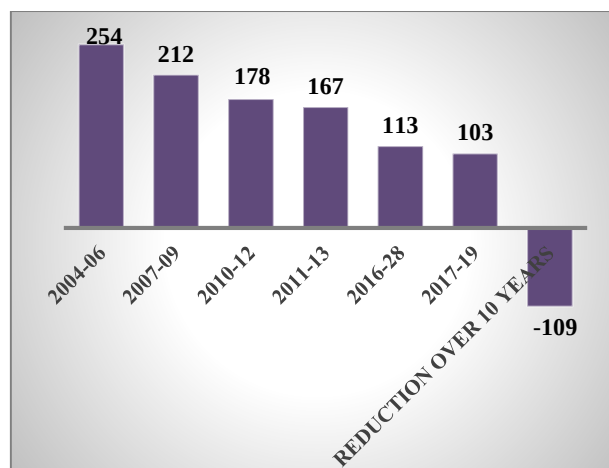


Figure 1: MMR per 100000 live births in India.

Source: SRS Statistical data, 2017-19, India.

However, the reason behind it is, there are many adolescents or mothers who are living in hard-to-reach areas and have greater chances of dying in or during childbirth. Inward Indian cities, rural and remote areas' adolescents are more vulnerable to teenage marriage and very high pregnancies than in urban areas, causing more maternal mortality in India.²⁴

THE TREND OF CHILD MORTALITY

Child mortality is a challenging public health issue and a policy concern for India. Because India obtains only one-third (29.9) per cent of the below poverty line population, as per the Asian Development Bank estimation. The rest of the below poverty line population remains away from the public notice. For whatever reason, India covers only 41 per cent of under-five birth registrations, consisting of 59 per cent from urban areas and 35 per cent from rural areas.²⁶ The unnoticed population or poor families are thus pushed to the margins of society. It excludes them from the government registry, both for baby birth and death registration. A child's death is emotionally very difficult to identify with parents for their registration. Children from rural and remote areas experience seven areas of severe deprivation due to poverty. These severe deprivations include such things as adequate nutrition, an appropriate diet that provides essential protein, micronutrients, and minerals. Another deprivation is safe drinking water, which provides potable water free of water-borne diseases. Adequate sanitation is one of the most important deprivations that protects against all types of health problems. In addition, health is defined as a state of complete physical, mental, and social well-being. Shelter for safe living and staying, education, and information is critical for all of humanity.²⁷ It aggravates the hunger, causing malnutrition, which is responsible for the maximisation of child mortality.

MDG-4 on child survival and interventions and SDG-2 focus on the elimination of all forms of malnutrition from the planet. But India still remains at a high risk of not

fulfilling such goals. As a result, malnourished children with severe acute malnutrition are facing a greater risk of death from a common childhood disease.²⁸ These illnesses are diarrhoea (a symptom of bowel infection), pneumonia (an infection of the lung), and malaria, caused by unhygienic and unsanitary conditions. Most factors associated with nutrition intake are responsible for approximately 45% of deaths in children under the age of five. Although many interventions have been undertaken in our country, still found very low reduction (infant mortality- 35.2 and under five mortality- 41.9 from 41 and 50 of NFHS 2015-16) in the factsheet of NFHS 2019-21. It indicates India's poor improvement in infant mortality and under-five mortality (only 5.8 and 8.1 per cent reduction) over a decade. Thus, India still needs more efforts to reduce it significantly (Figure 2).

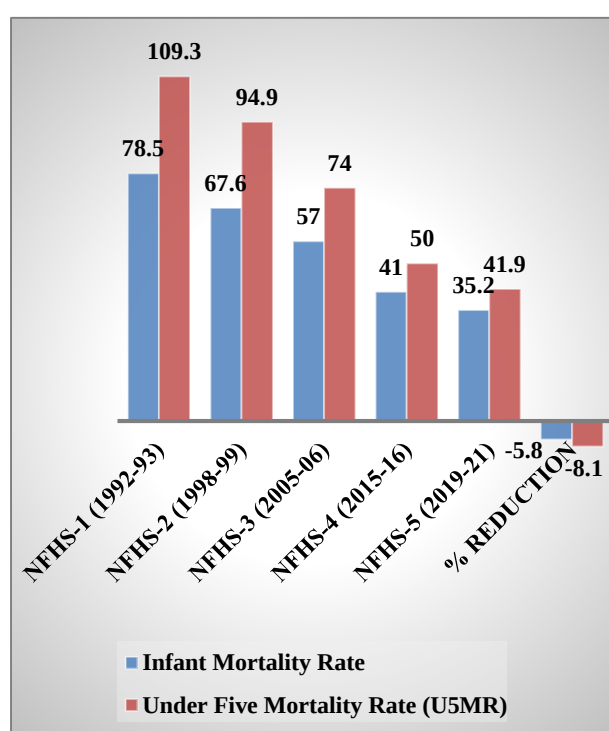


Figure 2: Trend of child mortality per 1000 live births.
Source: NFHS-5 Factsheets, 2019-21, India.

LEVEL OF MICRONUTRIENT-INTAKE AND MALNUTRITION AMONG CHILDREN IN INDIA

The essential element for all human beings to survive is good nutrition. Good nutrition (micronutrients) can only build good physical and mental development, reflecting better performance at work, better productivity in logical thoughtfulness, and better health in physical and psychological well-being in terms of the social dignity of his/her entire lifespan. Thus, good nutrition intake must be from the earliest stages of foetal development to birth, and go through infancy, childhood, adolescence, and so on into adulthood.

India is considered a poor country because of its poor health record, which is caused by poor nutrition intake. As

a result, three out of every four children suffer from anaemia. Besides, 84 per cent of all health expenditure is based on out-of-pocket expenditure in India.²⁹ It is drawing most Indian families into poverty, a key contributor to hunger and malnutrition.

Thus, the NFHS-5, 2019-21 report shows a poor improvement in nutrition consumption among children. In India, only around 71.2 per cent of children under 0-23 months are given vitamin A supplements, 13.3 per cent consume iron-rich food like beans, peas, lentils, nuts etc., and 40.6 per cent under 6-23 months consume food rich in vitamin A.²⁴ As a consequence, a large number of children are affected by malnutrition, resulting in child mortality in India. Furthermore, more than half (67%) of Indian children are anaemic, while 32.2, 19.3, and 35.5 percent are underweight, wasted, and stunted, respectively. This negative behaviour is taking chunks away from improving the sound health of the mind and body of children. Thus, ensuring the nutritional well-being of children is essential (Figure 3).

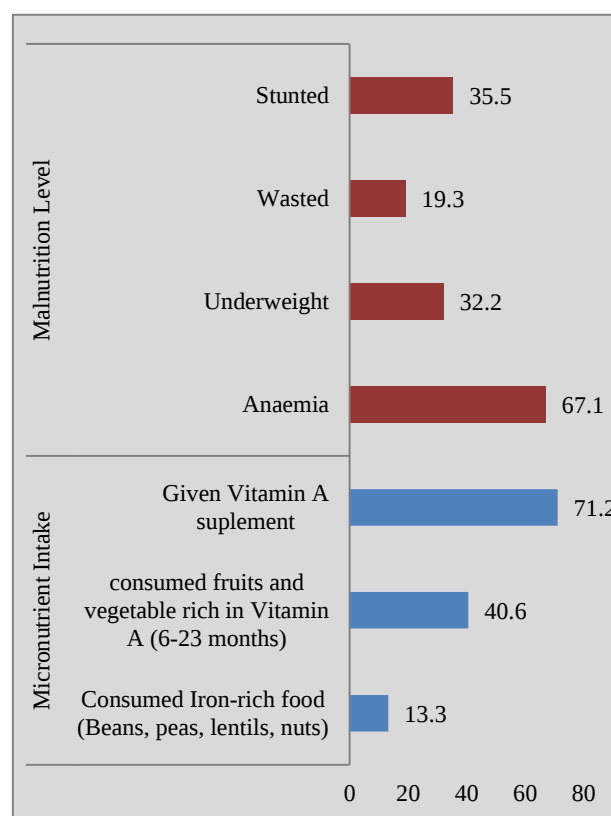


Figure 3: Malnutrition level and micronutrient-intake among children in India.

Source: NFHS-5 Report, 2019-21, India.

LEVEL OF PER-CAPITA CALORIE INTAKE PER DAY

Food and nutrition security is one of the most important factors for bringing about sound health of mind as well as body. Food is the only way to fulfil the basic essentials of protein, calories, and minerals, which produce the

microbial community in the body.³⁰ Since India is a diverse country, food consumption is observed differently in different regions in different years. As a result, the disadvantaged group's dietary diversity has become a major challenge for food security.¹ The decline in cereal consumption and the increase in non-cereal consumption both in rural and urban India correspond to a large proportion of serious nutrition deficiency.¹² Thus, India faces high region-specific mortality which requires measuring per capita food intake level for further improvement of the same.³¹ The per capita food consumption level varies from the ability of accessibility and utility of nutritious food as per working style and requirements. Adequate food and nutrition intake are important and necessary for healthy living. As per the Indian Recommended Dietary Allowance (RDA), one normal person needs to consume "2400 kcal/day in rural and 2100 kcal/day in urban areas to be healthy."³² But a fluctuational trend of protein consumption for the ten years, i. e.; 1993-94 to 2011-12, in both rural and urban India was observed. Though the per capita protein consumption in rural India is better than in urban India, rural India still has more maternal and child mortality comparatively (Figure 4).

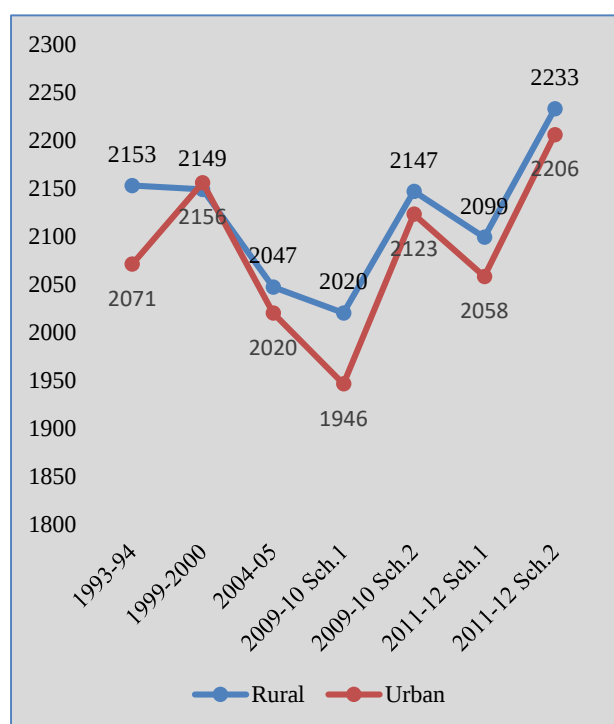


Figure 4: Level of per capita calorie intake per day in different years.

Source: NSS Report No. 560: Nutritional Intake in India, 2011-12.

In fact, the availability of calories in India is marginally higher than absolutely essential for keeping the Indian population at a normal level of activity. The concept of frugality among Indians is leading to somewhat lower nutrition intake and hunger. Because if it runs for a longer period, it converts into protein or mineral deficiency,

resulting in malnutrition. This is caused by political and economic instability.

THE LINK BETWEEN NUTRITION AND MORTALITY

Hunger and malnutrition in terms of improving maternal and child health have become challenging tasks in the global and national context. Good health depends extremely on safe and nutritious food. Adequate nutrition, thus, is essential for physical and cognitive development and/or for overall good health, contributing to socio-economic growth.² Good health always requires a diversity of food intake with good nutrition. A diversified diet that takes care of balanced nutritional needs is all that is needed to fight against the constant risk of malnutrition.^{10,12} Nutritional intake is the composition of micronutrients, commonly used as vitamins and minerals. It is very important and essential to a very small amount of the body. But its deficiency creates a life-threatening, enormous risk to pregnant women and children.²

Thus, multiple studies have demonstrated an indisputable link between maternal health and nutrition, aiming at the well-being of the child. A nutritional deficiency in women results in foetal malnutrition caused by the prevalence of taboo on food intake practices during pregnancy.³³ It results in micronutrient and macronutrient deficits, consequently resulting in low birthweight babies suffering from childhood losses of productivity in adults.^{34,35} This means, if women get good nutritional intake with good nutritional health, their children get good nutritious food from the womb of their mother.²⁰ The link originated "in pregnancy, where nutritional deficiencies adversely affect foetal development, resulting in low-birth-weight or overweight infants and an increased risk of complications during labour". Thus, the health of women is the key contributor to reducing mortality. This link has been greatly associated with a disadvantaged population in society in India because of a lack of affordable/purchasing power in the food market.³⁶ It forces them to buy cheap and unhealthy food to fulfil their hunger needs. As a result, particularly women and children from disadvantaged societies, fall into a gigantic malnutrition problem and are at risk of life-threatening. At the global level, India has the highest burden of malnutrition among women and children, with each reinforcing the other in an intergenerational fashion.

Eliminating hunger and malnutrition is not just highly moral but also has huge implications for socio-economic development. This link between nutrition and development is explicitly recognised in the recently agreed upon SDGs. SDG-2 has the aim of eliminating 'all forms of malnutrition' from the globe by reducing maternal and child mortality and is important for India. Thus, good nutrition is fundamental to optimal health and growth. It draws health strings from more than one generation. Because its effects run from maternal health to her child's health, and so on to adulthood, they will become This

trans-generational passage of risk constitutes a curse as well as an opportunity- with a cost-effective intervention for delivering multi-dimensional benefit. Nutrition is also a hidden force against maternal and neonatal mortality.¹⁸ The reason why poor nutrition leads to a high level of vulnerability, as well as psycho-social dysfunction and overall poor health.

FACTORS ASSOCIATED WITH MATERNAL AND CHILD MORTALITY

The WHO has listed some of the leading causes of child mortality. Preterm birth complications, because of which a baby suffers from a lifetime risk of disabilities. Pneumonia leads to the development of immature lungs. Birth asphyxia is a serious cause through which a child sometimes fails to breathe. Diarrhoea, an infection by bacteria, damages the inner lining of the baby's intestine and causes problems with nutrient absorption. Malaria is the most important factor in a baby's health.²⁸ Although these factors are important, nutritional factors have been left behind without notice. Thus, nutritional deficiencies become major causes of good health, which is essential to living a healthy life. Due to deficiencies in nutrition, stunting, wasting, and anaemia become prolonged nutritional deprivation.³¹ These factors result in delayed mental development, poor performance, and reduced intellectual capacities.

Underweight is the composite index of chronic or acute malnutrition. Nutritional deficiency of iron, vitamin A, and iodine in children affects child survival, a cognitive development that can be reduced through improvement in women's nutrition before or during pregnancy.²⁵ Thus, the study focuses on nutrition-related factors. Because in India, most women of reproductive age and children lack adequate protein and micronutrients due to poor nutrition intake, resulting in a higher risk of mortality. However, various underlying causes and relationships between maternal and child mortality and undernutrition are given below:

Poorly resourced, unresponsive to health and nutrition services

India is a vast country where diversity in the area, environment, education, status, lifestyle, and food pattern is available. This diversifies the requirements of essential nutrition. Thus, it also requires the proper distribution of health and nutrition services. However, people living in remote and out-of-reach areas were not provided with the same resources. For whatever reason, most of the disadvantaged population face the problem of nutritional food intake.

Food insecurity

In India, particularly the disadvantaged groups of society, do not have the appropriate facilities to store food nutritionally. For whatever reason, the stored food gets

deprived of nutritive values and becomes unhygienic. It may be due to either negligence or unawareness. The consumption of this food increases the risk of infectious diseases and malnutrition.

Lack of food preferences

Although most people have good knowledge of nutritional food, due to food choices as per culturally and environmentally accepted norms, people are in the grip of inadequate feeding practices. Although this case seems like a minor cause, it has a pivotal role in worsening health and life-saving perspective. Because if a nutritional deficiency is found during pregnancy, it adversely affects and becomes the cause of maternal death.¹⁸

Lack of sanitary environment

At the present standard of living, all people want a sedentary life. But due to the busy schedule of lifestyle in the global era, people do not get time for cleanliness and hence live with inadequate hygiene, access to water and sanitation. While food and micronutrient intake with a diverse diet become direct factors for good health, proper health services, adequate water, and sanitation become indirect factors.¹² Despite being one of the most important factors for good mental and physical health, they fail and increase the risk of infectious diseases and nutritional value. As a result, it increases infectious diseases, causing mortality.

Lack of healthcare facility

India is home to the most gender-sensitive country prior to women and children.³⁷ Because in India, discrimination and exclusion of mothers and children mean they are far from the accessibility of essential health and nutrition services. They are excluded from commodities that are provided by the government. Moreover, it is due to poverty and marginalisation in geographic and political India. These factors directly affect the health of mothers and children and are the causes of maternal and child mortality.

The poor socio-economic condition

Socio-economic status is regarded as one of the most important factors in improving health, particularly in alleviating malnutrition, which is heavily dependent on income.³⁷ The reason why the disadvantaged population of society is unable to purchase food is due to soaring food prices in the food market. Hence, they lack food preferences. Therefore, they are prone to unsanitary food consumption and high consumption of unprocessed or street food, which is high in energy density but low in nutritional value.

Prevalence of the patriarchal socialism

Due to the prevalence of patriarchal socialism, the status of women in India is not up to the mark.²⁵ Also, Indian

women are treated as old-fashioned stereotypes embedded in their culture. The factor's consequences include early marriage, poor maternal care, and poor nutrition, all of which contribute to rising maternal mortality rates. This socialism enhances vulnerability to children's and women's malnutrition as a form of low dietary intake even at the household level, poor caring facilities, and inequitable distribution of food within households.² The reason why India consistently contributes to a quarter of all global maternal deaths is more delivery complications in the younger age group of women rather than older women.^{25,38}

Poverty and lack of purchasing power

Lack of adequate nutrition results in poor physical and cognitive development among children and is also one of the leading contributors to mortality. Due to poverty and lack of purchasing power, poor communities cannot buy nutritious food from the local food market because of food price inflation. It pulls them into a protein deficit, causing malnutrition. Also, somehow, because of the volatility of food prices in the food market, the vulnerable group cannot afford the same, hence responsible for increasing malnutrition.¹² Thus, cost-effectiveness becomes an indirect cause of malnutrition, resulting in iron (anaemia) deficiency.

Lack of education and information

Education and information are two of the most important factors for social dignity and good health as well. But, in India, due to a lack of education and information in rural and disadvantaged communities, they are unaware of good and adequate nutrition. Hence, in India, disadvantaged groups fail to consume nutritious food and vitamin supplements, particularly women and children. This poor nutritional education leads to ignorance of feeding practices.

Prevalence of self-medication

Medication is the most important factor in being cured of illness. It is equally important to consult with a doctor for medication. But, in India, most people want to medicate themselves without consulting doctors and without knowing their exact illness. These types of conceptualizations and behaviours are growing day by day in our country. The reason why they are facing a high risk of infectious diseases and life-threatening problems is that it has become a major contributor to a nutritional deficiency that has led to maternal and child mortality.

CONCLUSION

Food intake practices and inadequate diets are of the utmost importance for malnutrition, leading to the public health issue of maternal and child mortality. It is true that securing knowledge about principles of prevention is not sufficient, but proper utilisation of food and nutrition

security is more important. There may be a lack of resources and poor health services, but proper utilisation of available resources and facilities may reduce maternal and child mortality. Another embarrassing factor is that many nutrition-related policies and programmes are proposed or created based on knowledge, but they are inadequately implemented when their impact is minimal. The reason why this paper identifies that India has poor improvement in terms of nutrition intake perspectives is responsible for the poor reduction in maternal and child mortality. Consequently, India has made little progress, i.e., only 109 death reductions in maternal mortality over one and a half decades, a 5.8 per cent reduction in infant mortality, and an 8.1 per cent reduction in under-five mortality. For whatever reason, it adversely impacts the health of women and children. Thus, this paper contributes to a few possible nutritional preventive approaches which can be taken care of, especially for a reduction in maternal and child deaths in India. It is essential to improve the quality of antenatal, childbirth, and postnatal care for mothers and their newborns in order to reduce the circumstances of death. Nutritional interventions are the most important means through which the health of children and adults born to well-nourished mothers can be improved. Besides women's empowerment and gender equality, agricultural growth should be encouraged to be proven to be remarkably cost-effective in ensuring dramatic and sustained impact for little up-front investment. It can be done only through the provision of proper access and utilisation of available food for nutrition security, particularly for the reproductive age group of women, mothers, and children. It would contribute a lot to reducing this public health issue in India. Thus, the government needs special initiation and focus on the creation of employment (both physical and psychological) opportunities for disadvantaged sections of society along with empowerment. Because the opportunities will enable them to increase their ability to afford nutritious dietary intake and improve their health, thereby reducing mortality in India.

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