Review

The Free Nutritious Meal Program in Supporting SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being): A Literature Review

Alya Raguan Al Habsyi[1], Lintan Kurnia Farizqi[1]

[1] Faculty of Medicine, Universitas Pembangunan Nasional "Veteran" Jawa Timur, Surabaya, Indonesia

Corresponding Author

Lintan Kurnia Farizqi

Faculty of Medicine, Universitas Pembangunan Nasional “Veteran” Jawa Timur

Rungkut Madya 191, Rungkut Kidul, District Rungkut, Surabaya, East Java 60293, Indonesia

Email: lintan.kurnia.fk@upnjatim.ac.id

ABSTRACT

Stunting remains a major obstacle to achieving Sustainable Development Goal (SDG) 2 (Zero Hunger) and SDG 3 (Good Health and Well-being) in Indonesia, with a prevalence of 24.4% recorded in 2021. The Indonesian government introduced the Free Nutritious Meal Program (*Program Makan Bergizi Gratis*, MBG) as a school-based strategy to improve the nutritional status and well-being of school children. This literature review aimed to synthesise available evidence on the effectiveness of the MBG program in improving students’ nutritional status, health, and academic achievement, and to examine its contribution to SDG 2 and SDG 3 targets. A literature review was conducted following PRISMA-informed reporting. Searches were performed in ScienceDirect, PubMed, ProQuest, and Google Scholar using the PICO framework and Boolean operators. Publications from 2021 to 2025 in English or Indonesian and available in open access were eligible. Five Indonesian studies met all criteria and were synthesised thematically. All five studies reported improvements in nutritional status, physical and mental health, school attendance, learning concentration, and academic performance, with additional benefits for local micro, small, and medium enterprise (MSME) empowerment and food-system resilience. However, all five also documented implementation challenges: logistical barriers and uneven distribution in remote, frontier, and outermost (3T) regions; non-standardised menus and inconsistent nutritional standards; food waste; dependence on government funding; and weak monitoring and evaluation. The MBG program shows consistent positive effects on nutrition, health, and educational outcomes and is aligned with SDG 2 and SDG 3 targets. Its long-term success requires strengthened policy design, cross-sectoral coordination, local community participation, and sustainable evaluation systems. Given the small evidence base, these findings should be interpreted as preliminary, and controlled and

longitudinal evaluations are required.

Keyword : Food resilience; free nutritious meal program; nutritional status; SDG 2; SDG 3; stunting.

Introduction

The prevalence of stunting in Indonesia shows enough numbers worrying, with data from the Central Statistics. Agency mention that the prevalence of stunting reached 24.4 % in 2021. [1] This figure reflects challenge big in effort improving nutritional status children and show that efforts to reduce malnutrition still needs to be improved. Stunting which is defined as failure growth in children consequence lack nutrition chronic, can have an impact term long to health, development, and educational achievement.[2] If not handled properly, this has the potential to hinder achievement of the Sustainable Development Goals (SDGs), especially SDG 2 which aims delete hunger and SDG 3 which focuses on ensuring healthy and supportive life welfare for all.[3.4]

The problem of stunting in Indonesia is not only caused by lack of access to food nutritious, but also influenced by various factors other factors, including parental education and family economic status.[5.6] Study show that family with level lower education tend to have minimal knowledge about healthy and balanced eating patterns, so that impact on nutritional status their children.[7] In addition, the difficult social and economic environment, including poverty and inequality access, also contribute to nutritional problems.[8]

In an attempt overcome in this regard, the free nutritious meal program introduced by the Indonesian government has become a key strategy to improve nutritional status, especially among the poor. children who are group the most vulnerable demographic.[9] This program aims to provide better access to healthy and nutritious food, at the same time increase knowledge nutrition among children through intervention educational accompaniment. [2.10] Along with that, research from Wulandari et al. underlines importance knowledge nutrition balanced as factor key to the success of the program, demonstrating that only give food is not enough, but education about Nutrition is an inseparable aspect.[11]

The purpose of This research is to evaluate the effectiveness of the free nutritious meal program in reducing stunting figures and role education nutrition in influencing change behavior and practices nutrition among children and parents. This study focuses on the impact of the program on understanding nutrition balance and its impact to educational achievement children. In addition, this research also wants to dig how support infrastructure and collaboration between various sectors can contribute to the success of this nutrition program. By obtaining better understanding of factors it is hoped that it can be found

recommendations for improvement program effectiveness and provide contribution to efforts stunting eradication in Indonesia.

Material and Methods

The method used in this research is a review literature that aims to analyze effectiveness *Free Nutritious Meal Program for Achievement of SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being) Targets.* Search and selection process literature use approach PICO (Population, Intervention, Comparison, Outcome) to facilitate identification relevant sources.[12] The PICO framework used is as follows following;

- **Population (P):** School children receiving the Free Nutritional Meal Program
- **Intervention (I):** Program for providing food free nutrition at school
- **Comparison (C):** Schools or groups that do not receive similar programs
- **Outcome (O):** Improved nutritional status, health, attendance and achievement academic student

Search literature conducted on several international and national databases such as ScienceDirect, PubMed, ProQuest, and Google Scholar use combination of keywords with methods Boolean Operators, namely: *"free nutritious meal program" OR "school feeding program" AND "Zero Hunger" AND "Good Health and Well-being"*. The search is limited to publications published scientific papers between year 2021–2025, in language English or Indonesian, and have access open access criteria its inclusion includes: articles study original research, method relevant qualitative or quantitative, population humans (not test animals), and discussion that includes aspect nutrition, health, and education. Meanwhile criteria exclusion includes: non- research articles such as review/editorial, access restricted access, or unrelated topics directly with the free nutritious meal program. Based on results search and selection process use criteria said, obtained 5 indonesian journals that meet the requirements conditions for further analysis. Every journal reviewed based on title, method, results research, as well as its relevance to achievements SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being).

Results

Characteristics of Included Studies

Five Indonesian studies met all eligibility criteria and were included in the qualitative synthesis (Table 1). All five employed qualitative designs, comprising netnographic analysis of social media and news-portal commentary (n=1), descriptive qualitative policy document analysis with international comparison (n=1), qualitative case study with interviews, document analysis, and field observation (n=1), descriptive qualitative study with

observation, interviews, and document review at a single school (n=1), and qualitative study with in-depth stakeholder interviews, field observation, and secondary data analysis (n=1). Settings comprised national-level policy analysis, a single junior secondary school in Tangerang, and multiple regions across Eastern Indonesia (Papua, East Nusa Tenggara, and Maluku). One study incorporated comparison with school feeding programs in India, Nigeria, and Brazil. Table 2 summarises the design, setting, and principal findings of each study.

Table 1. Characteristics and principal findings of included studies

No	Journal Title	Author & Year	Method	Research Result
1	Program Makan Bergizi Gratis di Tengah Krisis Food Waste	Siti Pitriani, Chalila Putri Komara, Deasy Silvya Sari, Dina Yulianti Year: 2025	This study used a qualitative netnographic approach through passive participatory online observation of social media platforms such as Twitter and comment sections on national news portals to analyze public behavior and interactions regarding the Free Nutritious Meal Program (MBG), with thematic content analysis applied to identify patterns and perceptions related to food security.	The study found that public perceptions of the MBG program were mixed, highlighting issues such as low food quality, increasing food waste, and distribution barriers in remote areas, alongside criticism of budget transparency and program effectiveness, while also recognizing its potential to strengthen food resilience if implemented efficiently and sustainably with community involvement.
2	Efektivitas Dan Tantangan Kebijakan Program Makan Bergizi Gratis Sebagai Intervensi Pendidikan Di Indonesia	Ucu Agustini, Sri Mulyani Year: 2025	This study employed a descriptive qualitative approach through policy document analysis, using primary and secondary sources such as the MBG program white paper, campaign reports, publications from the WFP and BPS, and comparative	The findings revealed that the MBG program, as a multisectoral policy involving health, education, and social welfare, successfully improved student attendance, academic performance, nutritional status, and local MSME empowerment,

			studies from India, Nigeria, and Brazil, analyzed descriptively and interpretatively to examine the program's structure, objectives, strategies, challenges, and international practices.	though challenges remained regarding non-standardized menus, uneven distribution, and budget diversion risks; lessons from international practices emphasized the importance of consistent policies, cross-sector coordination, and local contextual adaptation for long-term success toward Indonesia's 2045 Golden Generation goals.
3	Program Makan Bergizi Gratis: Analisis Kritis Transformasi Pendidikan Indonesia Menuju Generasi Emas 2045	Albaburrahim, Agus Purnomo Ahmad Putikadyanto, Agik Nur Efendi, Mochamad Arifin Alatas, Sahrul Romadhon, Liana Rochmatul Wachidah Year: 2025	This study utilized a qualitative case study design involving interviews with principals, teachers, parents, and students at schools receiving the MBG program, complemented by document analysis of relevant policies and evaluation reports as well as direct field observations of program implementation.	The findings indicated that the MBG program generally succeeded in improving students' health, motivation, and academic performance while contributing to the vision of Indonesia's Golden Generation 2045, yet faced challenges including logistical distribution barriers in remote areas, inconsistent nutritional standards, financial dependency on government funding, and cultural resistance to new menus; comparative analysis showed Brazil's success through strong supervision and nutrition education, contrasting with India's monitoring weaknesses, leading to

				recommendations for stricter oversight, improved food quality training, and comprehensive evaluation to build an efficient and sustainable distribution model.
4	Pelaksanaan Uji Coba Program Makan Bergizi Gratis di SMP Negeri 4 Tangerang	Nurul Azzahra, Akbar Dwi Dharmawan, Aras Fikar Mardatilah, Mohamad Ilham Habibi, Virliana Amanda Putri Aryani, Suhardi Year: 2025	This study applied a descriptive qualitative approach with data collected through direct observation of the program's implementation, in-depth interviews with the Deputy Principal for Student Affairs, and documentation review, with the main data sources consisting of interviews, observations, and relevant documents from SMP Negeri 4 Tangerang.	The findings showed that the MBG program at SMP Negeri 4 Tangerang was implemented as planned and received positive responses from students, improving their physical and mental health, learning focus, attendance, and enthusiasm; it also contributed to academic performance, social equity, and nutritional security in schools, though challenges remained in terms of limited budgets, school management readiness, and the need for regular participatory evaluations, highlighting the importance of sustainable policy and funding support, especially for expansion into remote and underdeveloped regions.
5	Kebijakan Makan Bergizi Gratis di Indonesia Timur: Tantangan, Implementasi,	Siti Fatimah, Abdul Rasyid, Anirwan, Qamal, Herna Otta Arwakon	This study employed a qualitative approach using in-depth interviews with key stakeholders such as government officials, health	The study found that the MBG program in Eastern Indonesia faced major challenges due to limited infrastructure, uneven food

dan Solusi untuk Ketahanan Pangan	Year: 2024	officers, and program beneficiaries, combined with direct field observations conducted in several regions across Papua, East Nusa Tenggara, and Maluku, as well as secondary data analysis of policy reports, government publications, and statistical data from the Central Statistics Agency (BPS), with thematic analysis used to identify major themes related to challenges, implementation, and policy solutions.	distribution, and weak monitoring and evaluation mechanisms, which hindered service quality assurance; nevertheless, the program succeeded in improving nutritional intake, reducing malnutrition and anemia rates, and enhancing health and academic performance, with recommendations emphasizing the need for stronger interinstitutional coordination, infrastructure improvement, local community participation, capacity building, and sustainable evaluation systems to ensure transparency and local adaptability.

Findings on Nutritional Status and Health Outcomes

All five studies reported improvements in nutritional status and health following program implementation. Agustini and Mulyani reported improvements in nutritional status alongside attendance and academic performance, and Albaburrahim et al. reported improvements in student health, motivation, and academic performance. Azzahra et al. documented improvements in physical and mental health, learning focus, attendance, and enthusiasm among students at SMP Negeri 4 Tangerang, while Fatimah et al. reported reduced malnutrition and anaemia prevalence and improved nutritional intake in Eastern Indonesia. Pitriani et al. did not report direct clinical outcomes but documented public recognition of the program's potential to strengthen food resilience when implemented efficiently and sustainably.

Beyond nutritional parameters, two studies reported psychosocial benefits. Azzahra et al. described improvements in students' mental well-being and reductions in social

disparities between students, while Albaburrahim et al. reported increased student motivation.[13] Fatimah et al. additionally reported improvements in academic performance associated with improved nutritional intake.

Findings on Educational Outcomes

Four studies reported educational benefits. Improvements in school attendance were documented by Agustini and Mulyani and Azzahra et al., while improvements in learning concentration and academic achievement were reported by Agustini and Mulyani,Albaburrahim et al., Azzahra et al., and Fatimah et al. Agustini and Mulyani further reported that improvements were most pronounced among marginalised student groups, suggesting an equity effect. Azzahra et al. similarly described reductions in social disparities between students.

Findings on Economic and Food-System Outcomes

Two studies reported economic benefits at community level. Agustini and Mulyani reported local MSME empowerment through food procurement, and Pitriani et al. identified the program's potential to strengthen food resilience when implementation is efficient and involves the community. Fatimah et al. reported that the program improved nutritional intake despite substantial infrastructural constraints, and recommended community participation and local capacity building as means of strengthening local food systems.

Findings on Implementation Challenges

All five studies documented implementation challenges, which clustered into five categories. First, logistical and distribution barriers in remote, frontier, and outermost (3T) regions were reported by Pitriani et al., Albaburrahim et al., and Fatimah et al. Second, non-standardised menus and inconsistent nutritional standards were reported by Agustini and Mulyani[11] and Albaburrahim et al., with Pitriani et al. additionally reporting low food quality, menus lacking animal protein, and food waste. Third, dependence on government funding and associated sustainability risk were reported by Albaburrahim et al.[13] and Azzahra et al. Fourth, weak monitoring and evaluation systems were reported by Agustini and Mulyani, Fatimah et al., and Azzahra et al., the latter specifying a need for regular participatory evaluation. Fifth, cultural resistance to unfamiliar menus was reported by Albaburrahim et al.

Findings on Enabling Factors

Three studies identified factors associated with successful implementation. Agustini and Mulyani emphasised policy consistency, cross-sector coordination, and local contextual adaptation, drawing on comparisons with India, Nigeria, and Brazil. Albaburrahim et al.

highlighted Brazil's strong supervision and nutrition education model as a contrast to weaker monitoring arrangements elsewhere. Fatimah et al. identified interinstitutional coordination, infrastructure improvement, local community participation, capacity building, and sustainable evaluation systems as key enabling conditions. Azzahra et al. emphasised school management readiness, sustainable funding support, and participatory evaluation.

Discussion

Contribution to SDG 2 (Zero Hunger)

The contribution of the MBG program to SDG 2 is evident primarily through its focus on providing access to nutritious food for school children, with the explicit aim of reducing hunger and strengthening national food resilience[12]. The reviewed studies support this framing: the program's capacity to meet daily nutritional requirements while procuring food materials from local suppliers contributes directly to community-level food resilience [11, 15]. Efforts to reduce stunting and malnutrition form part of the program's substantive contribution to SDG 2 targets[13]. Provision of free nutritious food is also conceptualised as fulfilment of children's basic rights, which directly assists in reducing hunger, particularly among low-income families.[14] This interpretation is consistent with the broader Indonesian policy literature, which positions school-based and locally produced supplementary feeding as a component of stunting prevention rather than as an isolated nutritional intervention[3, 16-18].

However, the food waste documented by Pitriani et al. represents a tension within this pathway: a program intended to strengthen food security may simultaneously generate waste where menu design and distribution are poorly matched to local conditions[12]. This tension is not unique to school feeding schemes. Household- and community-level food rescue initiatives have been developed specifically to divert surplus food from waste streams while simultaneously strengthening community food security[19], suggesting that a comparable rescue-and-redistribution mechanism could be incorporated into MBG surplus management at school and catering level. Such an arrangement would allow surplus meals to be redirected rather than discarded, converting an operational weakness into an additional contribution to the food-security objective of SDG 2.

Contribution to SDG 3 (Good Health and Well-being)

The program's relationship to SDG 3 is supported by evidence of improved physical growth and cognitive development, which correspond directly to SDG 3 targets[12]. Contributions to the prevention of anaemia and micronutrient deficiency were reported, with downstream benefits for mental health, well-being, and learning capacity [11, 15]. By meeting

basic nutritional requirements, the program has the potential to reduce the risk of stunting and malnutrition, thereby supporting quality of life and immune function in later life.[13] The program also appears to confer psychosocial benefit by reducing children's anxiety regarding food availability, which supports mental health [14]. Over the longer term, improved nutritional status through this program may contribute to reduced population disease burden and improved quality of life [15].

It should be noted that the health outcomes reported across the included studies were largely descriptive and self-reported or observationally assessed. No included study employed standardised anthropometric measurement protocols or validated biomarkers, which limits the strength of inference regarding clinical health effects.

Program Effectiveness

Taken together, the reviewed studies suggest that the MBG program is reasonably effective in improving nutritional status and supporting educational success. Improvements in nutritional quality were reported despite residual food waste attributable to menu design[12]. Improvements in student participation, school attendance, and academic achievement were documented, particularly among marginalised groups[11]. Improvements in physical and mental health, learning focus, and well-being were reported from direct school-level observation[14], and reductions in malnutrition and anaemia prevalence alongside improved dietary patterns were reported from Eastern Indonesia[15]. One study reported improvements in body mass index, reductions in anaemia, and increases in national examination scores of 5–8%[13].

These findings should be interpreted cautiously. All five studies were qualitative or descriptive, none employed a controlled comparison group, and none reported standardised effect estimates. The apparent consistency of positive findings across geographically diverse settings is encouraging, but the absence of controlled designs means that the observed improvements cannot be attributed to the program with confidence, as concurrent economic, educational, and health-system factors may contribute.

Implementation Challenges and Their Implications

The challenges identified across the included studies are consistent and operationally specific. Distribution barriers in 3T regions were reported by three studies[12, 13, 15], which reflects structural constraints of geography and transport infrastructure rather than program design failure. Non-standardised menus and inconsistent nutritional standards[11],[13] indicate the absence of a binding national nutrition standard, which is a policy gap rather than an implementation failure. Dependence on government funding[13, 15] and weak monitoring and

evaluation[11, 14, 15] together represent sustainability and accountability risks. Cultural resistance to unfamiliar menus[13] suggests that menu design requires local contextual adaptation rather than uniform national provision.

These challenges carry direct implications for the SDG contribution of the program. Where distribution is uneven, the equity benefit of the program is attenuated precisely in the regions with the highest stunting burden. Where nutritional standards are inconsistent, the health benefit becomes variable. Where monitoring is weak, the program cannot demonstrate accountability or enable iterative improvement.

Enabling Factors and Policy Implications

The reviewed studies converge on several enabling conditions. Cross-sector coordination among health, education, and social welfare sectors was identified as a determinant of success[11], supported by the finding that interinstitutional coordination is essential in difficult geographic settings[15]. Community participation, local capacity building, and involvement of local MSMEs were identified as factors that simultaneously improve program relevance and strengthen local economic benefit [11,12,15]. Policy consistency and contextual adaptation, informed by international comparison, were emphasised as preconditions for long-term success [11,13].

Accordingly, the policy implications identified from this synthesis are: (1) establishment of a binding national nutrition standard with clear menu specifications; (2) strengthened monitoring and evaluation systems with defined indicators and participatory school-level evaluation; (3) improved infrastructure and logistics for 3T regions; (4) integration of nutrition education into the school curriculum as a complement to food provision; (5) local community and MSME participation in food procurement; and (6) regulatory and budgetary consistency to prevent the program from becoming seasonal or politically contingent.

Long-Term Potential

Over the longer term, the MBG program has potential as social investment and human resource development. If design and distribution are improved, the program could serve as a strategic instrument for strengthening national food resilience and supporting local economic empowerment. Its potential contribution to building a healthy, productive, and competitive generation aligns with the Indonesia Emas 2045 vision, and the program is considered capable of reducing stunting and malnutrition prevalence and improving academic achievement over the long term. At school level, program sustainability has the potential to create a healthy and inclusive learning environment and to support educational

equity. If infrastructure and monitoring challenges can be overcome, the program could become an effective national strategy for reducing stunting, increasing productivity, and improving nutritional status in food-vulnerable communities.

It should be recognised, however, that school-based meal provision addresses the downstream end of the nutritional causal chain. Upstream approaches integrating land remediation with crop biofortification have been proposed as complementary strategies for addressing stunting at its agronomic source [20], and alignment between MBG procurement policy and locally produced biofortified crops would represent a logical convergence of the two approaches. Such alignment would simultaneously strengthen the SDG 2 objective of food-system resilience and the SDG 3 objective of improving micronutrient status, while reducing dependence on externally sourced food materials in 3T regions.

Limitations

This review has several important limitations. First, only five studies met the eligibility criteria, all were qualitative or descriptive in design, and all were conducted in Indonesia. The evidence base is therefore small and geographically restricted, and the findings cannot be generalised to other school feeding contexts. Second, no included study employed a controlled comparison group, meaning that observed improvements cannot be causally attributed to the program. Third, outcome measurement was heterogeneous and largely non-standardised, with no study reporting validated anthropometric protocols or biomarkers, which limits comparability and the strength of clinical inference. Fourth, the search was restricted to open-access publications from 2021 to 2025, which may have excluded relevant earlier studies, restricted-access studies, and grey literature from government evaluation reports. Fifth, publication and reporting bias may favour studies documenting positive outcomes, particularly given that the program is a prominent national policy. Sixth, one included study was based on netnographic analysis of social media commentary, which captures public perception rather than measured outcomes and is susceptible to selection and representativeness bias. Seventh, two included studies did not report complete bibliographic details, and verification of study quality was consequently limited. Eighth, the complementary strategies discussed in relation to food rescue and biofortification[19],[20] are drawn from literature outside the formal eligibility criteria of this review and are presented as contextual considerations rather than as synthesised evidence.

Implications for Research

The findings indicate clear priorities for future research. Controlled or quasi-experimental evaluations with comparison schools and standardised anthropometric

outcomes are needed to establish the magnitude of the program's nutritional effect. Longitudinal studies are required to determine whether short-term nutritional gains translate into sustained improvements in growth, cognitive development, and educational attainment. Cost-effectiveness analyses would inform decisions regarding expansion to 3T regions. Qualitative implementation research examining why distribution and monitoring failures occur in specific settings would support more targeted operational improvement. Finally, integration of program monitoring data with national stunting surveillance would enable evaluation at population scale. Evaluation of integrated models combining school meal provision with biofortified local procurement would additionally test whether upstream and downstream approaches produce additive benefit.

Conclusion

The Free Nutritious Meal Program contributes positively to improving the nutritional status, health, and academic achievement of students and supports the achievement of SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being). However, challenges including food quality, uneven distribution, food waste, and budget sustainability remain principal obstacles. With strong policy support, community engagement, and an effective monitoring system, the program has the potential to become long-term social investment in building a healthy, productive, and competitive generation toward Indonesia Emas 2045. Complementary strategies such as surplus food rescue and alignment with locally produced biofortified crops may further strengthen the program's contribution to both SDG targets. Given the limited and entirely qualitative evidence base, these conclusions should be regarded as preliminary, and controlled and longitudinal evaluations are required before the program's effectiveness can be established with confidence.

Declaration of Generative AI in Scientific Writing

The authors affirm that the usage of generative artificial intelligence tools, including ChatGPT. These tools were not used for generating content, data analysis, or interpretation. The authors are fully responsiblefor the accuracy and integrity of the content as well as the conclusions presented in this study

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