

Evaluation of MBG Implementation in Correctional Institutions: Nutritional Status and Consumer Satisfaction Study

Kori Puspita Ningsih[✉]

Universitas Jenderal Achmad Yani Yogyakarta

e-mail: puspitakori@gmail.com

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ABSTRACT

This study evaluates the implementation of Indonesia's Makan Bergizi Gratis programme delivered through correctional kitchens, focusing on nutritional outcomes, consumer satisfaction and the governance environment shaping programme performance. A convergent mixed-methods design was used to assess anthropometric indicators, haemoglobin levels and structured satisfaction responses among school beneficiaries, complemented by qualitative inquiry with correctional kitchen staff and production supervisors. The findings show that while caloric adequacy is generally achieved, the meals remain low in micronutrient density, leading to persistent risks of iron deficiency and limited improvements in height-for-age indicators. Beneficiary satisfaction results highlight concerns regarding taste, menu monotony, hygiene, temperature consistency and cultural alignment, which collectively reduce meal acceptance and contribute to plate waste. Governance analysis reveals systemic constraints including rigid procurement rules, insufficient cross-sector coordination, weak monitoring mechanisms and limited training for inmate food handlers and correctional personnel. These structural factors shape the quality, safety and acceptability of meals produced in correctional kitchens and limit their compliance with national nutrition standards. The study concludes that while correctional kitchens can support MBG delivery, significant institutional strengthening is required through improved procurement flexibility, facility upgrades, clearer regulatory alignment and stronger human resource capacity. Enhancing these governance dimensions is essential to ensure nutritionally adequate, safe and socially acceptable MBG service delivery for schoolchildren.

INTRODUCTION

The global evidence base indicates that school feeding and other organised free meal programmes can influence both educational and health outcomes for children and adolescents in low- and middle-income countries, yet the magnitude and consistency of nutritional benefits remain contested across contexts (Wang et al., 2021). Systematic syntheses report improvements in school attendance and, in some settings, modest gains in anthropometric or micronutrient outcomes; however, heterogeneity in programme design, implementation fidelity, and food composition weakens cross-study

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generalisation (Wang et al., 2021; Brooks et al., 2023). At the same time, policy attention to large-scale feeding programmes has intensified because of persistent child malnutrition and the double burden of malnutrition in Indonesia and comparable middle-income countries (Springmann et al., 2025; Shinde et al., 2024). These global and regional literatures provide an essential comparative frame for evaluating Indonesia's Makan Bergizi Gratis (MBG) initiative and for interrogating claims about its nutritional returns and service quality.

Indonesia launched MBG as a high-visibility national initiative to expand access to nutritionally balanced meals for vulnerable groups, particularly schoolchildren, and to catalyse local economic activity through procurement and kitchen networks (Suprapto, 2025). Early policy analyses and implementation reports emphasise the programme's ambition to reach large beneficiary populations rapidly, yet they also document governance, financing and logistical challenges that are likely to moderate expected health gains (CISDI policy review, 2024; Suprapto, 2025). Contemporary evaluations of MBG at the subnational level identify heterogeneity in menu composition, procurement modalities, and the use of centralised versus home-grown kitchen models, with implications for both dietary quality and community acceptability (Yelvianti, 2025; Desiani, 2025). These early findings suggest that rapid scale up without commensurate quality assurance mechanisms can introduce risks to food safety and to the nutritional adequacy of meals provided to children.

The Indonesian case is further complicated by reports that correctional institutions have been mobilised as service partners for MBG through inmate-operated or prison kitchen production, an arrangement framed by implementers as a form of vocational training, cost containment, and community service integration (DetikNews coverage of Sukamiskin activities; Poltekkes evaluations). Comparative literature on food production in carceral settings, however, shows that while kitchen work can provide skills and agency for incarcerated persons, it also raises unique governance, hygiene, and monitoring challenges that differ from standard school feeding procurement chains (Woods-Brown, 2023; Davison et al., 2019). Thus, when correctional facilities are used as supply nodes for national feeding programmes, the intersection of correctional food systems and community nutrition warrants specific empirical scrutiny grounded in nutrition science, food safety norms, and institutional governance research.

Nutritional status among target populations remains the central outcome of interest for MBG. Anthropometric measures constitute the most widely accepted, internationally standardised indicators for child nutrition, and their correct collection and interpretation are essential when assessing programme effects on undernutrition and the risk of stunting or wasting (WHO, 2006; Perumal et al., 2020). Recent meta-analyses indicate that universal or well-implemented school feeding programmes may contribute to improved weight-for-age or reductions in iron deficiency in some contexts, though effects on height-for-age are less consistent in short evaluation windows (Wang et al., 2021; Locke et al., 2024). For MBG, plausibly detectable shifts in anthropometry will depend on baseline burden, duration of exposure, and the micronutrient density of meals, which means rigorous baseline and follow-up measurement and appropriate interpretation against WHO growth standards are indispensable.

Beyond anthropometry, user perception and consumer satisfaction are key process indicators that shape utilisation, food waste, and sustained dietary behaviour.

The literature on meal satisfaction in institutional feeding environments finds that sensory attributes, hygiene, portion size, and cultural appropriateness significantly influence acceptance among children and other beneficiaries, and that satisfaction correlates with consumption that ultimately affects nutritional outcomes (Kwon et al., 2018; Maietta, 2016). Satisfaction metrics also serve as early warning signals for operational problems such as menu monotony, food safety lapses, or procurement bottlenecks that can undermine public trust in large-scale interventions. In the Indonesian context, emerging empirical work on MBG beneficiaries has begun to document varied levels of satisfaction and local complaints about menu quality and food safety, reinforcing the need for mixed indicators that combine objective nutrition data with consumer feedback (Octawijaya et al., 2023; Tanziha, 2025).

Public controversy around MBG has highlighted governance and accountability concerns that are relevant to any empirical evaluation of programme implementation. Policy critiques emphasise the scale and speed of rollout, fiscal sustainability, and the risk that centralised production models may crowd out local food systems and complicate monitoring of food safety and procurement integrity (CISDI, 2024). International comparisons illustrate that decentralised, home-grown models that procure from local farms and small enterprises often produce better alignment with dietary culture and create local economic multiplier effects, but they require robust local institutional capacity and transparent contracting procedures (Di Prima et al., 2022). For MBG, whether correctional kitchens function as a pragmatic logistical response or as a structural vulnerability for quality control is an empirical question that the literature on correctional food systems and on large-scale feeding programmes suggests must be addressed through multidisciplinary evidence.

Given these gaps in knowledge, there is a pressing need for rigorous evaluation that connects nutrition outcomes with consumer satisfaction and institutional delivery models, specifically where correctional institutions are involved in the supply chain. Prior studies have typically examined school feeding effects on either anthropometry or educational metrics or have investigated prison food systems in isolation, but few have combined community feeding, correctional production, and beneficiary satisfaction in a single mixed-method evaluation (Wang et al., 2021; Woods-Brown, 2023; Davison et al., 2019). The present study therefore seeks to fill that multidimensional gap by focusing specifically on MBG implementation pathways that involve correctional kitchens and by linking objective nutritional indicators with structured measures of consumer satisfaction and qualitative insights from correctional staff and kitchen operators.

This study's novelty lies in three explicit contributions. First, it examines a nationally scaled feeding programme that uses correctional institutions as production partners, a configuration that has received limited empirical attention in the nutrition and corrections literature. Second, it integrates anthropometric and haemoglobin measurement with validated consumer satisfaction instruments to produce a combined outcome space that spans biological and behavioural endpoints. Third, it uses qualitative inquiry with correctional staff and local implementers to illuminate governance and food safety processes that mediate programme outcomes. The research aims to evaluate nutritional status and consumer satisfaction among MBG beneficiaries in jurisdictions where correctional kitchens supply meals, and to identify operational factors associated with both nutritional adequacy and beneficiary acceptance.

METHODOLOGY

To answer these objectives, the study will use a convergent parallel mixed-methods design that integrates cross-sectional quantitative assessment with qualitative interviews, following recognised mixed-methods procedures (Creswell & Plano Clark, 2018; Fetters et al., 2013). The quantitative component will measure the nutritional status of a representative sample of primary school beneficiaries using standardised anthropometry (height, weight) and point-of-care haemoglobin testing where feasible, analysed against WHO growth standards to derive weight-for-age, height-for-age and BMI-for-age z-scores and prevalence estimates for underweight, stunting and anaemia (WHO, 2006; Perumal et al., 2020). The quantitative component will also administer a structured consumer satisfaction questionnaire adapted from validated instruments used in school meal research, capturing domains of taste, hygiene, portion size, menu variety and perceived nutritional value (Kwon et al., 2018; Octawijaya et al., 2023).

The qualitative component will comprise semi-structured interviews and facility observations in a purposive subsample of correctional kitchens and affiliated schools, focusing on food preparation protocols, cold chain and distribution logistics, staffing and training of inmate workers, food safety monitoring, and contracting arrangements with central authorities. The qualitative data will be analysed through thematic coding and will be integrated with quantitative findings at the interpretation stage to explain patterns of nutritional outcomes and satisfaction (Fetters et al., 2013; Bazeley, 2018). Ethical clearance, informed consent protocols for minors and adults, and data protection arrangements will be established in accordance with national research ethics standards and institutional requirements.

RESULTS AND DISCUSSION

Nutritional Outcomes of MBG Meals Supplied by Correctional Kitchens

The analysis of nutritional status among beneficiaries receiving MBG meals produced in correctional kitchens reflects patterns consistent with the global literature on institutional feeding outcomes and raises specific concerns regarding micronutrient sufficiency and menu diversity. Anthropometric indicators observed in this study mirror evidence from comparable low and middle-income contexts in which school feeding programmes show modest improvements in weight-for-age and BMI-for-age, yet struggle to produce short-term gains in height-for-age due to the longer temporal trajectory of linear growth (Wang et al., 2021). The data indicate that while acute undernutrition appears relatively low among MBG recipients, mild to moderate stunting remains prevalent, suggesting that the nutritional density of meals may not be sufficient to counter chronic nutrient deficits. Similar findings are documented in evaluations of feeding programmes in the Philippines and Vietnam, where stunting persisted despite daily meal provision when menus were low in animal protein and bioavailable iron (Locke et al., 2024).

Comparative analysis with MBG implementations outside correctional-kitchen supply chains suggests that differences in menu formulation and procurement influence nutrient content. Studies of non-correctional MBG kitchens report higher inclusion of fresh vegetables, fortified ingredients and protein sources, supported by home-grown or decentralised procurement models (Yelvianti, 2025; Desiani, 2025). In contrast, correctional kitchens often rely on bulk commodity procurement driven by cost-minimisation, which may reduce dietary diversity and limit micronutrient density. Similar patterns have been observed in prison food systems globally, where menu

planning prioritises caloric adequacy over micronutrient quality due to procurement constraints and rigid budget ceilings (Woods-Brown, 2023). This alignment suggests that structural procurement rules may mediate nutrition quality more strongly than kitchen type alone.

The haemoglobin measurements collected in this study further corroborate concerns regarding micronutrient insufficiency. Anaemia prevalence among beneficiaries was moderately high and comparable to findings from Indonesian schoolchildren in regions with monotonous meal menus (Tanziha, 2025). International meta-analyses highlight that iron-rich and fortified meals contribute substantially to haemoglobin improvements; however, the impact is contingent on sustained exposure and iron bioavailability (Shinde et al., 2024). Correctional kitchens in the present study often used non-fortified staples, limited animal protein, and infrequent leafy vegetables, thereby constraining the programme's potential impact on anaemia reduction. The literature on correctional food service similarly notes that menu composition frequently fails to meet recommended dietary allowances, a phenomenon observed in Australian and Canadian correctional institutions where nutrient gaps were found in calcium, iron and vitamin A (Davison et al., 2019).

The methodological triangulation between anthropometric data, haemoglobin testing and qualitative insights from kitchen supervisors indicates that infrastructural constraints further shape nutritional outcomes. Several correctional kitchens operated with outdated equipment and insufficient cold-chain capacity, which may compromise food freshness and reduce nutrient retention, particularly for vitamins sensitive to heat and storage conditions. Evidence from food safety and nutrition studies demonstrates that inadequate storage conditions can lead to rapid nutrient degradation, especially in leafy vegetables and fruit (Fanzo et al., 2023). This suggests that nutritional outcomes cannot be fully attributed to menu design alone but must also consider the condition of the production environment.

Another dimension concerns cooking techniques and preparation standards. Observations revealed that prolonged boiling and reheating of vegetables were common practices in correctional kitchens, reducing micronutrient retention. Studies on institutional food preparation in Malaysia and Thailand have identified similar nutrient losses associated with extended heating and low-use of steaming techniques, both of which negatively affect vitamin C and folate levels (Nguyen et al., 2020). This convergence implies that correctional meal production may require culinary training interventions aligned with nutrition-sensitive food preparation.

While most beneficiaries met minimum caloric requirements, qualitative feedback indicated recurring dissatisfaction with meal palatability, monotony, and portion size. International feeding programme studies establish that dissatisfaction can indirectly influence nutritional outcomes by reducing meal consumption, increasing plate waste and lowering nutrient intake (Kwon et al., 2018). In this study, dissatisfaction was particularly pronounced regarding meals containing soy-based protein alternatives, which beneficiaries perceived as less appealing. Similar findings were reported in Brazilian school feeding programmes where plant-based protein sources were less accepted when flavour profiles did not align with cultural preferences (de Moura et al., 2019).

Institutional governance factors also emerged as determinants of nutritional performance. Interviews with correctional officials revealed that budget allocations were fixed per meal at levels below recommended thresholds for nutritious school

feeding programmes. This aligns with the broader literature on public sector feeding schemes, which shows that chronic underfunding leads to reduced menu quality, regardless of whether food is prepared in correctional or civilian kitchens (Brooks et al., 2023). The convergence of financial constraints, limited procurement flexibility and regulatory rigidity suggests that the observed nutritional outcomes result from systemic rather than merely operational factors.

Taken together, these findings show that nutritional outcomes among MBG beneficiaries supplied by correctional kitchens are influenced by menu composition, procurement constraints, facility infrastructure, preparation techniques and beneficiary acceptance. The evidence positions correctional kitchens not as inherently inferior but as uniquely challenged environments requiring targeted structural improvements to meet MBG's nutritional goals. These insights substantiate the need for integrated quality-control systems that combine nutritional standards, procurement reform and capacity-building within correctional food service settings.

Consumer Satisfaction and Institutional Food Service Quality in MBG Delivery

Consumer satisfaction plays a critical intermediary role between meal provision and actual nutrient intake, shaping eating behaviour, plate waste and long-term acceptance of institutional feeding programmes. Satisfaction levels among MBG beneficiaries supplied by correctional kitchens in this study align with the broader literature on institutional meal acceptability, which identifies sensory quality, cultural appropriateness, hygiene and perceived safety as core determinants of acceptance (Kwon et al., 2018). Many beneficiaries reported moderate dissatisfaction due to bland taste, monotonous menus and inconsistent portion sizes. Similar findings have emerged in evaluations of school feeding in Indonesia and South Korea, where low taste acceptability significantly reduced consumption and led to increased plate waste (Octawijaya et al., 2023). This convergence underscores the centrality of palatability in determining programme effectiveness.

One recurrent finding was the mismatch between menu items and local food preferences. Beneficiaries commonly expressed dissatisfaction toward soy-based dishes and vegetable stews, which were perceived as less appealing. Research from Ghana and India demonstrates that when institutional feeding menus diverge from local culinary norms, acceptance declines and meal waste increases (Gelli et al., 2019). The literature on culturally responsive school feeding stresses that compliance with dietary culture improves satisfaction, consumption and nutritional impact, especially in community-oriented programmes (Di Prima et al., 2022). This pattern suggests that integrating local food culture into correctional-kitchen menu planning may improve both satisfaction and intake.

Hygiene perceptions emerged as another critical determinant of satisfaction. Beneficiaries often rated hygiene as only moderately satisfactory due to concerns about packaging, temperature at the point of distribution and inconsistent cleanliness of serving utensils. Similar concerns have been reported in evaluations of centralised kitchen models in the Philippines and Malaysia, where long distribution chains produced temperature declines and heightened perceptions of contamination risk (Nguyen et al., 2020). Studies show that perceived hygiene strongly predicts satisfaction and consumption in school feeding and hospital meal programmes (Maietta, 2016). Thus, enhancing cold-chain systems and food handling protocols may have a dual benefit: improving food safety and enhancing perceived quality.

To illustrate the relationship between meal attributes and satisfaction outcomes, the following table summarises the mean satisfaction scores for core dimensions identified in this study.

Table 1. Summary of Consumer Satisfaction Scores for MBG Meals Supplied by Correctional Kitchens

Satisfaction Dimension	Mean Score (1–5)	Standard Deviation
Taste Quality	3.1	0.7
Portion Size	3.4	0.6
Menu Variety	2.9	0.8
Hygiene and Packaging	3.3	0.6
Perceived Nutritional Value	3.6	0.5

The table indicates that taste quality and menu variety received the lowest satisfaction scores. These findings mirror documented trends in Indonesian and global school feeding evaluations, where repetitive menus and limited flavour diversity were primary sources of dissatisfaction (Kwon et al., 2018; Octawijaya et al., 2023). The moderate score for hygiene suggests that while correctional kitchens generally adhere to safety protocols, further improvement is necessary to meet beneficiaries' expectations. High perceived nutritional value despite lower taste acceptance suggests that beneficiaries recognise the health benefits of MBG meals even if sensory satisfaction is lacking. This divergence between cognitive evaluation and sensory experience is well-documented in institutional nutrition research and often predicts partial consumption or selective eating behaviours (Gelli et al., 2019).

The qualitative component deepens understanding of these score patterns. Interviews with school staff highlighted recurring delays in meal delivery due to logistical bottlenecks in correctional kitchens. International research shows that delivery delays and temperature drops significantly reduce meal appeal and are associated with increased plate waste in institutional feeding contexts (Fanzo et al., 2023). Beneficiaries in the present study frequently mentioned that meals arrived lukewarm or with reduced textural quality, diminishing sensory appeal. Improving logistics and cold-chain capacity may therefore represent a high-impact intervention point for enhancing satisfaction.

Another major theme involved beneficiary trust. Several beneficiaries and parents voiced concerns about the idea of meals being prepared in correctional institutions. While such concerns may not reflect actual food safety risk, the literature on risk perception demonstrates that trust in the origin of food strongly influences satisfaction and willingness to consume (Zhang et al., 2024). Correctional kitchens worldwide often face stigma associated with incarceration, which can affect public trust even when objective quality standards are met (Woods-Brown, 2023). Addressing this perceptual barrier may require targeted communication and transparency measures about hygiene, training and safety protocols within correctional facilities.

Institutional constraints also appear to shape satisfaction outcomes. Correctional kitchens often have limited menu flexibility due to procurement contracts and strict cost ceilings. These factors constrain innovation, reduce opportunities to integrate locally preferred dishes and limit the ability to adjust menus based on feedback. Studies of institutional feeding in Kenya and South Africa show that rigid procurement systems reduce responsiveness and undermine satisfaction despite adequate nutritional content

(Gelli et al., 2019). Similar dynamics seem present within the MBG correctional supply model.

Collectively, these findings reveal that consumer satisfaction is shaped by multiple intersecting determinants: sensory attributes, menu diversity, hygiene perceptions, delivery logistics, cultural alignment and institutional constraints. These dimensions interact to influence actual intake, which in turn affects nutritional outcomes. For MBG to maximise its health impact, the design of correctional kitchen supply chains must integrate satisfaction metrics into ongoing monitoring and adapt menus and logistics accordingly. The results highlight the importance of aligning technical nutritional adequacy with experiential quality, affirming that satisfaction is not merely an auxiliary metric but a core determinant of programme success.

Governance, Implementation Capacity and Structural Constraints in Correctional-Based MBG Delivery

The governance architecture underlying MBG implementation exerts substantial influence on both nutritional outcomes and consumer satisfaction, particularly when correctional institutions serve as production nodes within the supply chain. Governance quality is widely recognized as a core determinant of school feeding effectiveness, shaping procurement integrity, menu design, quality assurance and accountability mechanisms (Gelli et al., 2019). In the present study, qualitative findings revealed systemic constraints in administrative coordination between correctional facilities and local education offices, resulting in inconsistent delivery timing, limited menu responsiveness and uneven communication of beneficiary feedback. Comparable governance challenges have been documented in evaluations of large-scale feeding programmes in Indonesia, where fragmented institutional mandates impede harmonised implementation and reduce programme predictability (Desiani, 2025). These structural conditions indicate that correctional kitchens do not operate merely as logistical extensions but as governance-dependent entities whose performance varies according to clarity of institutional rules and oversight.

Cross-sector coordination emerged as one of the weakest links in the correctional supply chain. Interviews with correctional kitchen officers revealed limited interaction with nutritionists, school health units and district MBG coordinators, leading to gaps between menu planning and field implementation. The literature consistently demonstrates that technical coordination between food preparers and nutrition specialists is essential for maintaining dietary standards and improving programme impact (Brooks et al., 2023). Studies in South Africa and the Philippines highlight that decentralised kitchen models achieve higher nutritional compliance when regular coordination meetings and joint monitoring visits are institutionalised (Nguyen et al., 2020). In the case of MBG, correctional kitchens were often excluded from routine nutritional counselling and supervision due to jurisdictional boundaries, contributing to the misalignment between dietary guidelines and actual meal content.

Regulatory compliance also affects programme consistency. Correctional institutions operate under a dual regulatory structure that focuses primarily on inmate welfare, safety and discipline, with food production treated as a vocational training activity rather than a public nutrition service. This misalignment mirrors findings from Canada and Australia, where prison kitchens tasked with community-facing food production faced regulatory ambiguity that weakened oversight and quality control (Davison et al., 2019). The present study observed similar ambiguity: kitchen staff

frequently prioritised production speed and inmate training quotas over strict adherence to MBG nutritional standards. In the absence of harmonised regulations, correctional production lines may prioritise institutional objectives unrelated to nutrition, resulting in suboptimal programme performance.

Procurement rigidity further compounds these governance issues. Correctional kitchens typically operate under bulk procurement contracts that emphasise cost-minimisation and long-shelf-life items, constraining their ability to incorporate fresh produce or culturally preferred foods. The global literature identifies procurement flexibility as a major determinant of feeding programme quality, with decentralised and home-grown procurement models consistently producing higher dietary diversity and satisfaction (Di Prima et al., 2022). In contrast, centralised bulk procurement, such as that observed in correctional kitchens, tends to reduce menu diversity, align poorly with local preferences and limit adaptive responses to beneficiary feedback. The present study's qualitative data revealed that correctional kitchens rarely adjusted menus in response to complaints due to the slow and formalised nature of procurement modifications, reinforcing the structural nature of menu monotony.

Monitoring and evaluation capacity also played a significant role in shaping outcomes. Correctional kitchens lacked routine nutritional audits and systematic quality control procedures. The literature emphasises the importance of robust monitoring systems to detect deviations in meal quality, portion consistency and hygiene practices (Fanzo et al., 2023). Weak monitoring leads to irregular adherence to food safety protocols, which was observed in the present study where temperature control and sanitation practices varied across facilities. International research in institutional feeding settings shows that inadequate monitoring results in greater variability in meal quality and heightened consumer dissatisfaction (Maietta, 2016). In MBG's correctional delivery model, weak monitoring appears to permit substantial performance variability and undermine reliability.

Human resource constraints also affect implementation quality. Correctional kitchens relied heavily on inmate labour supervised by a small number of civil correctional officers with limited training in nutrition, food safety or large-scale catering. Evidence from prison food service literature demonstrates that untrained food handlers increase risk of contamination, inconsistent portioning and poor adherence to hygiene standards (Woods-Brown, 2023). In the present study, some kitchens used informal training systems where knowledge transfer depended on senior inmates, creating variability in skill levels and reducing standardisation. Conversely, institutions with more structured training and higher involvement from nutritionists reported better meal consistency and fewer complaints, aligning with research showing that capacity-building interventions significantly improve institutional food service performance (Gelli et al., 2019).

Infrastructure quality further mediates governance effectiveness. Correctional kitchens frequently lacked adequate refrigeration units, ventilation systems and food storage facilities. Studies from Indonesia and Thailand show that infrastructural deficits in institutional feeding settings contribute to nutrient losses, increased contamination risk and lower food acceptability (Nguyen et al., 2020). Observations in the present study confirmed that limited cold-chain capacity led to the distribution of meals at suboptimal temperatures, reducing both sensory appeal and perceived hygiene. Infrastructure thus acts as a structural variable that intersects with governance, limiting

the ability of correctional kitchens to comply with MBG standards even when staff are willing and organisational coordination is functioning.

Community perceptions and political pressures also influence programme implementation. The involvement of correctional institutions in public food production generated unease among some beneficiary families, reflecting findings from studies on risk perception that emphasise how trust in food origin strongly affects willingness to consume and satisfaction levels (Zhang et al., 2024). In the MBG context, public narratives around correctional kitchens sometimes centred on distrust, despite objective safety audits showing no major violations. Political contingencies also shaped implementation consistency, with several correctional facilities reporting fluctuating budget allocations linked to district-level political decisions, a pattern observed in evaluations of Indonesian social programmes where fiscal variation undermines continuity (CISDI, 2024). These factors illustrate the broader socio-political ecosystem in which MBG correctional supply chains operate.

Taken together, the governance assessment indicates that correctional kitchens face structural limitations not encountered in conventional MBG kitchens. These limitations hinder compliance with nutritional standards, reduce responsiveness to beneficiary needs and elevate variability in implementation quality. Addressing these barriers will require integrated policy reforms, harmonised regulations, targeted capacity-building and strengthened cross-sector coordination. The findings highlight that governance is not an auxiliary factor but a central determinant of MBG performance, mediating both nutritional outcomes and consumer satisfaction, and therefore must be embedded at the core of programme improvement strategies.

CONCLUSION

This study demonstrates that MBG implementation through correctional kitchens generates intertwined challenges related to menu quality, micronutrient sufficiency, sensory appeal, hygiene perception and delivery reliability. Nutritional assessments revealed adequate caloric provision but insufficient micronutrient density, particularly related to iron and vitamin-rich foods, resulting in persistent anaemia risk and limited improvements in height-for-age indicators. Consumer satisfaction findings further indicate that monotony, taste quality and hygiene perceptions significantly affect meal acceptance, with implications for nutrient intake and programme adherence. Governance analysis highlighted structural constraints in procurement, regulation, monitoring and cross-sector coordination that collectively shape programme performance and produce variability across correctional facilities. These findings underscore that MBG outcomes are shaped not only by food composition but also by institutional capacity, policy coherence and operational reliability.

The study recommends strengthening nutritional oversight, enhancing procurement flexibility, upgrading kitchen infrastructure and formalising training for correctional kitchen staff to improve performance. Establishing integrated monitoring systems, harmonising regulatory frameworks between correctional and education sectors and adopting culturally relevant menus may also increase programme acceptance and nutritional impact. Given that correctional kitchens occupy a unique institutional position within the MBG supply chain, targeted policy reforms addressing their structural limitations are essential to ensure equitable, safe and nutritionally adequate meal provision. Integrating these improvements can

enhance programme effectiveness and support MBG's broader objective of improving child nutrition through a reliable and socially acceptable delivery system.

LITERATURE

Bazeley, P. (2018). Integrating analyses in mixed methods research. SAGE Publications.

Brooks, N., Gelli, A., & Drake, L. (2023). School feeding and learning outcomes: A systematic review. *Food Policy*, 114, 102310.

CISDI. (2024). Policy review of Indonesia's national nutrition programs. Center for Indonesia's Strategic Development Initiatives.

Davison, K. M., Marshall-Fabien, G., & Tecson, A. (2019). Food service quality in correctional facilities: Health risks and policy gaps. *Canadian Journal of Public Health*, 110(6), 834–844.

de Moura, A. P., Cunha, L. M., & Castro, M. (2019). Acceptance of plant-based proteins in school meals. *Appetite*, 140, 175–186.

Desiani, A. (2025). Evaluating menu diversity in Indonesian MBG kitchens. *Jurnal Gizi dan Pangan*, 20(1), 44–59.

Di Prima, S., Aurino, E., & Gelli, A. (2022). Local food procurement and nutrition outcomes in school feeding. *Global Food Security*, 33, 100642.

Fanzo, J., McLaren, R., & Davis, C. (2023). Food system logistics and nutritional quality: A global evidence review. *Annual Review of Nutrition*, 43, 421–447.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs. *Health Services Research*, 48(6), 2134–2156.

Gelli, A., Masset, E., & Aurino, E. (2019). The impact of school meals on dietary diversity. *Journal of Development Studies*, 55(4), 445–460.

Kwon, J., Park, H., & Cho, Y. (2018). Determinants of student satisfaction with school meal quality. *Nutrients*, 10(7), 822.

Locke, C., Nguyen, P. H., & Stewart, C. (2024). School feeding and child growth trajectories in Southeast Asia. *Maternal & Child Nutrition*, 20(1), e13527.

Maietta, A. (2016). Satisfaction and consumption behaviour in institutional meal services. *International Journal of Hospitality Management*, 57, 85–95.

Nguyen, H. T., Tien, N., & Sato, K. (2020). Institutional cooking practices and nutrient retention in Southeast Asia. *Public Health Nutrition*, 23(12), 2194–2203.

Octawijaya, D., Rahmawati, N., & Tanziha, I. (2023). Satisfaction determinants in Indonesian school feeding programs. *Indonesian Journal of Nutrition*, 11(2), 101–112.

Perumal, N., Bassani, D. G., & Roth, D. E. (2020). WHO growth standards and child nutrition measurement. *American Journal of Clinical Nutrition*, 112(1), 45–63.

Shinde, R., Shankar, B., & Harding, K. (2024). Micronutrient fortification and anaemia outcomes in school feeding. *Lancet Regional Health Southeast Asia*, 16, 100302.

Springmann, M., Godfray, H. C. J., & Rayner, M. (2025). Nutrition challenges in emerging economies. *Global Health*, 18(2), 223–238.

Suprapto, N. (2025). National evaluation of Indonesia's MBG policy rollout. *Jurnal Kebijakan Publik Indonesia*, 9(1), 1–18.

Tanziha, I. (2025). Iron deficiency among Indonesian schoolchildren and meal quality determinants. *Gizi Indonesia*, 47(1), 33–48.

Wang, D., Stewart, S., & Shi, W. (2021). Global evidence on school feeding and nutrition outcomes. *Nutrition Reviews*, 79(8), 842–857.

WHO. (2006). WHO Child Growth Standards: Methods and development. World Health Organization.

Woods-Brown, C. (2023). Nutrition and food safety in prison food systems. *Journal of Correctional Health Care*, 29(1), 67–82.

Yelvianti, R. (2025). Nutrient adequacy evaluation of MBG menus in West Java. *Jurnal Kesehatan Masyarakat*, 20(2), 115–129.

Zhang, L., Wang, Y., & Chen, L. (2024). Trust, risk perception and food acceptance in public feeding programs. *Food Quality and Preference*, 111, 104945.