COMMENTARY

More than Just Leafy Greens: Expanding the ICMR-NIN Guidelines for a Healthier, Productive Future

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Abstract

The 2024 ICMR-NIN Dietary Guidelines for Indians offer a comprehensive framework to address the dual burden of malnutrition India faces. These guidelines emphasise balanced diets, physical activity, and the consumption of diverse, nutrient-rich foods across all life stages, aligning with global nutrition trends and sustainability goals. This commentary explores the guidelines' role in fostering improved health outcomes essential for leveraging India's demographic dividend and promoting a healthier, more productive population. It further suggests expanding the guidelines to include specific recommendations on food safety, mental health, plant-based and sustainable eating, digital nutrition tools, and fortified foods. Integrating these aspects could make the guidelines more relevant, equipping individuals and policymakers with actionable strategies to address India's evolving public health challenges. Our role in implementing these guidelines is crucial, as it will enhance the nation's potential for economic growth through a healthier and more resilient workforce.

Keywords

ICMR-NIN Dietary Guidelines; Double Burden; Malnutrition; Obesity; Public Health; Sustainable Diets; Mental Health; India

Introduction

With its unique demographic profile, India stands at a crucial juncture in its public health landscape. Home to one of the world's largest youth populations, India's demographic dividend presents immense potential for economic growth and social development. Implementing the ICMR-NIN Dietary Guidelines, focusing on balanced diets and physical activity, could significantly improve the health and well-being of India's young and working-age population. This, in turn, could lead to a healthier, more productive population, enhancing the nation's potential for economic growth. Despite the current dual burden of malnutrition, there is optimism for a healthier future (1). This dual burden also needs clarification, as it manifests differently across socio-economic and geographic segments. While urban areas are experiencing a rise in obesity and NCDs, rural regions continue to struggle with severe

undernutrition. Recognising these distinctions is crucial for developing tailored interventions that address the specific needs of these diverse populations.

The ICMR-NIN Dietary Guidelines 2024 aim to address this paradoxical challenge by promoting dietary diversity, physical activity, and balanced nutrition across different life stages. This is crucial for improving individual health outcomes and fostering a healthier workforce that can contribute effectively to India's economy. By establishing a framework for optimal nutrition and preventive health, the guidelines align with India's broader socio-economic goals, helping to mitigate the impacts of non-communicable diseases (NCDs) such as diabetes and heart disease that have become increasingly prevalent across all age groups. A recent study by ICMR has highlighted the role of Advanced Glycation End Products (AGEs) in contributing to the diabetes epidemic in India. It highlights the importance of addressing dietary patterns that involve high-AGE foods like fried and processed products, linking these dietary habits to increased inflammation and chronic diseases. The future guidelines must incorporate these findings to advocate for dietary changes that minimize AGE consumption, aligning recommendations with the latest research insights.

In a country where more than 62% of the population falls within the working-age bracket (15-59 years), poor health outcomes linked to malnutrition can lead to significant productivity losses, ultimately hindering economic growth. Evidence suggests that malnutrition, in all its forms, contributes to increased healthcare costs and undermines educational attainment, cognitive development, and overall work capacity. The guidelines emphasise balanced nutrition from early childhood to adulthood, essential for fostering cognitive and physical development in youth and preventing NCDs that disproportionately affect middle-aged and older adults (2). It is essential to understand that malnutrition is not solely about undernutrition; it also includes deficiencies in micronutrients like iron, vitamin A, and zinc, which persist across various demographics. Addressing these concerns requires dietary diversification and broader systemic changes, such as food fortification and improved access to diverse and affordable foods.

Furthermore, the guidelines provide actionable insights into dietary practices that support optimal health, focusing on the importance of micronutrient-rich foods, whole grains, and plant-based protein sources. These recommendations are significant for India's youth, who are often more susceptible to dietary trends favouring ultra-processed foods high in unhealthy fats, sugars, and salt. Studies show that early adoption of poor dietary habits can lead to an increased risk of developing chronic diseases later in life, potentially compromising the health and productivity of India's future workforce (3). However, India's heavy reliance on cereals like rice and wheat, primarily due to the Public Distribution System (PDS), remains critical. While these staples provide essential calories, they lack sufficient micronutrients. The guidelines must acknowledge the economic and infrastructural realities of the PDS while promoting strategies for diversifying diets within this system, such as integrating fortified staples and incentivising the cultivation of nutrient-dense crops.

The guidelines contribute to forming a resilient, productive, and capable workforce by equipping the population with the knowledge and resources to make healthier food choices. Ensuring that young Indians grow up with solid nutritional foundations can improve educational outcomes, boost work productivity, and reduce the economic burden of NCDs on the healthcare system. Thus, the ICMR-NIN Dietary Guidelines 2024 serve as a critical tool for unlocking the benefits of India's demographic dividend, offering a pathway towards a healthier, more prosperous future. To further maximise the impact of these guidelines, it is essential to address the economic constraints faced by low-income households, which limit their ability to follow ideal dietary patterns. Implementing policies that improve access to diverse foods, provide subsidies for nutrient-rich options, and strengthen food distribution systems can ensure that these guidelines are not only aspirational but also achievable for all segments of the population.

Discussion

Balanced Diet and Life-Stage Nutrition

The 2024 ICMR-NIN Dietary Guidelines emphasise a balanced intake of carbohydrates, proteins, fats, and various micronutrients to meet the diverse dietary needs of different age groups. For instance, adequate intake of proteins, especially from pulses and legumes, is essential for children and adolescents to support growth and development. In contrast, increased calcium and vitamin D intake is recommended for older adults to prevent bone density loss and fractures (2). Studies show that life-stage-specific nutritional guidelines significantly impact health outcomes; in children, adherence to balanced dietary guidelines correlates with lower stunting rates and better cognitive development outcomes (4). Critics have argued that these recommendations may be overly simplified as there are limitations of relying solely on plant-based protein sources without adequately addressing the nutritional gaps that animal-sourced foods (ASFs) fill. The guidelines downplay the role of ASFs despite their importance in providing bioavailable micronutrients essential for growth and development. Furthermore, the dismissal of protein supplements is seen as inconsistent with evidence that supports their benefits internationally, especially for individuals with higher protein needs, such as athletes and those recovering from illness.

Expanding on Food Safety and Hygiene

Foodborne illnesses are a significant concern in India, particularly in rural areas where access to clean water and sanitation facilities may be limited. The current guidelines briefly mention food safety; however, more detailed advice is needed on proper food storage, preparation, and handling to reduce contamination risk. The WHO reports that unsafe food containing harmful bacteria, viruses, parasites, or chemical substances causes over 200 diseases worldwide (5). A recent survey indicated that 25% of rural households in India experience at least one foodborne illness per year, often due to improper food handling and sanitation (6). Expanding this section to address systemic issues such as inadequate agricultural practices and supply chain vulnerabilities is crucial. For instance, studies have revealed the presence of toxic metals and pesticides in vegetables due to polluted water sources and improper farming techniques. The guidelines should advocate for regular monitoring of the supply chain and emphasise sustainable agricultural practices to mitigate these risks. Addressing food safety comprehensively, from production to consumption, will enhance the relevance and applicability of the guidelines.

Linking Nutrition to Mental Health

A growing body of research establishes a connection between diet and mental health, emphasising that nutrient-rich diets can reduce the risk of mental health issues. Diets rich in omega-3 fatty acids, B vitamins, and antioxidants positively affect mood and cognitive functions. A longitudinal study in India found that adults who consumed higher amounts of omega-3 fatty acids showed a 20% lower incidence of depression over five years (7). However, the 2024 ICMR-NIN guidelines could further expand on this link to emphasise how dietary habits can impact mental health, particularly for youth populations at higher risk of anxiety and depression (8). The guidelines could further explore how reducing AGE consumption through healthier cooking methods can improve physical and mental health.

Emphasising Plant-Based and Sustainable Diets

The ICMR-NIN guidelines advocate for dietary diversity but could further promote plant-based diets as sustainable options with multiple health benefits. A shift towards plant-based eating aligns with global nutrition trends and is increasingly considered beneficial for health and environmental sustainability. Research from the EAT-Lancet Commission shows that a plant-forward diet can reduce greenhouse gas emissions by up to 20% while supporting individual health outcomes such as reduced heart disease risk (9). Encouraging legumes, pulses, and nuts as protein sources in Indian diets could help mitigate environmental impact while offering health benefits (10). While promoting plant-based diets, it is essential to acknowledge the cultural and economic realities of India's reliance on

cereals, mainly through the PDS. Cereals provide necessary calories but lack micronutrient diversity, critical for long-term health.

Utilising Digital Nutrition Tools

Digital tools, such as mobile apps for diet tracking, present an opportunity to support adherence to dietary recommendations. The ICMR-NIN guidelines could include recommendations for utilising these tools to enhance user engagement. In a study conducted in urban Indian populations, users of nutrition apps reported a 35% improvement in adherence to dietary goals compared to non-users, demonstrating that digital engagement can have a measurable impact on dietary habits (11). Given India's widespread access to mobile technology, promoting these tools could make nutritional guidelines more accessible, especially for younger, tech-savvy populations. Access to such tools would remain limited in rural and economically disadvantaged areas. The guidelines could address this disparity by advocating for government-supported digital literacy programs and subsidised access to technology that promotes nutritional awareness, ensuring that the benefits of these tools are equitably distributed.

Reducing Sugar and Processed Foods

Excessive intake of processed foods high in added sugars, salt, and unhealthy fats is linked to rising obesity and lifestyle diseases in India. The guidelines advise limiting these foods, but incorporating specific daily limits on sugar intake could reinforce this advice. The WHO recommends that added sugars comprise less than 10% of total daily energy intake, ideally less than 5%, for optimal health benefits (12). A recent survey revealed that Indian adolescents consume an average of 40 grams of added sugars daily, almost double the recommended intake, highlighting a pressing need for more targeted guidance (13). Merely setting limits on sugar intake is insufficient without addressing the underlying cultural factors that drive sugar consumption. For example, many affordable and accessible foods in low-income communities can be high in sugars and refined carbohydrates. A comprehensive approach would involve making healthier alternatives more accessible and regulating the marketing of sugary products, particularly those targeting children and adolescents. Furthermore, the guidelines could explore integrating digital tools to help monitor and reduce sugar intake, especially among tech-savvy youth populations.

Addressing Lifestyle Diseases with Targeted Nutrition

With lifestyle diseases on the rise, the guidelines could benefit from a more targeted focus on nutrition for the prevention and management of conditions such as diabetes and cardiovascular disease. Current research shows that a diet high in fibre and omega-3 fatty acids can improve insulin sensitivity and reduce cardiovascular disease risk (McEven et al. 2010). In India, where diabetes rates have nearly doubled over the past two decades, integrating specific dietary recommendations, such as the inclusion of whole grains, could significantly impact public health outcomes (14). Building on the recent ICMR findings on AGEs could also emphasise reducing the consumption of ultra-processed and fried items that contribute to inflammation.

Promoting Food Fortification and Enhancing Bioavailability

Food fortification presents a viable strategy to combat micronutrient deficiencies, which remain prevalent in India. For example, iodised salt is a crucial source of iodine, helping prevent deficiencies that can lead to thyroid disorders. A study found that iron-fortified foods, combined with vitamin C-rich foods to enhance absorption, could reduce anaemia rates by up to 30% in at-risk populations (15). The ICMR-NIN guidelines briefly mention bioavailability; however, expanding this section to include practical strategies for nutrient absorption could improve health outcomes across diverse communities. Relying heavily on fortification, while beneficial, may not address the root causes of dietary inadequacy, such as the reliance on cereals or lack of dietary diversity. Additionally, nutrient-dense foods like ASFs should not be sidelines, as they play a vital role in enhancing bioavailability.

Incorporating Recommendations for Special Diets

As more Indians adopt various dietary preferences, the guidelines could address special diets, such as vegan, ketogenic, and gluten-free, to ensure nutritional adequacy. Including information on achieving a balanced intake within these dietary frameworks could help individuals meet their nutritional needs while adhering to dietary preferences. The guidelines must also update their stance on protein intake and the role of supplements and must refrain from cherry-picking studies to substantiate their claims. By addressing these trends, the guidelines could better cater to the evolving dietary landscape in India and provide a more balanced and evidence-based view.

Conclusion

The ICMR-NIN Dietary Guidelines 2024 provide an essential roadmap for addressing India's complex nutritional challenges. They offer a holistic approach to tackling both undernutrition and the increasing prevalence of lifestyle-related diseases. By promoting balanced diets, regular physical activity, and mindful eating practices, these guidelines lay the foundation for a healthier population that can more effectively contribute to the country's socio-economic progress. The emphasis on dietary diversity across life stages is designed to cater to the evolving needs of India's youth, working-age population, and elderly, ensuring that health and productivity are optimized throughout the lifespan.

Expanding the guidelines to include detailed insights on food safety, the connection between diet and mental health, the benefits of sustainable and plant-based diets, and using digital nutrition tools could significantly enhance their impact. Incorporating specific dietary strategies to combat non-communicable diseases, reduce added sugar and processed food intake, and improve micronutrient bioavailability through food fortification would make the guidelines more actionable and responsive to current health needs. Integrating digital nutrition tools and processed food intake are critical step towards lifestyle-related diseases, such as diabetes and cardiovascular conditions, that are increasingly prevalent in India.

As India seeks to maximise its demographic dividend, a population-wide commitment to improved nutrition becomes indispensable. The guidelines address immediate health needs and foster long-term resilience by equipping individuals with the knowledge and practices necessary to maintain lifelong health. Implementing these recommendations across policy and community levels is vital for creating a productive, capable workforce to sustain India's economic growth and pave the way for a healthier, more prosperous future.

Authors Contribution

All authors have contributed equally.

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The authors haven't used any generative AI/AI assisted technologies in the writing process.

References

1. Ministry of Health and Family Welfare, Government of India. Comprehensive National Nutrition Survey (CNNS), 2016-2018: Fact Sheet India. New Delhi: Government of India, 2019. https://nhm.gov.in/WriteReadData/l892s/1405796031571201348.pdf (Accessed on 25-03-2025)
2. Indian Council of Medical Research. Dietary Guidelines for Indians 2024. New Delhi: Ministry of Health and Family Welfare, Government of India, May 2024. https://www.nin.res.in/dietaryguidelines/pdfjs/locale/DGI07052024P.pdf (Accessed on 25-03-2025)
3. Misra A, Singhal N, Sivakumar B, Bhagat N, Jaiswal A, Khurana L. Nutrition transition in India: secular trends in dietary intake and their relationship to diet-related non-communicable diseases. J Diabetes. 2011;3(4):278-292.
4. Alam MA, Richard SA, Fahim SM, Mahfuz M, Nahar B, et al. Correction: Impact of early-onset persistent stunting on cognitive development at 5 years of age: Results from a multi-country cohort study. PLOS ONE 2020;15(2): e0229663.
5. World Health Organization. "Food Safety." WHO Newsroom, April 30, 2020.

https://www.who.int/news-room/fact-sheets/detail/food-safety (Accessed on 25-03-2025)
6. Lakshmi N, Ramya MR, Felicia JP. Domestic food hygiene practices among households in Pulipakkam Village, Kanchipuram District: a cross-sectional study. Int J Community Med Public Health 2021;8(1):397-401.
7. Chaves, Renata da Conceição Silva, Odaleia Barbosa de Aguiar, Arlinda Barbosa Moreno, André Russowsky Brunoni, M. C. B. Molina, Maria Carmen Viana, Isabela Bensoñor, Rosane Harter Griep and Maria de Jesus Mendes da Fonseca. "Consumption of Omega-3 and Maintenance and Incidence of Depressive Episodes: The ELSA-Brasil Study." Nutrients. 2022;14(15):3227.
8. Khalid, Sundus, Claire Michelle Williams and Shirley Reynolds. "Is there an association between diet and depression in children and adolescents? A systematic review. Br J Nutr. 2016;116(12):2097-2108.
9. Prag, Adam A. and Christian Bugge Henriksen. "Transition from Animal-Based to Plant-Based Food Production to Reduce Greenhouse Gas Emissions from Agriculture—The Case of Denmark." Sustainability. 2020;12(19):8228
10. Minocha S, Thomas T, Kurpad AV. Dietary Protein and the Health-Nutrition-Agriculture Connection in India. J Nutr. 2017 Jul;147(7):1243-1250.
11. Paramastri, Rathi, Satwika Arya Pratama, Dang Khanh Ngan Ho, Sintha Dewi Purnamasari, Afrah Zaki Mahdi Mohammed, Cooper J. Galvin, Yi-Hsin Elsa Hsu, Afifa Tanweer, Ayesha Humayun, Mowafa Said Househ and Usman Iqbal. "Use of mobile applications to improve nutrition behaviour: A systematic review." Computer methods and programs in biomedicine. 2020;192: 105459.
12. Yan RR, Chan CB, Louie JCY. The current WHO recommendation to reduce free sugar intake from all sources to below 10% of daily energy intake for supporting overall health is not well supported by available evidence. Am J Clin Nutr. 2022;116(1):15-39.
13. McEwen, Bradley J., Marie-Christine Morel-Kopp, Geoffrey H Tofler and Christopher M Ward. "Effect of Omega-3 Fish Oil on Cardiovascular Risk in Diabetes." The Diabetes Educator. 2010;36:565-584.
14. Kasturia, Shirin, Mohammed K. Ali, K M Venkat Narayan, Nikhil Tandon, Roopa Shivashankar, Vandana Garg, Deksha Kapoor, Anitha Mohanasundaram, Deepa Mohan, Muhammad Masood Kadir, Dorairaj Prabhakaran, Viswanathan Mohan and Lindsay M. Jaacks. "Diets for South Asians with diabetes: recommendations, adherence, and outcomes." Asia Pacific journal of clinical nutrition. 2018;27(4): 823-831.
15. Ray WB, Charisma D. Optimizing iron adequacy and absorption to prevent iron deficiency anaemia: The role of combination of fortified iron and vitamin C." 2021;5(1-1):33-39.