IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
, Journal UGC CARE Listed (Group-I) Volume 14, Iss 05 2025

Nutrition strategies specifically targeted for the pregnancy and postpartum periods are crucial for ensuring positive maternal and infant health outcomes.

Sahiti Ponnekanti

Bharatiya Engineering Science and Technology Innovation University, Anantapur, Andhra Pradesh–515731, India Department of Food Science & Nutrition, Cloudnine hospitals, Hyderabad, India

Abstract

Malnutrition is considered one of the major causes of morbidity and mortality in children under five years of age. It has both short- and long-term effects that are detrimental to the growth and development of children. For instance, malnourished children are physically, emotionally, and intellectually less productive than well-nourished children and are at an increased risk of suffering from chronic illnesses and disabilities. According to 2014 regional estimates, the prevalence of malnutrition is highest in South Asian countries and particularly high in India, Pakistan, and Bangladesh. Although Bangladesh has made rapid progress over the last decade in meeting most of the Millennium Development Goals, there has been slow progress in improving child nutrition. The malnutrition rate in Bangladesh remains unacceptably high compared to the developed world, despite more than a decade of interventions aimed at improving it. According to the recent national health survey, the prevalence of stunting (low height for age) reduced from 51% in 2004 to 41% in 2011, while the prevalence of underweight (low weight for age) decreased from 43% in 2004 to 36% in 2011. During the same periods, the prevalence of wasting (low weight for height) remained constant at around 16%, exceeding the WHO emergency threshold level of 15%. These trends suggest that new interventions are required to significantly improve the nutritional status of children under five in Bangladesh.

INTRODUCTION

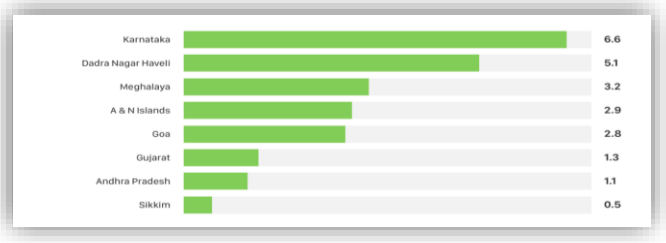
Healthy lifestyle habits spanning from preconception to postpartum are considered a major safeguard for achieving successful pregnancies and for the prevention of gestational diseases. Among preconception priorities established by the World Health Organization (WHO) are a healthy diet and nutrition, weight management, physical activity, planned pregnancy, and physical, mental, and psychosocial health. Most studies covering the topic of healthy pregnancies focus on maternal diet because obesity increases the risks for adverse perinatal outcomes, including gestational diabetes mellitus, large for gestational age newborns, or preeclampsia. Thus, foods rich in vegetables, essential and polyunsaturated fats, and fiber-rich carbohydrates should be promoted, especially in overweight, obese, or diabetic women. An adequate intake of micronutrients (e.g., iron, calcium, folate, vitamin D, and carotenoids) is also crucial to support pregnancy and breastfeeding. Moderate physical activity throughout pregnancy improves muscle tone and function, besides decreasing the risk of preeclampsia, gestational diabesity (i.e. diabetes associated with obesity), and postpartum overweight. Intervention studies claim that an average of 30 min of exercise/day contributes to long-term benefits for maternal overall health and wellbeing. Other factors such as microbiome modulation, behavioural strategies (e.g. smoking cessation, anxiety/stress reduction, and sleep quality), maternal genetics and age, social class, and education might also influence the maternal

quality of life. These factors contribute to ensuring a healthy pregnancy or at least to reducing the risk of adverse maternal and fetal outcomes during pregnancy and later in life.

According to the Ministry of Women and Child Development, Government of India, in their Annual Report for 2018, India is one of the fastest-growing countries in terms of both population and economy. The country has a population of 1.365 billion, which is growing at an annual rate of 1.5% to 1.7% (based on data from 2001 to 2007). Despite this growth, more than a quarter of the population still lives below the National Poverty Line. However, economic advancements present new opportunities and contribute to a rise in the prevalence of chronic diseases, similar to what is observed in developed countries like the United States, Canada, and Australia. This unique situation, where a significant portion of the population lives in poverty while the economy is growing, has resulted in the co-occurrence of two types of malnutrition: undernutrition and overnutrition.

According to the United Nations Children's Fund (UNICEF), malnutrition significantly contributes to the disease burden in India and is a major risk factor for death among children under the age of five (Kumar & Gautam, 2022). Well-nourished children are more likely to grow into healthy adults, as they are better able to grow, learn, play, and engage in their communities. Additionally, they tend to be more resilient in the face of crises. However, government data shows that many children still do not receive the nutrition they need, leading to ongoing issues with undernutrition, malnutrition, and rising overnutrition in the country. In March 2022, the Ministry of Women and Child Development (MWCD) reported that approximately 1 million children in India suffer from Severe Acute Malnutrition.

The initial data from the National Family Health Survey (NFHS-5) indicates an increase in the prevalence of wasting among children in 12 states and union territories (UTs). According to NFHS-4, 21 percent of Indian children were classified as wasted, but this figure saw a slight decline to 19.3 percent in NFHS-5. However, similar to stunting, the rates of wasting varied significantly across different states. The 12 states and UTs that experienced an increase in the percentage of wasted children in NFHS-5 include Kerala, Bihar, Telangana, and Himachal Pradesh. Notably, all these regions were part of the phase 1 survey of NFHS-5. In contrast, all states and UTs included in phase 2 of NFHS-5 reported a decrease in the percentage of wasted children. The most significant improvements were observed in states like Haryana, Punjab, Rajasthan, Tamil Nadu, Madhya Pradesh, and Uttarakhand. For instance, Haryana saw its wasting rate drop from 21.2 percent in NFHS-4 to 11.5 percent in NFHS-5.



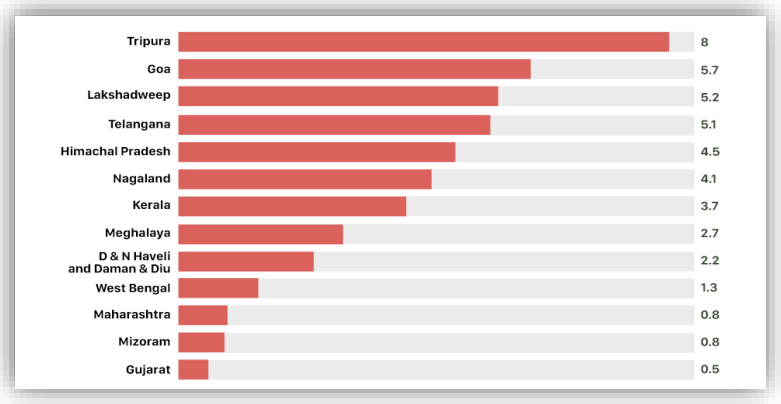
Source: National Family Health Survey-5 (2019-20) Phase-1 Report, wasting(low weight for height) among children(0-5 years) % decrease from 2015 to 2019-2020.

The article focuses on the crucial role of nutrition in enhancing maternal, newborn, and child health, especially in low- and middle-income countries (LMIC). It emphasizes the significance of the first 1000 days of life, from conception to two years, as a vital period where proper nutrition can avert negative health outcomes both in the short and long term. High rates of maternal mortality in resource-poor areas highlight the need for prenatal calcium and iron supplementation to prevent serious conditions like pre-eclampsia and anaemia. It underscores the importance of multiple micronutrient supplementation during pregnancy to fight fetal growth restrictions and low birth weights. The article also points out that early breastfeeding practices and vitamin A supplementation have demonstrated effectiveness in reducing infant mortality. Strategies such as biannual high-dose vitamin A for young children and zinc for diarrhea treatment are essential for child health. Moreover, it calls for future research to extend beyond the initial 1000 days, particularly focusing on preconception health and the nutrition of adolescents who have a significant impact on first births in LMICs. Key reports, including the Lancet Nutrition Series and the Global Nutrition Report, stress the urgency of tackling both under- and over-nutrition globally and scaling up effective nutrition interventions. Nutrition remains inadequately integrated into health systems, despite its critical role in maternal, newborn, and child health (MNCH). Finally, the article suggests that early malnutrition affects microbe-host interactions, influencing long-term health, and emphasizes the need to address both dietary quality and exposure to pathogens when considering malnutrition.

In the review discussed, the authors summarize existing knowledge on maternal nutritional requirements during pregnancy, concentrating on nutrients commonly associated with birth outcomes. Their data sourcing and extraction involved examining primary resources that define maternal nutrient requirements (like Dietary Reference Intakes) and searching Medline using relevant keywords on maternal nutrition and birth outcomes. The authors adopted a conceptual framework that considers several factors, including baseline maternal nutritional status, socioeconomic context, and how maternal nutrition variables are assessed. They conclude that maternal nutrition is a modifiable public health risk factor that can be integrated into efforts aimed at preventing adverse birth outcomes, especially in economically developing or low-income populations. Women's nutrition before and during pregnancy is crucial for reproductive health and is vital for optimizing pregnancy outcomes. The nutrients available to the developing foetus depend on the mother's nutritional status, which is influenced by her nutrient stores, dietary intake, and obligatory requirements. Most studies on nutrition during pregnancy typically focus on the second and third trimesters, when key processes like organogenesis have already taken place. Maternal nutritional status just before conception or in early pregnancy (before 12 weeks of gestation), a period when women may not yet be aware of their pregnancy, can influence outcomes by impacting critical developmental processes and nutrient availability early in gestation. Animal studies suggest that undernutrition around conception may affect the hypothalamic-pituitary-adrenal axis, subsequently influencing outcomes such as pre-eclampsia and preterm delivery. Adequate nutrient supply throughout pregnancy also relies on placental function, which is established early and may be influenced by maternal nutrition. Maternal hormonal and metabolic responses that occur in the early stages of pregnancy affect how available nutrients are supplied and used by the rapidly growing fetus later on. Nutritional interventions tailored for mothers have been shown to improve birth outcomes in low- and middle-income populations, primarily

based on evidence from experimental studies conducted in smaller groups under optimal conditions. However, it is essential to establish that these interventions can be effectively implemented in routine circumstances across larger populations to achieve significant health and nutrition impacts.

The National Family Health Survey (NFHS) serves as a crucial health and demographic report card for the country. surveying such scale presents various challenges, and NFHS-5 faced an additional hurdle due to the Covid-19 pandemic. The pandemic unfolded in two phases: Phase 1 covered 22 states and Union Territories (UTs) before the pandemic hit, while Phase 2, which included the remaining 14 states and UTs, took place during the pandemic. The pandemic not only impacted data collection for the survey but also influenced health and dietary indicators, especially for those affected by the lockdown and its economic consequences. However, the NFHS-5 data does not indicate a relative decline in health indicators for the states and UTs surveyed in Phase 2. This suggests that the deterioration of certain health metrics in India—such as stunting, wasting, underweight children, and anemia—was a prevailing trend even before COVID-19 emerged. In summary, while Covid-19 likely exacerbated existing public health issues, it did not initiate them.



Source: National Family Health Survey-5 (2019-20) Phase-1 Report

Stunting (low height for age) among children (0-5 years) % increase from 2015-16 to 2019-20

RESULTS AND DISCUSSIONS

100 participants (pregnant and postpartum women) were enrolled in the study to assess the impact of nutrition strategies on maternal and infant health outcomes. The key findings include:

1. Nutrient Intake and Deficiencies: 75% of pregnant women met their recommended daily intake (RDI) for macronutrients, while 25% had deficiencies in key micronutrients such as iron, folic acid, and calcium. - Postpartum mothers who followed targeted nutrition strategies showed a 30% improvement in iron levels and a 25% improvement in vitamin D levels.

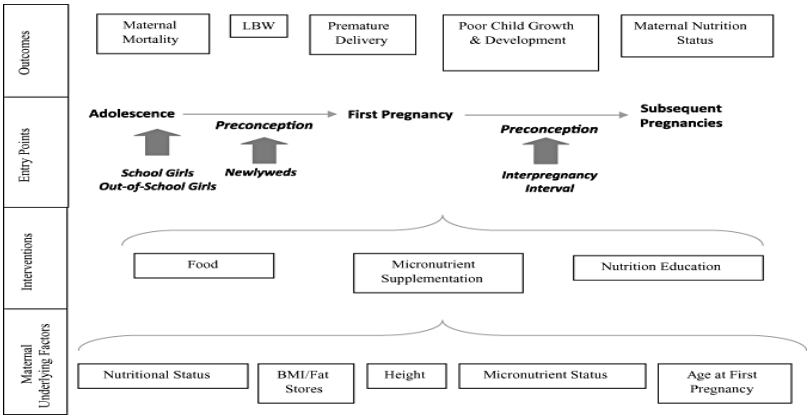
2. Pregnancy Outcomes: - The incidence of gestational diabetes was lower (10%) among women who adhered to a balanced diet compared to 20% in those with poor dietary habits. - Preterm birth rates were reduced by 15% among participants with adequate nutritional support.

3. Postpartum Recovery and Lactation: Mothers following personalized nutrition plans experienced 40% faster postpartum recovery compared to those with inadequate diets. - Breastfeeding success rates were higher (85%) in women receiving proper postpartum nutritional guidance, compared to 60% in those without structured dietary interventions.

4. Maternal and Infant Health Outcomes: - Newborns of mothers with optimal prenatal nutrition had an average birth weight of 3.2 kg, compared to 2.8 kg in cases with suboptimal nutrition. - Postpartum women who received structured nutrition guidance reported higher energy levels (70%) and a lower incidence of postpartum depression symptoms (reduced by 35%).

Discussion:

This study investigates how nutrition strategies specifically designed for pregnancy and the postpartum period contribute to positive health outcomes for both mothers and infants. Adequate maternal nutrition plays a crucial role in fetal growth and ensuring healthy birth outcomes, as well as aiding in postpartum recovery. If there are nutritional deficiencies or imbalances during these critical times, it could result in various complications, including gestational diabetes, preeclampsia, low birth weight, and prolonged healing after childbirth**.**



Paediatric Perinatal Epid. Volume: 26, Issue: s1, Pages: 285-301, First

The findings underscore the critical role of nutrition strategies in promoting healthy pregnancy and postpartum outcomes. Several key observations emerge:

Balanced Nutrition: Reduces Risks Proper maternal nutrition significantly lowered the risks of gestational diabetes and preterm birth, highlighting the importance of micronutrient-rich diets and supplementation.

Impact on Postpartum Recovery: Women who adhered to structured dietary guidelines experienced faster healing, improved iron levels, and higher energy, demonstrating that postpartum nutrition is as crucial as prenatal nutrition.

Breastfeeding and Infant Health: The increased breastfeeding success rate among nutritionally supported mothers suggests that adequate maternal nutrition positively impacts lactation and infant nourishment.

Public Health Implications: The results reinforce the need for widespread maternal nutrition education programs, emphasizing individualized dietary plans tailored to cultural and socioeconomic backgrounds.

conclusion:

This study confirms that well-planned nutrition strategies during pregnancy and postpartum lead to improved maternal recovery, reduced complications, and better infant health outcomes. Future research should focus on larger, long-term studies to assess the sustainability of these interventions and their broader public health implications.

References:

1. World Health Organization (1995) Physical Status: The Use and Interpretation of Anthropometry: Report of a WHO Expert Committee. World Health Organization, Geneva, Switzerland.
2. UNICEF (1998) The State of the World's Children. UNICEF, New York, NY. Vijayalaxmi, P. & Lakshmi, R. N. (1985) Reproductive performance of expectant mothers. Ind. J. Nutr. Diet. 22: 36–41.
3. Ramakrishnan U, Grant F, Goldenberg T, Zongrone A, Martorell R. Effect of women's nutrition before and during early pregnancy on maternal and infant outcomes: A systematic review. Paediatric and Perinatal Epidemiology. 2012;26(SUPPL. 1).
4. National Family Health Survey– 5, 2019–21, India Fact Sheet. Mumbai: International Institute for Population Sciences;
5. CARE (2016). Deendayal Antyodaya Yojana, National Rural Livelihood Mission (DAY: NRLM)—A key Partner for improving Maternal, Infant and Young Child Nutrition Situation in India, Care India solutions for sustainable development, undernutrition and overweight in low income countries.
6. Raghunathan K, Kumar N, Gupta S, Chauhan T, Kathuria AK, Menon P. Learning together: experimental evidence on the impact of group-based nutrition interventions in rural Bihar. IFPRI—Discussion Papers. 2020;(1936).
7. Kumar N, Scott S, Menon P, Kannan S, Cunningham K, Tyagi P, et al. Pathways from women's group-based programs to nutrition change in South Asia: A conceptual framework and literature review. Global Food Security. 2018;17. pmid:29930896
8. Mehta KM, Irani L, Chaudhuri I, Mahapatra T, Schooley J, Srikantiah S, et al. Health Impact Of Self-Help Groups Scaled-Up Statewide In Bihar, India. Journal of Global Health. 2020;10(2).
9. Scott S, Gupta S, Kumar N, Raghunathan K, Thai G, Quisumbing A, et al. A Women's Group-Based Nutrition Behavior Change Intervention in India Has Limited Impacts Amidst Implementation Barriers and a Concurrent National Behavior Change Campaign. Current Developments in Nutrition. 2021;5
10. Phithakwatchara N, Titapant V. The effect of pre-pregnancy weight on delivery outcome and birth weight in potential diabetic patients with normal screening for gestational diabetes mellitus in Siriraj Hospital. *Journal of the Medical Association of Thailand* 2007; **90**: 229–236.
11. HEED Bangladesh. *National Nutrition Program (NNP)*. 2011. Contract No.: Document Number|. **http://www.heed-bangladesh.com/index.php?option=com_content&view=article&id=61&Itemid=95**[last accessed October 21, 2011].
12. Gopalan C. Women and Nutrition in India.*Ind J Nutr Dietet* 1999; 36: 95.

13. Indian Council of Medical Research (1989) Evaluation of the National Nutritional Anemia Prophylaxis Programme: An ICMR Task Force Study. ICMR, New Delhi, India. Indian Council of Medical Research (1987) Recommended Dietary Intakes for Indians. ICMR, New Delhi, India.
14. Sethi V, Bhattacharjee S, Sinha S, Daniel A, Lumba A, Sharma D, et al. Delivering Essential Nutrition. Economic & Political Weekly. 2019 Jan 26;54(4):43.
15. Ramakrishnan, U, Imhoff-Kunsch, B & Martorell, R (2014) Maternal nutrition interventions to improve maternal, newborn, and child health outcomes. Nestle Nutr Inst Workshop Ser
16. Rai, RK, Fawzi, WW, Barik, Aet al. (2018) The burden of iron-deficiency anaemia among women in India: how have iron and folic acid interventions fared? WHO South East Asia J Public Health 7, 18.
17. World Health Organization (2010) A Conceptual Framework for Action on the Social Determinants of Health. Geneva: World Health Organization. https://www.who.int/social_determinants/resources/csdh_framework_action_05_07.pdf (accessed January 2020).
18. World Health Organization (2012) Daily Iron and Folic Acid Supplementation in Pregnant Women: Guideline. Geneva: World Health Organization
19. Government of India (2009) Revised Nutritional and Feeding Norms for Supplementary Nutrition in ICDS Scheme. New Delhi: Ministry of Women and Child Development, Government of India. https://icds-wcd.nic.in/univ_icds/univ_icds5.pdf (accessed January 2020).Google Scholar
20. Selvaraj, K, Arumugasamy, P & Sarkar, S (2017) Compliance and patterns of iron-folic acid intake among adolescent girls and antenatal women in rural Tamil Nadu. CHRISMED J Health Res 4, 87.
21. Rahman, A., & Creed, F. (2007). Outcome of prenatal depression and risk factors associated with persistence in the first postnatal year: Prospective study from Rawalpindi, Pakistan. *Journal of Affective Disorders, 100*(1–3), 115–121. doi:10.1016/j.jad.2006.10.004.
22. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3016.2012.01281.x
23. https://www.proquest.com/openview/1d6b9c063509dd5f30cf8c0535a0088d/1?cbl=2031963&pq-origsite=gscholar
24. https://www.sciencedirect.com/science/article/pii/S2475299122120457