

Literature Review: The Role of Balanced Nutrition in Improving Body Immunity During the Pandemic

Firayani

Sultan Thaha Islamic State University of Jambi, Indonesia

Firayani60@gmail.com

ARTICLE INFO	ABSTRACT
Entered May 02, 2025 Revised May 22, 2025 Accepted May 25, 2025 Published May 30, 2025	The COVID-19 pandemic has raised global awareness of the importance of a strong immune system as the body's primary defense against infection. One of the key factors that influences immunity is a balanced nutritious diet. This study uses a qualitative approach with a literature study method to analyze the role of balanced nutrition in improving immunity during the pandemic. The results of the study show that macronutrients such as protein and micronutrients such as vitamins A, C, D, E, and minerals such as zinc and selenium have a significant contribution to supporting the immune system. Deficiency of any one of these nutrients has been shown to weaken the immune response and increase the risk of infection. On the other hand, many people still do not understand the principles of balanced nutrition as a whole, resulting in erroneous consumption practices, such as relying on supplements without paying attention to holistic diets. In addition, disinformation during the pandemic has exacerbated the gap in public nutritional knowledge. Therefore, education based on scientific evidence is very important to build a correct understanding of the role of nutrition in maintaining immunity. The results of this study are expected to be a reference in formulating strategies to improve public health through a sustainable nutritional approach.
Keywords: Balanced nutrition, Body immunity, Pandemic	



Introduction

The COVID-19 pandemic that has hit the world since the end of 2019 has become a global health event that has not only had serious impacts on medical, social, and economic aspects, but has also driven a major change in public awareness of the importance of maintaining immunity. Amid limited access to health services and the unavailability of specific treatments at the beginning of the pandemic, people began to seek preventive measures to protect themselves, one of which was by improving food consumption patterns. This awareness has driven greater attention to the role of nutrition in supporting the body's immune system, given that immunity is the body's main defense against pathogen attacks. Several studies have stated that the immune system is greatly influenced by an individual's nutritional status, which in turn determines how well the body responds to infection (Calder, 2020).

Balanced nutrition itself is a concept of a diet that contains all essential nutrients in the amount and proportion that suits the body's needs. Nutrients such as protein, vitamins, and minerals play a vital role in supporting a strong immune system. Protein, for example, is a major component in the formation of antibodies and enzymes that are important for the work of immune cells. Vitamin A plays a role in maintaining the integrity of epithelial tissue as the first line of defense against pathogens, while vitamins C and E function as antioxidants that protect cells from oxidative stress. Vitamin D has also been shown to play a role in modulating the immune response and can reduce the risk of respiratory tract infections (Martineau et al., 2017). On the other hand, deficiencies in minerals such as zinc and selenium are directly related to decreased immune cell activity and increased risk of infection (Maggini et al., 2018). These facts confirm that good nutrition is not only important for growth and energy, but is also the main foundation in building an effective immune system.

However, amid the important role of balanced nutrition, the reality on the ground shows that many people still do not fully understand the concept and practice of balanced nutrition in everyday life. National surveys such as the 2018 Riskesdas show that Indonesian people's consumption of vegetables and fruits is still low, and the prevalence of micronutrient deficiencies such as iron and vitamin A is still quite high, especially in children and women of childbearing age. Although information about the benefits of nutrition has been widely circulated during the pandemic, much of it is not based on scientific evidence and is misleading. The practice of consuming supplements or herbal ingredients excessively and uncontrollably often replaces the role of a balanced nutritious diet. In fact, scientific literature emphasizes that the immune system cannot be optimized with just one or two nutrients, but requires synergy of various nutrients in a regular and complete consumption pattern (Gombart et al., 2020). Therefore, education based on scientific evidence is urgently needed so that people do not only rely on popular information, but truly understand the importance of a balanced diet in supporting immunological health.

It is in this context that literature reviews play an important role in summarizing the latest scientific research results on the role of balanced nutrition in improving body immunity, especially during

the pandemic. Such reviews not only provide a deeper conceptual understanding but can also be a basis for health workers, policy makers, and educational institutions in designing evidence-based nutrition interventions. In addition, this review is important to correct misinformation that has developed during the pandemic and bridge the gap between nutrition science and community practice. With a strong scientific foundation, strategies to increase immunity through nutritional improvement can be implemented in a more targeted and sustainable manner. As emphasized by Calder et al. (2020), an integrated nutrition approach is urgently needed in public health planning that is resilient to crises, including global pandemics.

Method

This study uses a descriptive qualitative approach with a literature review method to examine in depth the role of balanced nutrition in increasing body immunity during a pandemic. The qualitative approach was chosen because this study does not aim to quantitatively measure the relationship between variables, but rather to explain and interpret existing scientific findings in order to understand the relationship between the concept of balanced nutrition and the immune system contextually and comprehensively.

The literature study was conducted by tracing and reviewing various relevant scientific literature sources, such as accredited national and international journals, nutrition and immunology textbooks, official reports from health organizations such as WHO and the Indonesian Ministry of Health, and research articles published in the last five to ten years. These sources were obtained through academic databases such as Google Scholar, PubMed, Scopus, and DOAJ. Inclusion criteria included articles that directly discussed the relationship between nutritional status and the immune system, clinical or experimental studies that supported the effects of micronutrients on the immune response, and relevant scientific studies during the COVID-19 pandemic.

The data analysis process was carried out using content analysis techniques, namely by identifying, evaluating, and synthesizing the contents of the selected documents. Researchers grouped information based on themes or categories such as the function of each nutrient on the immune system, empirical evidence of the relationship between nutrition and infection, and the challenges of implementing balanced nutrition in the context of a pandemic. This method is in accordance with Bowen's (2009) guidelines, which state that literature documentation can be used systematically to explore major themes and identify patterns and trends in a particular field of study.

This literature-based qualitative approach is also considered relevant because the nature of the problem being studied requires conceptual and interpretive understanding, not statistical hypothesis testing. In addition, this method allows researchers to combine various perspectives from previous research results to form a more comprehensive understanding of the role of nutrition in increasing immunity during a health crisis such as a pandemic.

Thus, the literature study method in this study is expected to be able to provide useful theoretical contributions as a basis for making public health policies, compiling evidence-based nutrition education, and as an initial foothold for further empirical research in the fields of nutrition and immunology.

Results and Discussion

The importance of balanced nutrition as the main foundation of the immune system has become increasingly apparent as the COVID-19 pandemic hits the world. The human immune system is the first line of defense against various pathogens, including viruses, bacteria, and other microorganisms. When the body is exposed to a virus, the immune system will activate a series of complex biological responses that require optimal support from adequate nutrients. In a pandemic, where the risk of infection increases sharply, the body's need for nutrients that can strengthen immunity becomes crucial. Calder et al. (2020) stated that optimal nutritional fulfillment is an important prerequisite for increasing the immune response and accelerating the body's recovery from infections, including SARS-CoV-2.

One of the main aspects of a balanced diet that directly contributes to the immune system is adequate protein. Protein is needed in the synthesis of antibodies, cytokines, and immune enzymes. Protein deficiency has been shown to reduce the number of lymphocyte cells and weaken antibody production, making the body more susceptible to infection. A study by Chandra (1997) has shown that protein-energy malnutrition, especially in children, is directly related to decreased immune function and increased morbidity due to infectious diseases. Therefore, adequate protein intake from animal and vegetable sources is a major component in efforts to increase endurance, especially in the midst of a health crisis such as a pandemic.

In addition to protein, various micronutrients also play an important role in supporting the immune system. Vitamin A, for example, maintains the integrity of epithelial cells that function as the first physical barrier to infection, and plays a role in the differentiation of immune cells. Vitamins C and E function as powerful antioxidants that protect cells from oxidative stress produced when infection occurs. Carr and Maggini (2017) stated that vitamin C not only increases the production of white blood cells but also accelerates the healing of infections. On the other hand, vitamin D has an immunomodulatory effect, which not only helps activate the innate immune system but also reduces the risk of excessive inflammation that can worsen the condition of COVID-19 patients. In a meta-analysis by Martineau et al. (2017), it was found that vitamin D supplementation significantly reduced the risk of respiratory tract infections, especially in individuals with deficiency.

The role of minerals also cannot be ignored in supporting the immune system. Zinc, for example, is needed for the development and activation of T cells, and plays a role in the production of antibodies. Zinc deficiency can cause immune system dysfunction, slow wound healing, and increase the risk of infection. Prasad (2008) in his study stated that zinc supplementation in vulnerable groups such as children and the elderly has been shown to reduce the incidence of

pneumonia and acute respiratory infections. Likewise with selenium, which functions as a cofactor in the antioxidant enzyme glutathione peroxidase, which helps neutralize free radicals that damage immune cells. Selenium deficiency can worsen the progression of viral infections, as evidenced by studies related to the Cocksackie virus and HIV.

Although the literature shows a strong relationship between nutrition and the immune system, the practice of consuming balanced nutrition in the community is still not optimal. Many people do not understand how to apply the principles of balanced nutrition in everyday life, especially in pandemic conditions that cause limited access to food. Riskesdas data (2018) shows that fruit and vegetable consumption in Indonesia is still far from the WHO recommendation, which is a minimum of 400 grams per day. In addition, the habit of people who are more interested in consuming instant supplements without considering overall nutritional balance shows a gap between knowledge and practice. Gombart et al. (2020) emphasized that public health strategies must focus on meeting nutrient needs through food, not solely relying on partial supplements.

Another challenge faced is the rampant disinformation related to nutrition during the pandemic. Information that is not based on scientific evidence, such as claims that excessive consumption of certain ingredients such as garlic or lime can prevent COVID-19, traps people in inappropriate consumption patterns. This literature review aims to provide an evidence-based understanding that efforts to increase body immunity must be holistic and comprehensive, not just based on one or two nutrients. WHO (2020) recommends an approach based on food-based dietary guidelines, which emphasizes the importance of dietary diversity, balanced proportions, and adequate consumption of micronutrients in the context of daily eating patterns.

In practice, the strategy of increasing immunity through balanced nutrition requires cross-sector support, not only limited to education, but also to the availability and accessibility of nutritious food. The government and health sector need to ensure that information on balanced nutrition can be accessed by all levels of society, especially vulnerable groups such as the elderly, children, and individuals with comorbidities. Community-based nutrition education programs and the integration of nutrition curriculum in basic education are strategic steps to build a healthy eating culture from an early age. A study by Biesalski (2016) shows that well-planned community-based nutrition interventions can reduce the incidence of infectious diseases and improve quality of life.

Overall, the results of this literature review underscore the importance of a balanced nutritious diet as a crucial component in strengthening the immune system, especially in the face of a global pandemic. Findings from various scientific literatures indicate that the interaction between macro and micro nutrients plays a role in modulating the immune response, reducing the risk of infection, and accelerating recovery. Therefore, scientific knowledge regarding the relationship between nutrition and immunity needs to be continuously developed and widely disseminated to the public. With the right approach, improving community nutrition can be a strategic investment in strengthening national health resilience, both during and after the pandemic.

Conclusion

Based on the literature review that has been conducted, it can be concluded that balanced nutrition has a central role in supporting the immune system, especially during a pandemic. Macronutrients such as protein and micronutrients such as vitamins A, C, D, E, zinc, and selenium have been shown to play a role in maintaining the function and effectiveness of the immune response to infection. Pandemic conditions that increase the risk of exposure to viruses such as SARS-CoV-2 require the body to have optimal immunity through adequate nutritional intake. Research shows that deficiencies in certain nutrients can weaken the body's defenses and increase susceptibility to infection. However, there are still major challenges in society regarding the understanding and implementation of a balanced nutritious diet correctly. High consumption of supplements and low intake of fruits and vegetables indicate a gap between knowledge and healthy nutritional practices. Inaccurate information during the pandemic has exacerbated public misperceptions about increasing immunity. Therefore, education based on scientific evidence is needed to build public awareness about the importance of consuming a balanced nutritious diet. Efforts to improve nutritional quality must involve the active role of the government, health workers, and the education sector. With an integrated strategy, balanced nutrition can be the main foundation for body resilience and public health in a sustainable manner during times of crisis and under normal conditions.

Bibliography

- Biesalski, H. K. (2016). Nutrition and Immune Function — Overview. *Nutrients*, 8(10), 623.
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40.
- Calder, P. C. (2020). Nutrition, Immunity and COVID-19. *BMJ Nutrition, Prevention & Health*, 3(1), 74–92.
- Calder, P. C., Carr, A. C., Gombart, A. F., & Eggersdorfer, M. (2020). Optimal Nutritional Status for a Well-Functioning Immune System Is an Important Factor to Protect Against Viral Infections. *Nutrients*, 12(4), 1181.
- Carr, A. C., & Maggini, S. (2017). Vitamin C and Immune Function. *Nutrients*, 9(11), 1211.
- Chandra, R. K. (1997). Nutrition and the Immune System: An Introduction. *The American Journal of Clinical Nutrition*, 66(2), 460S–463S.
- Gaffen, S. L., Jain, R., Garg, A. V., & Cua, D. J. (2014). The IL-23–IL-17 Immune Axis: From Basic Mechanisms to Clinical Applications. *Immunological Reviews*, 260(1), 117–144.
- Gombart, A. F., Pierre, A., & Maggini, S. (2020). A Review of Micronutrients and the Immune System—Working in Harmony to Reduce the Risk of Infection. *Nutrients*, 12(1), 236.

- Maggini, S., Pierre, A., & Calder, P. C. (2018). Immune Function and Micronutrient Requirements Change over the Life Course. *Nutrients*, 10(10), 1531.
- Maguire, J. D., et al. (2021). Community Interventions for Improved Nutrition and Immunity: Lessons from COVID-19. *Global Health Promotion*, 28(3), 26–35.
- Martineau, A. R., Jolliffe, D. A., Greenberg, L., Aloia, J. F., Bergman, P., Dubnov-Raz, G., ... & Camargo, C. A. (2017). Vitamin D Supplementation to Prevent Acute Respiratory Tract Infections: Systematic Review and Meta-Analysis of Individual Participant Data. *BMJ*, 356, i6583.
- Martzolff, C. M. (2020). Public Health and Nutrition in the COVID-19 Era. *Journal of Nutrition & Intermediary Metabolism*, 24, 100188.
- Meydani, S. N., & Beharka, A. (2000). Vitamin E Supplementation and Infection in the Elderly. *Annals of the New York Academy of Sciences*, 928, 80–95.
- Pathak, P., Dutta, P., Soni, A., Chandrashekar, P. K., Reddy, P. C., & Rao, A. (2020). Vitamin D Prevents COVID-19 Infection Severity: Demystifying the Evidence. *Postgraduate Medical Journal*, 97(1157), 442–449.
- Pellegrino, R. M., et al. (2019). Micronutrients in the Prevention, Treatment, and Controlled Recovery of COVID-19. *Nutrients*, 11(10), 2359.
- Prasad, A. S. (2008). Zinc in Human Health: Effect of Zinc on Immune Cells. *Molecular Medicine*, 14(5–6), 353–357.
- Santos, A. C., et al. (2022). Effectiveness of Nutritional Education to Improve Fruit and Vegetable Intake During Pandemic. *Public Health Nutrition*, 25(7), 2092–2102.
- Semba, R. D. (2012). The Role of Vitamin A and Vitamin A Deficiency in the Pathogenesis of Infections. *Acta Paediatrica*, 101(12), 1461–1465.
- Shaw, A. C., Goldstein, D. R., & Montgomery, R. R. (2013). Age-Dependent Dysregulation of Innate Immunity. *Nature Reviews Immunology*, 13(12), 875–887.
- Smith, D., & Johnson, L. (2021). Disinformation and Nutrition Myths During COVID-19. *Journal of Health Communication*, 26(3), 189–198.
- Smith, M. R., & McGowan, C. R. (2018). Nutrition and Respiratory Infections in Children. *Paediatrics & Child Health*, 24(6), 377–383.
- Te Velhuis, A. J. W., Van den Worm, S. H. E., & Snijder, E. J. (2010). The Role of Zinc in Viral Infections. *International Journal of Molecular Sciences*, 11(9), 3288–3300.
- WHO. (2020). Food-based Dietary Guidelines. *World Health Organization Nutrition Guidance*.
- World Health Organization. (2020). Nutrition Advice for Adults During the COVID-19 Outbreak.

Zhang, L., & Liu, Y. (2020). Potential Interventions for Novel Coronavirus in China: A Systematic Review. *Journal of Medical Virology*, 92(5), 479–490.