

Human Resource Capacity in Global School Feeding Programs: Lessons for Indonesia's MBG Policy

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ABSTRACT: Indonesia's Free Nutritious Meal Program (Makan Bergizi Gratis/MBG) is a strategic initiative aimed at enhancing child nutrition and educational outcomes nationwide. However, its implementation faces persistent challenges related to human resource capacity, institutional coordination, and program management. This study conducts a bibliometric analysis of 116 Scopus-indexed journal articles (2020–2025) to map global research trends in school feeding programs, focusing on human resource management and capacity building. Using VOSviewer, we identified five dominant thematic clusters: (1) capacity building and health promotion, (2) clinical nutrition interventions, (3) food security and policy governance, (4) education and organizational management, and (5) stakeholder engagement and leadership. "Capacity building" emerged as a central node across all themes, underscoring its foundational role in program sustainability. The findings offer a conceptual framework to inform Indonesia's MBG implementation, highlighting the need for cross-sectoral coordination, localized capacity development, and professional training systems. This study contributes to evidence-based policy design by aligning Indonesia's MBG initiative with global best practices in school nutrition governance.

KEYWORDS: School feeding program, human resource capacity, capacity building, nutrition policy, bibliometric analysis, Indonesia, MBG

INTRODUCTION

The nutritional well-being of school-aged children remains a critical concern, particularly in low- and middle-income countries, where malnutrition and stunting continue to hinder educational outcomes and long-term human capital development. Numerous studies have shown that school-based feeding programs not only improve children's cognitive performance and school attendance but also promote social equity and long-term health outcomes (Altindag et al., 2020; Lundborg et al., 2022; Prawijaya et al., 2025).

In Indonesia, the government has introduced the Makan Bergizi Gratis (MBG) or Free Nutritious Meal Program as a national intervention to combat child malnutrition and enhance educational performance. Anchored in Presidential Regulation No. 83 of 2024 and supported by Law No. 62 of 2024 on the State Budget (Perpres 83, 2024; UU RI No. 62, 2024), The MBG policy represents a strategic effort to institutionalize school nutrition as a component of human capital investment. The program is also politically significant, having been one of the flagship promises during the 2024 presidential election.

Despite this policy momentum, the implementation of MBG has faced multiple challenges. Issues such as food safety incidents, menu inconsistency, poor logistics, and limited local capacity have led to community resistance in several regions. Cases of food poisoning and logistical failures have highlighted gaps in operational readiness, particularly in human resources and institutional coordination.

Internationally, research on school feeding programs has increasingly recognized the centrality of human resource management and capacity building to their success. Comparative studies in countries such as Japan, India, the United States, and South Korea have shown that effective implementation is contingent not only on funding and logistics but also on institutional governance, cross-sector collaboration, and the professional competence of educators, nutritionists, and program managers (Aldrin Pasha et al., 2025; Katz et al., 2022; Waida & Kawamura, 2022).

However, while many studies focus on food quality, delivery models, or short-term health outcomes (Liguori et al., 2024; Stone et al., 2025), Few have conducted a systematic mapping of the interlinkages between school feeding programs and human resource capacity development. This represents a critical gap, particularly in contexts like Indonesia, where institutional fragmentation and capacity deficits persist.

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This study addresses that gap by conducting a bibliometric analysis of global literature on school feeding programs, nutrition interventions, and their relationship with human resource management and capacity building. It seeks to answer four key research questions:

1. What are the global publication trends related to school feeding and human resource management?
2. Which countries and institutions are leading research in this domain?
3. What major thematic clusters emerge from the literature?
4. How can these insights be applied to strengthen Indonesia's MBG implementation?

By focusing on human resource development as a core determinant of policy success, this study contributes to the evidence base for designing more sustainable, inclusive, and effective national nutrition interventions. Moreover, it positions Indonesia's MBG initiative within a broader global discourse on public health governance and institutional capacity

MATERIAL AND METHODS

This study employed a descriptive bibliometric analysis design to map global research trends related to school feeding programs, nutrition interventions, and their intersection with human resource management and capacity building. Bibliometric analysis is widely used in research evaluation to quantify the structure, development, and thematic focus of scientific literature across a specific domain (Dorban & Vandevenne, 1992). It provides a systematic approach for identifying patterns, thematic clusters, and knowledge gaps in the literature (Berry et al., 2021; Liguori et al., 2024).

A. Data Source and Search Strategy

The article selection process followed a multi-stage screening procedure, as illustrated in Figure 1. Bibliographic data were retrieved from the Scopus database, one of the largest and most comprehensive indexing platforms for peer-reviewed literature across disciplines. The search was conducted on October 15, 2025, covering articles published between 2020 and 2025 to capture recent developments and post-pandemic insights relevant to school nutrition and governance.



Figure 1. Flowchart of the article selection process for bibliometric analysis

The search strategy included a combination of free-text and controlled keywords in titles, abstracts, and keyword fields. The keyword combinations used were:

"school free nutrition meal program" OR "school feeding program" OR "nutrition intervention" AND "human resource management" OR "capacity building"

The inclusion criteria for article selection were as follows:

- a) Document type: Journal article
- b) Publication stage: Final
- c) Language: English
- d) Source type: Peer-reviewed journals
- e) Publication years: 2020–2025

An initial set of 995 documents was retrieved. After removing duplicates and applying filters, 250 documents remained. A second-level screening was conducted by adding the keyword "capacity building" to ensure thematic relevance, resulting in a final sample of 116 articles for analysis.

B. Data Analysis Tools and Procedure

The selected documents were exported in CSV format and analyzed using VOSviewer (version 1.6.19), a widely used software for bibliometric visualization (Van Eck & Waltman, 2010). The co-occurrence analysis was performed to identify thematic clusters based on keyword frequency and relational linkages.

To enhance thematic clarity, generic terms such as "humans," "article," "male," and "female" were excluded from the analysis. A minimum threshold of five keyword occurrences was applied to produce a more focused network. The overlay visualization technique in VOSviewer was used to map the evolution of research focus over time.

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Each keyword node in the visual network represents a topic within the literature, with node size indicating frequency and link thickness indicating the strength of association between keywords. Clusters were color-coded to denote major thematic areas (e.g., green for capacity building and health promotion, red for healthcare delivery, etc.).

This mixed-method bibliometric mapping was further qualitatively interpreted to derive conceptual insights and practical implications for the implementation of Indonesia's MBG program. The thematic clustering helps position capacity building not merely as a technical component, but as a systemic pillar that bridges policy, management, and education governance (Katz et al., 2022; Rasanjani & Rahmi, 2025).

RESULT AND DISCUSSION

A. General Publication Trends

A total of 116 Scopus-indexed journal articles published between 2020 and 2025 met the inclusion criteria after screening (Figure 2).

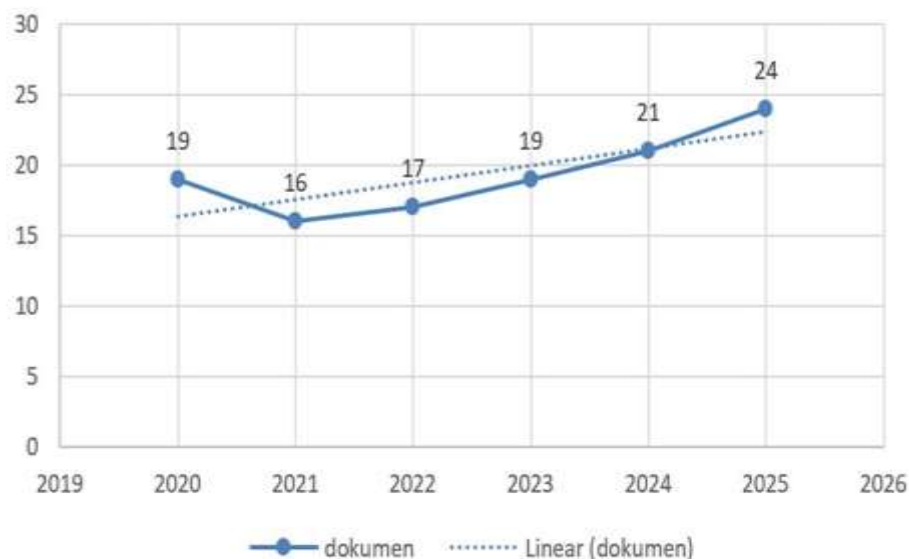


Figure 2. Filtered article results after applying inclusion criteria

The annual trend analysis reveals a significant increase in scholarly interest in school feeding programs and nutrition-related capacity building, particularly following the COVID-19 pandemic (Figure 3).

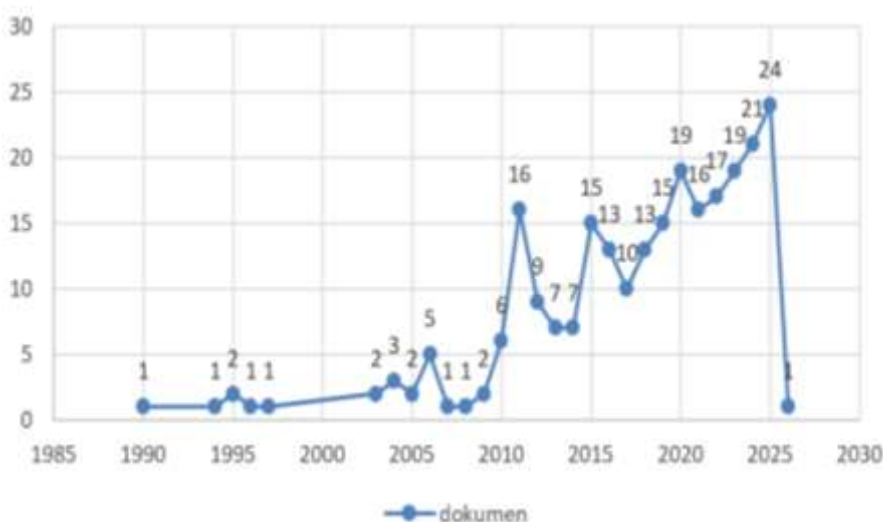


Figure 3. Annual distribution of Scopus publications (2020–2025)

This trend reflects the growing international recognition of school-based nutrition as a strategic tool for post-pandemic recovery and human capital development (Katz et al., 2022)

The geographical distribution of publications indicates that the United States, India, and the United Kingdom are the leading contributors to this research area (Figure 4).

Documents by country or territory

Compare the document counts for up to 15 countries/territories.

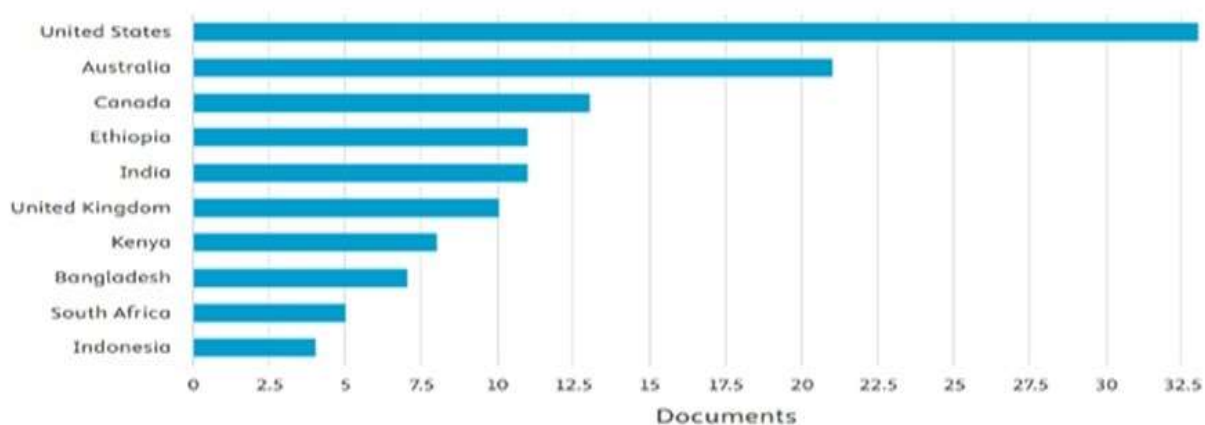


Figure 4. Top 10 contributing countries to school nutrition and HRM research

These countries have longstanding national school lunch programs and serve as important policy laboratories for developing economies such as Indonesia (Aldrin Pasha et al., 2025; Berry et al., 2021).

B. Keyword Co-occurrence and Thematic Clustering

To understand how key concepts are interrelated in global literature, a co-occurrence analysis was conducted using VOSviewer. From the final 116 articles, keywords appearing at least five times were included, while generic biomedical terms (e.g., "humans", "male", "female", "article") were excluded to sharpen thematic focus. The resulting network, shown in Figure 5, provides a visual representation connections prior to any thematic filtering. Each node represents a keyword, with node size indicating frequency and the thickness of links reflecting the strength of co-occurrence between terms. The visualization highlights the complexity and breadth of research topics related to school feeding programs and human resource capacity.

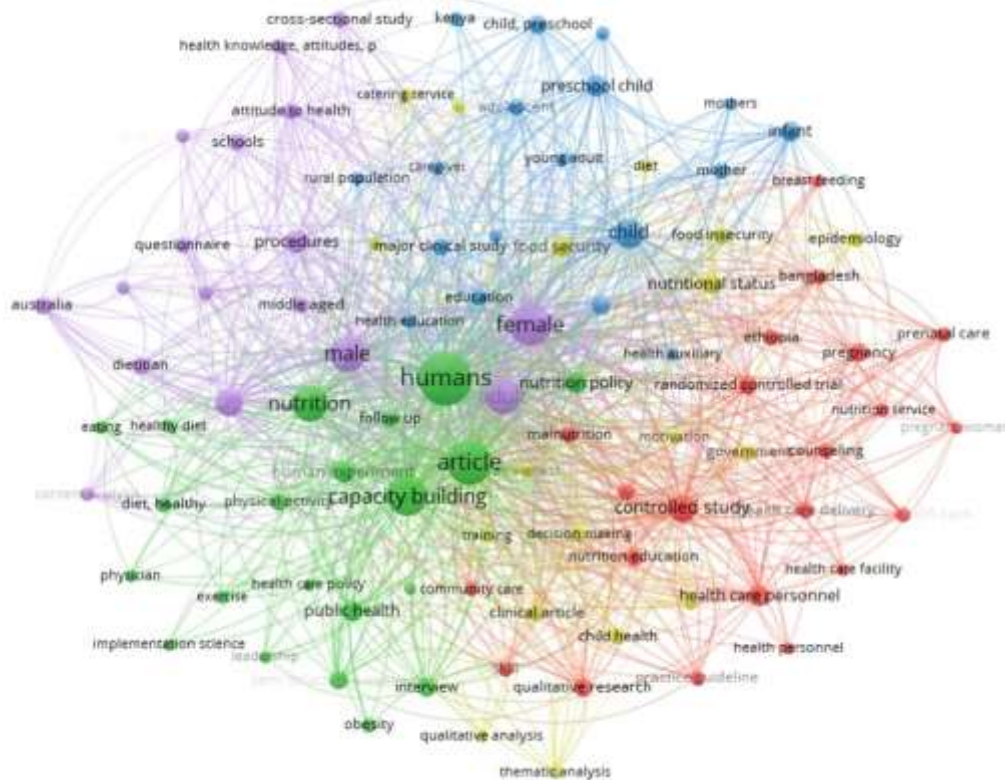


Figure 5. Initial VOSviewer keyword co-occurrence network (all keywords)

To improve thematic clarity and reduce noise, irrelevant or overly generic terms were removed, and the network was reprocessed, resulting in the refined cluster visualization shown in Figure 6

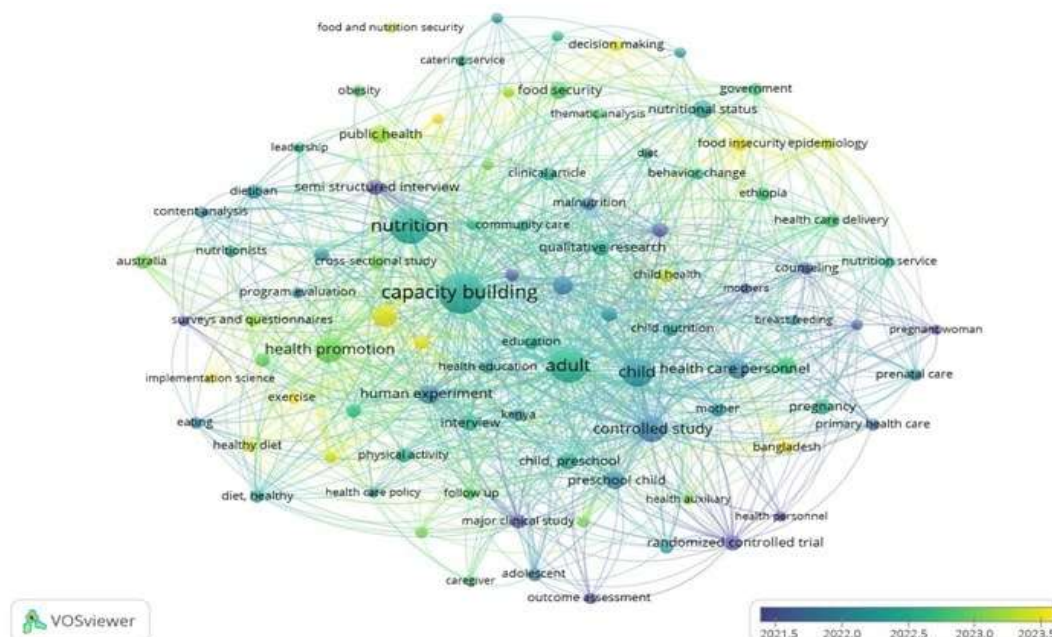


Figure 6. Refined VOSviewer network showing major thematic clusters

The co-occurrence network analysis yielded five dominant thematic clusters, each reflecting specific focal areas within the global literature. These clusters, visualized using VOSviewer, reveal how school feeding programs intersect with health promotion, policy, education, and institutional management. The following sections provide a qualitative interpretation of each cluster.

The resulting clusters are discussed below:

Cluster 1 – Capacity Building and Health Promotion (Green Cluster)

Following the refined co-occurrence analysis, further focus was directed toward the cluster representing “capacity building” due to its central position and high frequency within the overall network. As visualized in Figure 7, this cluster denoted in green captures a thematic nexus centered on human resource development, health promotion, implementation science, and program evaluation. The dense connectivity of “capacity building” with terms such as “training”, “professional development”, and “health promotion” underscores its cross-cutting relevance across school nutrition initiatives. (Dorban & Vandevenne, 1992; Katz et al., 2022).

This visualization affirms the conceptual role of capacity building not merely as a support function, but as a strategic pillar that underlies the success of school feeding programs. In the context of Indonesia’s MBG implementation, it reinforces the critical need for sustained investment in workforce readiness, monitoring systems, and institutional development at both national and local levels. (Prawijaya et al., 2025).

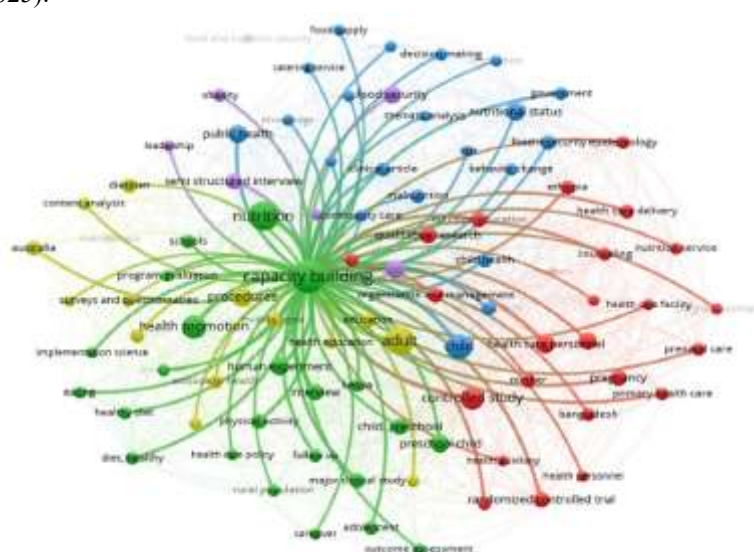


Figure 7. Network visualization highlighting the “capacity building” cluster.

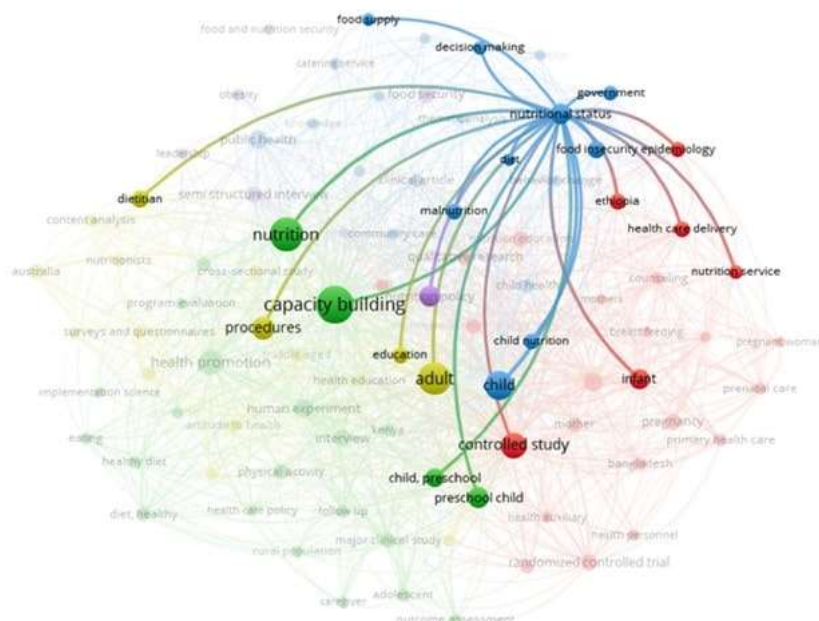


Figure 9. Keyword map related to food security and governance

Cluster 4 – Education and Organizational Management (Yellow Cluster)

The yellow cluster illustrated in Figure 10 highlights the educational and institutional management dimensions of school feeding programs. Key terms in this cluster include “education”, “school system”, “organization and management”, “nutrition education”, and “dietitian”. This thematic area positions schools not merely as food distribution points but as vital platforms for behavioral change, health promotion, and administrative coordination (Rassanjani & Rahmi, 2025; Waida & Kawamura, 2022).

For Indonesia's MBG policy to be effective, it is critical that schools be equipped with the necessary organizational infrastructure and human resources. This includes assigning clearly defined operational roles, integrating nutrition education into the school curriculum, and employing certified dietitians to support program quality. The findings reinforce the idea that without school-level capacity, national-level policy risks ineffective translation on the ground.

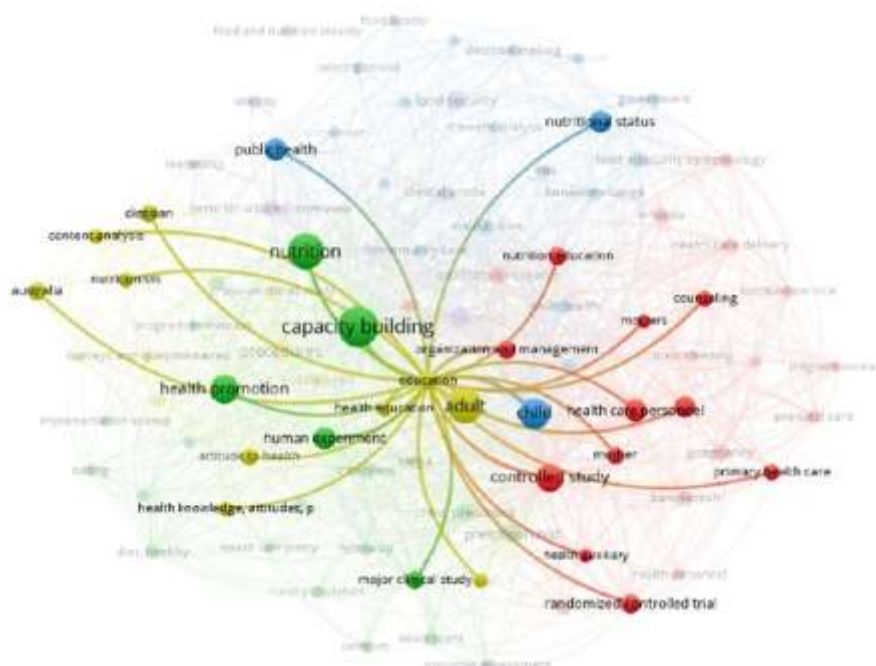


Figure 10. Cluster visualization for education, school management, and institutional readiness.

Cluster 5 – Policy Leadership and Stakeholder Engagement (Purple Cluster)

The final cluster, visualized in Figure 11, centers on the sociopolitical aspects of nutrition programs, particularly leadership, stakeholder engagement, and cultural adaptation. Prominent keywords include “nutrition policy”, “semi-structured interview”,

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“leadership”, and “food preferences”. This cluster reflects the growing recognition that community participation, local leadership, and culturally sensitive menu design are essential to gaining program legitimacy and public trust (Manson et al., 2026; Soma et al., 2024).

For Indonesia's MBG policy, the implication is clear: implementation must not rely solely on top-down directives. Instead, program success depends on engaging local stakeholders, including parents, teachers, local governments, and communities, in co-designing menus, setting priorities, and resolving contextual challenges. Without such engagement, resistance or rejection from beneficiaries, as already seen in some MBG pilot cases, may persist

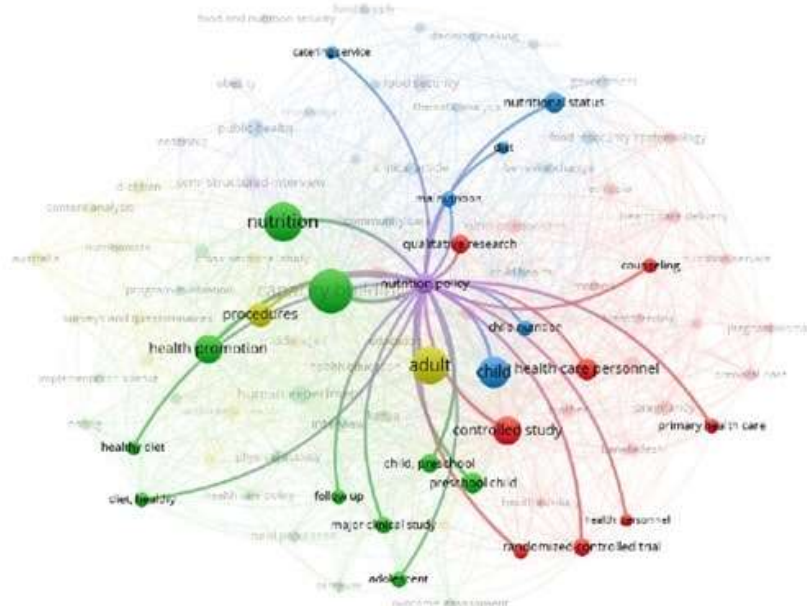


Figure 11. Visualization of keywords associated with policy engagement and leadership.

CONCLUSIONS

This study provides a comprehensive bibliometric mapping of global research on school feeding programs, with a particular focus on human resource management and capacity building. Through the analysis of 116 Scopus-indexed articles published between 2020 and 2025, five thematic clusters were identified: (1) capacity building and health promotion, (2) clinical and maternal nutrition interventions, (3) food security and policy governance, (4) education and organizational management, and (5) stakeholder engagement and leadership.

The findings demonstrate that “capacity building” functions not only as a technical component but as a central node linking diverse aspects of school nutrition programs—ranging from institutional readiness and professional development to policy coordination and community acceptance. This underscores the multidimensional nature of human capital in sustaining effective nutrition initiatives.

For Indonesia's Free Nutritious Meal Program (MBG) to achieve long-term impact, investment in human resource capacity must go beyond training modules. It should include the development of localized leadership, professional certification systems, cross-sector collaboration, and the institutionalization of monitoring and evaluation frameworks. Furthermore, program legitimacy and uptake depend on meaningful community engagement and alignment with local food cultures and preferences.

This study contributes to the evidence base for more integrated and sustainable nutrition policies, and offers a conceptual roadmap for policymakers and practitioners seeking to strengthen school feeding systems through a human-centered, governance-informed lens.

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