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Impact of Nutritional Practices and Food Taboos on Pregnant Women in India: A Comprehensive Review

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Abstract

Pregnancy marks a pivotal period in a woman's life, requiring careful dietary management to ensure the health of both mother and child. This comprehensive review investigates the nutritional conditions and food taboos encountered by pregnant women in India, exploring the complex relationship between socioeconomic factors, cultural beliefs, and dietary practices. Despite India's economic growth, issues like poverty and undernutrition continue to pose risks, particularly for women from lower socioeconomic backgrounds. By examining dietary recommendations and regional dietary patterns, the review highlights the importance of addressing nutritional deficiencies and promoting a balanced diet to support optimal fetal development and maternal health. Regional dietary analysis indicates that Indian women's diets are predominantly cereal-based with slight variations in the intake of cereals, millets, pulses, and legumes compared to non-pregnant, non-lactating women. Studies also reveal a significant prevalence of protein-calorie inadequacy, especially among rural pregnant women, emphasizing the urgent need for interventions to address these nutritional gaps. The review delves deeper into widespread food taboos, including the classification of foods as 'hot' or 'cold' and the imposition of certain dietary restrictions during pregnancy. By debunking these misconceptions and presenting evidence-based insights, strides can be made in improving maternal and child health outcomes. The review integrates a broad range of research findings, highlighting the critical need for culturally tailored interventions and comprehensive educational programs to enhance maternal nutrition in India. It offers significant insights into the complex nutritional challenges faced during pregnancy, laying the groundwork for targeted interventions and policy initiatives focused on advancing maternal and child health outcomes.

Keywords*:* Pregnancy, India, dietary practices, recommended dietary allowance (RDA), maternal nutrition; food taboos

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INTRODUCTION

The nutritional landscape in India is characterized by profound disparities, reflecting a complex interplay between economic growth and persistent challenges in human development, particularly in education, wealth distribution, and nutrition. Despite India's significant economic progress, the Global Hunger Index is 2023 [1] highlights a concerning reality: India ranks 111th out of 125 countries, indicating severe levels of undernutrition, with the world's highest child-wasting rate at 18.7 percent. This starkly illustrates a critical paradox, in which economic advancements have not consistently translated into enhanced well-being for the broader population. Within this context, the status of pregnant women emerges as a poignant

concern, intricately woven with socioeconomic factors and cultural practices [2]. The vulnerability of pregnant women, especially those from lower socioeconomic strata, is accentuated by factors, such as lower literacy rates and precarious economic conditions. These challenges contribute to the high prevalence rates of conditions such as anemia, affecting approximately 37% of pregnant women in India [3].

Addressing these complex nutritional challenges requires a multi-faceted approach that encompasses recommended dietary allowances (RDA) and an understanding of cultural dietary restrictions. RDA [4] provided essential guidelines for nutrient intake during pregnancy, emphasizing the importance of adequate nutrition for maternal and fetal health. However, cultural beliefs and food taboos play a significant role in shaping dietary practices and often influence food choices and consumption patterns among pregnant women. Strategies such as implementing food supplementation programs, empowering women through targeted agricultural initiatives, and providing culturally sensitive counseling have demonstrated significant potential for positive outcomes.

By understanding and respecting cultural beliefs while providing evidence-based information, healthcare professionals can empower pregnant women to make informed choices that promote both cultural integrity and optimal maternal and fetal nutrition. This comprehensive approach is essential for addressing the complex interplay between nutritional requirements, cultural dietary restrictions, and taboos during pregnancy in India.

NUTRITIONAL CONDITIONS IN INDIA

India has the world's highest rate of child-wasting, with 18.7% of children experiencing severe undernutrition [1].

India, being a development paradox due to its exponential economic growth, discreetly underscores its low progress in human sectors such as education, wealth distribution, and nutrition. The coexistence of poverty and undernutrition perpetuates a situation of unhealthy populations, and the maintained pace of food production but inadequate access fuels the lack of progress [5]. Various strategies have been employed; however, their implementation is not uniform. The primary goal of India's key initiative, the National Nutrition Mission, known as Prime Minister's Overarching Scheme for Holistic Nourishment. (POSHAN) Abhiyaan, is to enhance maternal nutrition by employing strategies such as skill development, technological advancements, communication for behavioral change, rallying communities, and fostering collaboration across various sectors [6]. In India, where socioeconomic status and cultural practices significantly influence healthcare outcomes, the condition of pregnant women is a poignant concern [7]. The intricate relationship between health and socioeconomic factors, compounded by prevailing cultural norms, significantly heightens the vulnerability of women during pregnancy, especially those from lower-middle and lower-class backgrounds. As the majority of India's female population finds themselves in these socioeconomic brackets [2], their health status becomes intricately tied to their societal and economic circumstances. Within this framework, factors such as lower literacy rates and precarious socioeconomic conditions compounded the challenges faced by pregnant women, amplifying their vulnerability to adverse health outcomes. For instance, approximately 37% of pregnant women in India suffer from anemia [8] and approximately half of them consume sufficient protein and energy [3].

Recommended Dietary Allowance [4]

Recommended dietary allowance (2020) [4] represents the intake levels of essential nutrients that, according to scientific knowledge, the Food and Nutrition Board deemed sufficient to meet the nutritional needs of nearly all healthy individuals [9]. This highlights the approximate nutrient intake by an individual that would help him/her attain optimal health. The RDA for non-pregnant women vs. pregnant women is shown in Tables 1 and 2

Table 1. RDA 2020.

RDA 2020 Protein, carbohydrate and minerals								
Age group		***Protein (G/Day)***	***Cho (G/Day)***	***Calcium (mg/Day)***	***Magnesium (mg/Day)***	***Iron (mg/Day)***	***Zinc (mg/Day)***	***Iodine (µg/Day)***
Unit		*g/day*	*g/day*	*mg/day*	*mg/day*	*mg/day*	*mg/day*	*µg/day*
Women	Sedentary	45.7	130	1000	325	29	13.2	150
	Moderate							
	Heavy							
Pregnant	2nd trimester	+9.5	175	1000	385	40	14.5	250
	3rd trimester	+22						

Table 2. RDA 2020 Table of Vitamin.

RDA 2020 Vitamins										
Age group		***Thiamine***	***Riboflavin***	***Niacin***	***Vitamin B6***	***Folate***	***Vitamin B12***	***Vitamin C***	***Vitamin A***	***Vitamin D***
Unit		*mg/Day*	*mg/Day*	*mg/Day*	*mg/Day*	*µg/Day*	*µg/Day*	*mg/Day*	*µg/Day*	*IU/Day*
Women	Sedentary	1.4	1.9	11	1.9	220	2.5	65	840	600
	Moderate	1.7	2.4	14	1.9					
	Heavy	2.2	3.1	18	2.4					
Pregnant	2nd trimester	2	2.7	+2.5	2.3	570	+0.25	+15	900	600
	3rd trimester									

A review of National Nutrition Monitoring Bureau (NNMB) data [3] showed approximately half of pregnant women experienced insufficient energy intake, with 35% lacking adequate protein and 20% deficient in fat intake. Most pregnant women in India consume less than 50% of the RDA for essential micronutrients such as iron, vitamin A, riboflavin, vitamin C, and folic acid, with estimates ranging from 50 to 80% [3].

Balanced Diet

Most nutrients show a notable rise to support optimal fetal development and maintain the health of the expecting mother. A balanced diet, containing similar quantities of nutrients, is a vital aspect of pregnancy. The developmental origins of the health and disease hypothesis suggest that many adult conditions begin in fetal life. Additionally, certain epigenetic changes influenced by factors such as diet can affect multiple generations. Promoting a healthy diet and an active lifestyle are recommended to prevent excessive gestational weight gain (GWG). In populations affected by undernutrition, it is recommended to ensure a balanced intake of energy and protein to mitigate the risk of adverse pregnancy outcomes such as low birth weight (LBW), small for gestational age (SGA) infants, and stillbirths [10].

Thus, a balanced diet helps to avoid or combat nutritional deficiencies during the developmental stages of the fetus and in the lifespan of both the mother and child. Some of the key nutrients and their needs for pregnancy are listed in Table 3.

Table 3. Nutrients and their need in pregnancy.

Nutrient	Needed for	Deficiency causes
Folic acid	• Neural tube development in the fetus • Precursor of l-methyl folate necessary for DNA replication and RNA synthesis, DNA methylation • Regulate homocysteine metabolism.	Primarily neural tube defects (NTD) (spina bifida, anencephaly)

Iron	• Production of hemoglobin • Transport of oxygen • Fetal growth • Development of appendages, including the placenta	Anemia
Protein	Muscle and body development of the fetus and maternal tissue repair and growth.	Deformed body structure
Carbohydrate	• Provides energy to the expecting mother. • Non-starch polysaccharides help to combat constipation and increase the reduced motility of the gastrointestinal tract.	Constipation/irregular bowel movement
Iodine	Essential to produce the thyroid hormones, thyroxine (t4) and the 3,5,3'-triiodothyronine (t3), which are vital for the neurological development of a fetus.	Cretinism

Source

1. *Jouanne et al. [11] reported nutrient requirements during pregnancy and lactation.*
2. *Nutrition in Pregnancy, Williamson (2006) [12].*
3. *Iodine deficiency in pregnancy: The effect on neurodevelopment in children. Skeaff (2011) [13].*

DIET OF PREGNANT WOMEN IN VARIOUS REGIONS OF INDIA

The nutrient pattern has been compiled from various publications [14, 15, 7, 16]. Indian women's diets are primarily cereal-based. The average intake of cereals, millets, pulses, and legumes was marginally higher and that of roots and tubers was marginally lower than that observed among non-pregnant non-lactating (NPNL) and sedentary women [17]. According to the NNMB Brief Report on Urban Nutrition [18], the prevalence of protein-calorie inadequacy among rural pregnant women is significantly higher than that among NPNL women (5.1%). In contrast, urban populations exhibit gross inadequacy in vitamin A and Riboflavin consumption, while their consumption of vitamin C and total folate appears to be adequate. However, none of the groups met the expected RDA for nutritional consumption. These findings promote critical awareness focused on enhancing not only the quantity but also the quality of nutritional intake [19]. This goal can be accomplished through comprehensive nutrition and health education programs and campaigns, especially for lower-class, middle-class, and lower-class pregnant and lactating mothers. Such events are required to reduce the inadequate consumption caused by illiteracy and promote affordable nutrient-rich foods.

DIET AND FOOD TABOOS

Food taboos are widespread in various human cultures. They are typically influenced by religious, cultural, and societal factors. Food taboos, whether grounded in scientific validity, are frequently used to safeguard individuals. For instance, the correlation between allergies and depression could have prompted the prohibition of certain food items identified as the causative agents of allergies [20].

Eat for Two

Eat for two' is an old age myth for pregnancy, which says that an expecting mother must eat for two, for herself and the growing baby. However, the phrase has mixed opinions. While it aids in weight gain (+11–13 kg) to support pregnancy, it can make the mother obese, leading to unnecessary complications during pregnancy and delivery and increased birth weight of the fetus [21]. Many experts advise that, despite increased hunger during pregnancy, there is no necessity to "eat for two," even in cases of expecting twins or triplets. This caution helps avoid excessive snacking on foods that are high in fat and sugar. One should just follow A healthy diet [21]. Thus, frequent feeding and healthy eating habits help in achieving optimal growth for both baby and expecting mother rather than 'Eating for Two [22] (Figures 1, 2).

Concept of 'Hot' and 'Cold' Food

Many Indian communities classify foods as 'hot' or 'cold,' with perceptions varying widely across regions. 'Hot' foods are often considered harmful during pregnancy, while 'cold' foods are seen as beneficial.

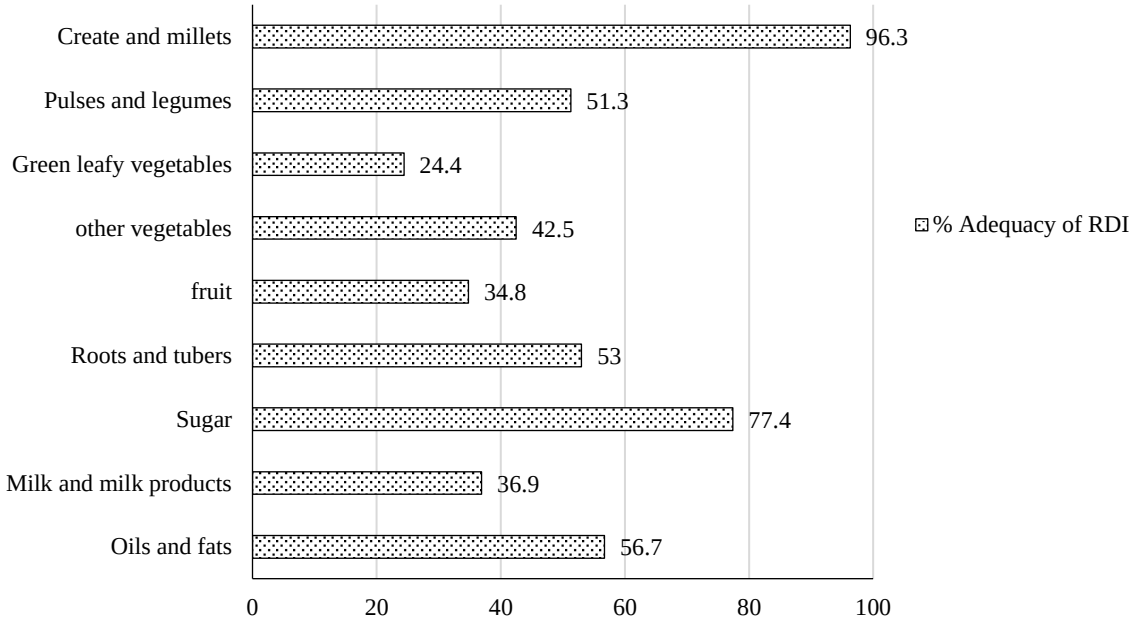

Figure 1. Foods foods are categorised under different food groups.
Sources: S tyagi (Human nutrition metabolism volume 31,2023

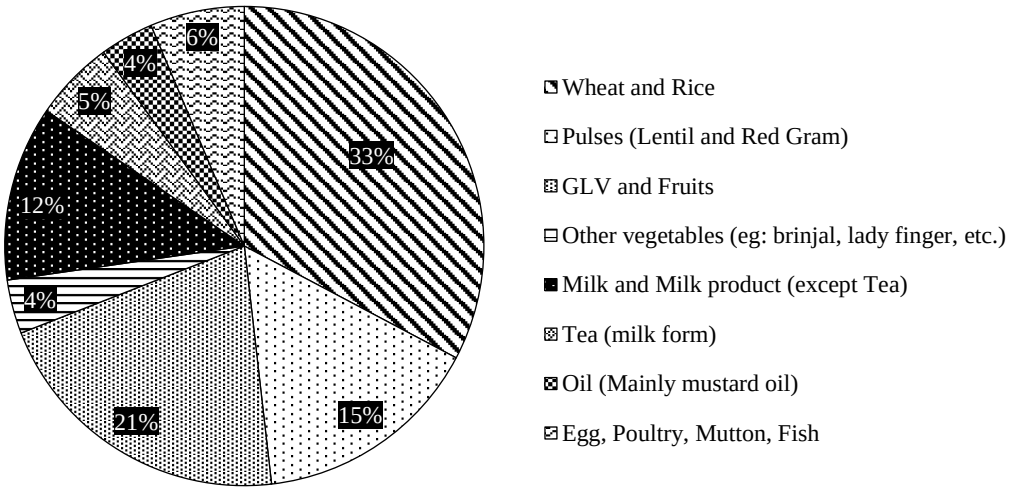

Figure 2. Food groups distribution of pregnant women.

Many women believe that pregnancy induces a “hot state” in the body, making the consumption of hot foods (papaya, coconut, pineapple, red chilies, jackfruit, meat, and eggs) during this period harmful, potentially leading to abortion. Conversely, cold foods (yogurt and certain vegetables, particularly gourds excluding brinjals and cabbage) are believed to have a cooling effect on the body and are considered beneficial. However, hot foods were deemed essential immediately after childbirth to aid the mother's recovery from labor and to promote milk production. During breastfeeding, cold foods are prohibited due to concerns about causing diarrhea and common colds in the baby, as well as reducing milk secretion in the mother [23].

Animal foods are generally perceived as hot, whereas milk and its derivatives may be classified differently based on regional beliefs. Fruits are generally perceived as cold, but there are exceptions, with some fruits considered 'hot' in specific communities. Therefore, there is a consensus that certain foods, such as papaya, pineapple, and jaggery, are perceived as 'hot' across different communities [24].

Specific Food Taboos

- Pregnant women are often advised to consume pawpaw and jackfruit because of concerns that substances in these fruits may have abortive effects [20].
- Papaya, especially unripe or semi-ripe, contains latex, which induces uterine contraction. Thus, it is not consumed during pregnancy to prevent early contractions.
- Pineapples contain bromelain, which is consumed during pregnancy [25]. This enzyme modifies the texture of the cervix, potentially leading to premature contractions that may result in miscarriage. Additionally, it causes diarrhea, which is particularly uncomfortable for pregnant individuals [26].
- Chakrabarti and Chakrabarti (2019) observed that foods with a sticky texture, such as tender jackfruit and banana stem, were traditionally avoided during pregnancy because of concerns that they hinder the natural clearing of the vernix, the greasy material covering the newborn's body. Additionally, they noted in their research that hard-to-open fruits, such as coconut and bel, were also avoided during pregnancy, as it was believed they could lead to difficult or obstructed labor. They mentioned that "coconut shapes like a uterus and eating it could cause the uterus to harden" [23].
- Certain foods are believed to affect a baby's appearance and complexity. For example, some taboos restrict the consumption of fruits and vegetables of a specific color, which might influence the baby's skin tone [27].

APPROACHES TO TACKLE NUTRITIONAL REQUIREMENTS AND CULTURAL DIETARY RESTRICTIONS DURING PREGNANCY IN INDIA

1. Assessments of food supplementation and cash transfer programs show a reduction in economic constraints, thereby enhancing the affordability of the recommended foods [28].
2. Strategies aimed at improving food availability include the promotion of kitchen gardens, homestead production, empowerment of women through cooperatives, and interventions in agriculture that prioritize nutrition [29].
3. Strengthening the food systems approach, which encompasses the entire process, from agricultural production to consumption, is essential (farm-to-fork) [28].
4. Adopt an approach that ensures the affordability, availability, accessibility, and sustainability of diverse nutrient-rich foods, thus guaranteeing food security and resilience for pregnant women [28].
5. When counseling pregnant women, it is important to acknowledge their cultural beliefs about food choices, which can often create anxiety and uncertainty due to conflicting information. By offering culturally sensitive counseling. These concerns can be effectively addressed.
6. Offering culturally appropriate and easily accessible food choices rich in essential nutrients can help pregnant women maintain a balanced diet while honoring their cultural beliefs.
7. Dispelling misconceptions is essential for empowering pregnant women with evidence-based information regarding food taboos [27].

SUMMARY

This review provides an in-depth examination of the nutritional status and dietary restrictions of pregnant women in India. This emphasizes the role of socioeconomic disparities, traditional cultural practices, and biomedical guidelines in influencing maternal nutrition across the country. Despite advancements in addressing maternal undernutrition, numerous challenges remain, such as poverty, limited access to healthcare, and deeply ingrained cultural beliefs regarding pregnancy diets. This review highlights the critical need for targeted interventions that consider the wide range of dietary practices and cultural beliefs present in various regions and communities throughout India. By identifying knowledge gaps and proposing directions for future research, this review seeks to contribute to the formulation of evidence-based strategies aimed at enhancing maternal and fetal health outcomes in the Indian context.

CONCLUSION

India's fight for optimal maternal and child health hinges on effectively addressing the nutritional needs of pregnant women. Although economic progress is undeniable, undernutrition remains a stubborn adversary, especially for expectant mothers and their developing babies. To overcome this challenge, a nuanced strategy is needed that seamlessly integrates scientific knowledge with the rich tapestry of cultural practices. RDA serve as a scientific compass, providing crucial guidance on the specific nutrients required by pregnant women. However, cultural beliefs heavily influence dietary choices. Healthcare professionals must embrace cultural sensitivity in counseling. By acknowledging and understanding food taboos, they can craft personalized dietary plans that cater to women's nutritional needs while respecting their cultural heritage. Empowering women with evidence-based information is critical. Demystifying myths surrounding food taboos allows pregnant women to make informed dietary decisions. This necessitates debunking common misconceptions and highlighting the nutritional benefits of alternative foods that resonate with cultural preferences. For instance, if a woman avoids certain vegetables due to a "heating" property, recommending equally nutritious alternatives with a "cooling" effect can bridge the gap between scientific advice and cultural beliefs.

Dismantling socioeconomic disparities is paramount to ensuring access to a nourishing diet. Food supplementation programs targeting pregnant women provide safe nets. Empowering women through agricultural interventions, such as training in kitchen gardening or small-scale livestock rearing, can equip them with knowledge and resources to cultivate a more diverse and nutritious food source for their families. Moreover, advocating for food system approaches, such as farm-to-fork initiatives, can establish a more efficient and sustainable framework for delivering nutrient-dense foods to communities, thereby enhancing maternal and child health. In conclusion, addressing the nutritional needs of pregnant women in India requires a comprehensive and multi-faceted strategy. By integrating scientific understanding with cultural sensitivity, dispelling myths, and tackling socioeconomic barriers, we can pave the way for a healthier future for mothers and their children. By nurturing a holistic approach that respects tradition, while embracing evidence-based practices, India can unlock its full potential for optimal maternal and child health.

REFERENCES

1 Global Hunger Index. Global Hunger Index Report, Vol. 2023 [online]. 2023. Available from: https://www.globalhungerindex.org/pdf/en/2023.pdf
2 Abhishek K. The rise and rise of middle class in India [online]. Medium. Available from: https://medium.com/@kriteshabhishek/the-rise-and-rise-of-middle-class-in-india-d5e9d29551ee
3 National Nutrition Monitoring Bureau. Diet and Nutritional Status of Rural Population, Prevalence of Hypertension & Diabetes Among Adults and Infant & Young Child Feeding Practices—Report of Third Repeat Survey (NNMB Technical Report No. 26). National Institute of Nutrition, Indian Council of Medical Research; 2012.
4 National Institute of Nutrition. Recommended dietary allowances (RDA) [online]. 2020. Available from: https://www.nin.res.in/RDA_Full_Report_2020.html
5 Varadharajan KS, Thomas T, Kurpad AV. Poverty and the state of nutrition in India. Asia Pac J Clin Nutr. 2013;22(3):326–39. DOI: 10.6133/apjcn.2013.22.3.19. PMID: 23945402.
6 Ministry of Women and Child Development. POSHAN Abhiyaan [online]. Available from: https://poshanabhiyaan.gov.in/
7 Rao KM, Balakrishna N, Arlappa N, Laxmaiah A, Brahmam GNV. Diet and nutritional status of women in India. J Hum Ecol. 2010;29(3):165–70. DOI: 10.1080/09709274.2010.11906259.
8 World Health Organization (WHO). Data on anemia [online]. Global Health Observatory. Available from: https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children_
9 National Research Council (US). Subcommittee on the 10th edition of the Recommended Dietary Allowances. Recommended Dietary Allowances, 10th ed. National Academies Press: Washington, USA; 1989.

10 Danielewicz H, Myszczyszyn G, Dębińska A, Myszkal A, Boznański A, Hirnle L. Diet in pregnancy-more than food. Eur J Pediatr. 2017;176(12):1573–9. DOI: 10.1007/s00431-017-3026-5. PMID: 29101450.
11 Sripathi N, Mohapatra J, Dehury P, Neeragatti S, Behera S, Dehury RK. The function of mid-day meal scheme: A critical analysis of existing policies and procedures in Rayagada District of Odisha (India). Int J Community Soc Dev. 2023;5(1):97–118. DOI: 10.1177/25166026221138436
12 Jouanne M, Oddoux S, Noël A, Voisin-Chiret AS. Nutrient requirements during pregnancy and lactation. Nutrients. 2021;13(2):692. DOI: 10.3390/nu13020692. PMID: 33670026.
13 Williamson CS. Nutrition in pregnancy. Nutr Bull. 2006;31(1):28–59. DOI: 10.1111/j.1467-3010.2006.00541.x.
14 Gautam VP, Taneja DK, Sharma N, Gupta VK, Ingle GK. Dietary aspects of pregnant women in rural areas of Northern India. Matern Child Nutr. 2008;4(2):86–94. DOI: 10.1111/j.1740-8709.2007.00131.x. PMID: 18336642.
15 Andersen LT, Thilsted SH, Nielsen BB, Rangasamy S. Food and nutrient intakes among pregnant women in rural Tamil Nadu, South India. Public Health Nutr. 2003;6(2):131–7. DOI: 10.1079/PHN2002367. PMID: 12675955.
16 Tyagi S. Assessment of maternal dietary intake during pregnancy and its relation with nutritional status of infants at birth. Hum Nutr Metab. 2023;31:200180. DOI: 10.1016/j.hnm.2022.200180.
17 National Nutrition Monitoring Bureau. Third Repeat Rural Survey—Technical Report No. 26 [online]. 2012. Available from: https://www.nin.res.in/downloads/NNMB_Third_Repeat_Rural_Survey%20%20%20Technicl_Report_26%20(1).pdf
18 National Nutrition Monitoring Bureau. Urban Nutrition Report—Brief Report [online]. 2017. Available from: https://www.nin.res.in/downloads/NNMB%20Urban%20Nutrition%20Report%20-Brief%20%20%20report.pdf
19 Swaminathan S, Raj R, Thomas T, Kurpad AV. RDA for Indians—What more do we need, and do these fit requirements? J Indian Med Assoc. 2015;36.
20 Meyer-Rochow VB. Food taboos: their origins and purposes. J Ethnobiol Ethnomed. 2009;5:18. DOI: 10.1186/1746-4269-5-18. PMID: 19563636.
21 Drife JO. Weight gain in pregnancy: eating for two or just getting fat? BMJ. 1986;293(6552):903–4. DOI: 10.1136/bmj.293.6552.903. PMID: 3094709.
22 Skeaff SA. Iodine deficiency in pregnancy: the effect on neurodevelopment in the child. Nutrients. 2011;3(2):265–73. DOI: 10.3390/nu3020265. PMID: 22254096.
23 Chakrabarti S, Chakrabarti A. Food taboos in pregnancy and early lactation among women living in a rural area of West Bengal. J Family Med Prim Care. 2019;8(1):86–90. DOI: 10.4103/jfmpc.jfmpc_53_17. PMID: 30911485.
24 Nag M. Beliefs and practices about food during pregnancy: implications for maternal nutrition. Econ Polit Wkly. 1994;29:2427–38.
25 Leelakanok N, Petchsomrit A, Janurai T, Saechan C, Sunsandee N. Efficacy and safety of bromelain: A systematic review and meta-analysis. Nutr Health. 2023;29(3):479–503. DOI: 10.1177/02601060231173732. PubMed: 37157782.
26 Potdar RD, Sahariah SA, Gandhi M, Kehoe SH, Brown N, Sane H, et al. Improving women's diet quality preconceptionally and during gestation: Effects on birth weight and prevalence of low birth weight—A randomized controlled efficacy trial in India (Mumbai Maternal Nutrition Project). Am J Clin Nutr. 2014;100(5):1257–68. DOI: 10.3945/ajcn.114.084921. PubMed: 25332324.
27 Kumar D, Kumar P, Ahuja V. Food taboos during pregnancy in a north Indian population. J Clin Diagn Res. 2013;7(1):101–4.
28 Nguyen PH, Kachwaha S, Tran LM, Sanghvi T, Ghosh S, Kulkarni B, Beesabathuni K, Menon P, Sethi V. Maternal diets in India: gaps, barriers, and opportunities. Nutrients. 2021;13(10):3534. DOI: 10.3390/nu13103534. PMID: 34684535.
29 National Health Service (NHS). Have a healthy diet during pregnancy [online]. 2023. Available from: https://www.nhs.uk/pregnancy/keeping-well/have-a-healthy-diet/

