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NUTRITION PROGRAM IN DAYCARE SERVICES TO COMBAT STUNTING IN TODDLERS: A SCOPING REVIEW

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Abstrak

Stunting masih menjadi masalah kesehatan masyarakat yang banyak terjadi di negara berkembang akibat asupan gizi yang tidak memadai dan terbatasnya layanan pengasuhan anak usia dini. Tujuan: Penelitian ini bertujuan memetakan dan mensintesis bukti ilmiah terkait program gizi yang diterapkan di layanan daycare sebagai pendekatan terintegrasi untuk pencegahan stunting pada balita. Metode: Penelitian menggunakan *scoping review* dengan kerangka PRISMA-ScR melalui penelusuran literatur pada PubMed, ScienceDirect, Google Scholar, dan DOAJ untuk studi terbit tahun 2018–2025 yang berfokus pada intervensi gizi di daycare. Hasil: Sebanyak sepuluh studi memenuhi kriteria dan menunjukkan tiga model intervensi, yaitu program pemberian makan terstruktur, edukasi gizi dan pemberdayaan orang tua, serta kolaborasi lintas sektor antara daycare, layanan kesehatan, dan pemerintah lokal. Intervensi pada daycare formal memberikan hasil lebih baik dibandingkan pusat pengasuhan informal. Kesimpulan: Program gizi berbasis daycare memiliki potensi kuat dalam mencegah stunting melalui pelayanan gizi terpadu, peningkatan kapasitas pengasuh, dan keterlibatan masyarakat. Standarisasi praktik gizi dan penguatan kebijakan nasional diperlukan untuk mendukung keberlanjutan program dan menurunkan prevalensi stunting.

Kata Kunci: Daycare, Anak Usia Dini, Gizi, Kesehatan Masyarakat, Stunting

Abstract

Stunting remains a significant public health issue, particularly in developing countries, where inadequate nutrition and limited early childhood care contribute to growth failure. This study aims to map and synthesize existing evidence on nutrition programs implemented in daycare services as an integrated approach to combat stunting among toddlers. Methods: This research employed a scoping review using the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) framework. Relevant literature was identified through PubMed, ScienceDirect, Google Scholar, and DOAJ databases. Inclusion criteria covered studies published between 2018 and 2025 focusing on nutrition interventions in daycare or early childhood education settings. The key to the search is as follows: "nutrition" or "diet" and "program" and "daycare" or "childcare" and "stunting" or "growth failure" and "factors" or "determinants" or "influences" or "barriers" The material displayed in search engines is selected based on inclusion and exclusion criteria. Results: Ten eligible studies were analyzed through thematic synthesis to identify intervention characteristics and key outcomes. The findings revealed three main intervention models: (1) structured feeding programs that improve dietary diversity and growth; (2) nutrition education and parental empowerment that enhance healthy feeding practices; and (3) cross-sector collaboration integrating daycare, health, and local policy systems. Conclusion: Programs implemented in formal daycare settings demonstrated better nutritional outcomes compared to informal or unregulated centers. Daycare-based nutrition programs hold strong potential to prevent stunting by combining nutrition services, caregiver education, and community participation. Strengthening national policies to standardize daycare nutrition practices and training caregivers can enhance program sustainability and contribute significantly to reducing stunting prevalence in early childhood.

Keywords: *Daycare; Early Childhood; Nutrition; Public Health; Stunting*

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INTRODUCTION

In many developing countries, including Indonesia, stunting remains one of the most complex and challenging problems in public health. This phenomenon not only indicates failure in children's physical growth, but also reflects chronic malnutrition and broader social injustices. The World Health Organization (WHO) reported in 2023 that an estimated 148 million children under five worldwide are stunted. This figure shows that nearly one in five children under the age of five grow to a height below the standard for their age. This condition is a sign of ongoing malnutrition caused by an unbalanced diet, repeated infections, and a lack of developmental stimulation from early life (Harahap et al., 2024). In the context of public health, stunting is not only a physical problem but is also associated with low cognitive abilities, immune system disorders, an increased risk of chronic diseases in adulthood, and reduced economic productivity. The long-term consequences of stunting result in the loss of human resource potential and have implications for the nation's competitiveness. Therefore, reducing stunting rates is a global priority in achieving the Sustainable Development Goals (SDGs), particularly the third goal, which emphasizes the importance of health and well-being for all people of all ages (Akmal et al., 2019).

The Indonesian Nutrition Status Survey (SSGI, 2022) data shows that 21.6% of toddlers suffer from stunting, a figure that still exceeds the 20% threshold recommended by the WHO. Although the government has launched the National Movement to Accelerate Stunting Reduction, which has involved various sectors such as health, education, and community empowerment to reduce stunting in Indonesia. Approaches that are too focused on household interventions, such as nutrition counseling and supplementary feeding, still face obstacles in terms of sustainability and target coverage. In this context, early childhood education institutions such as daycare centers or childcare centers are strategic tools in stunting prevention efforts (Elisaria et al., 2021). Daycare centers not only function as temporary childcare facilities, but also have the capacity to promote child development and meet nutritional needs through healthy eating programs. According to Gelli et al. (2018), nutrition interventions in early childhood education centers can increase food consumption diversification and significantly reduce stunting rates in Malawi. Huriah et al. (2021) argue that the daily energy intake of preschool children increased after implementing a nutrition education integration program at the Yogyakarta Early Childhood Education Institution.

However, this contrasts with the findings of Madiba et al. (2019), which show that the presence of children in informal daycare can increase the risk of stunting due to poor food quality, inadequate sanitation, and minimal involvement of caregivers in monitoring nutrition in South Africa. According to Trisnawati et al. (2025), these disparities indicate that there are variations in the implementation of nutrition programs in daycare centers, which are influenced by the quality of interventions, policy support, and the capacity of the human resources implementing them.

The research gap is evident in the absence of systematic studies mapping the implementation of nutrition programs in daycare centers and their effectiveness in reducing stunting in toddlers. Most previous studies have focused on home-based nutrition interventions or nutrition counseling for mothers, without examining the strategic role of daycare centers as an important part of the stunting prevention system. In fact, daycare centers are strategically positioned because they operate during the golden period of child development, when nutrition and education interventions can be carried out in a targeted and sustainable manner. On the other hand, the literature on nutrition interventions in daycare centers is still limited and tends to focus on the context of specific countries without cross-regional comparative analysis (Saleh et al., 2021). Research in Africa tends to emphasize socioeconomic aspects and food security, while research in Asia focuses on education and parenting behaviors. The lack of integration between these findings indicates that scientific evidence on the effectiveness of nutrition programs in daycare centers remains fragmented.

In addition, most studies have not used a systematic framework such as the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) in compiling more comprehensive evidence. This has resulted in a limited understanding of the key factors for the success of nutrition programs in daycare centers, both in terms of direct intervention with children and from the perspective of institutional management and public policy support (PS et al., 2025).

These conditions form the rational basis for conducting this study. In the context of public health, systematic mapping of nutrition programs in daycare centers is important because it can explain how these interventions play a significant role in reducing stunting rates, as well as identifying supporting and inhibiting factors. According to Sakti et al. (2025) and Suprapto et al. (2025), daycare centers have unique characteristics in combining elements of education, childcare, and nutrition services in one system, thus having the potential to become effective multidimensional intervention centers in

stunting prevention efforts.

This study aims to comprehensively review various nutrition program models that have been implemented in daycare centers in various countries using the PRISMA-ScR approach. This approach allows for the identification of intervention variations, classification of findings based on themes, and the development of a conceptual map of the role of daycare centers in stunting prevention. The integration of scientific evidence from two continents, Asia and Africa, is a novelty in this study, which seeks to identify global patterns in the implementation of daycare-based nutrition programs. In addition, this study develops a new conceptual framework called the Integrated Daycare Nutrition Model, which links balanced nutrition, health education for parents and caregivers, and family empowerment to ensure the sustainability of nutrition programs. Through this study, it is hoped that a deeper understanding of the strategic role of daycare as a key node in the stunting prevention system will be created, while also producing practical recommendations for policymakers, health workers, and early childhood educators in strengthening collaboration between the education and health sectors.

METHODS

This study used a scoping review design with reference to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines. This approach was used to identify, map, and synthesize scientific evidence on the implementation of nutrition programs in daycare services as a strategy for preventing stunting in children under five years of age. Through a scoping review, this study can examine various research designs, understand the variety of intervention approaches, and identify gaps in existing literature, without having to conduct a quantitative assessment of the effectiveness of a particular intervention.

1. Study Design

This study design is descriptive-exploratory in nature, focusing on mapping relevant scientific literature. The PRISMA-ScR approach can provide a comprehensive overview of the research landscape, covering quantitative, qualitative, and mixed studies, without limiting the type of research design. The results of this study not only present a synthesis of empirical data but also a conceptual analysis of the strategic role of daycare in the stunting prevention system.

2. Study Setting and Subjects

This study did not directly involve human participants, but focused on analyzing published scientific articles. The unit of analysis in this study was primary research articles discussing nutrition programs, health education, or stunting prevention interventions in daycare centers and early childhood education institutions. The articles analyzed cover various geographical contexts, both from Asian countries (such as Indonesia, Bangladesh, and India) and Africa (such as Malawi, Kenya, and South Africa). The inclusion criteria in this study included primary research articles (quantitative, qualitative, or mixed methods designs), articles focusing on children under five years of age, describing the implementation of nutrition, education, or stunting prevention interventions in daycare centers, articles published between 2018 and 2025, and articles written in English or Indonesian. Meanwhile, exclusion criteria included non-PRISMA narrative review articles, policy reports without empirical data, and studies that did not specifically mention daycare as the main location of intervention. The article screening process was carried out by two researchers independently to ensure objectivity and consistency in the selection of literature used.

3. Data Collection

The data collection process was carried out from August to October 2025 through four main electronic databases, namely PubMed, ScienceDirect, Google Scholar, and Directory of Open Access Journals (DOAJ). In addition, hand searching was also conducted on relevant articles listed in the bibliography of the main publications to ensure that no potential literature was overlooked. All search results were imported into Mendeley Reference Manager for organization and duplication detection. After duplicates were removed, articles were selected based on their titles and abstracts, followed by a full-text review to determine their eligibility according to the inclusion and exclusion criteria. Of the 84 initial articles, 24 passed the initial selection, and finally 10 articles were selected for in-depth analysis because they met all the established inclusion criteria (Fig. 1).

4. Data Analysis

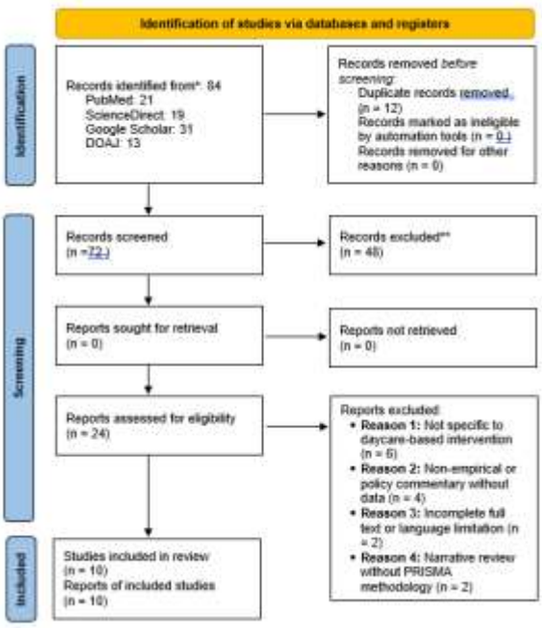
Data analysis was conducted using a thematic approach adapted from the Arksey and O'Malley (2005) framework for scoping reviews. Each article that passed the selection was extracted based on author, year of publication, research location, study design, population characteristics, type of intervention, main results, and relevance to the research topic. The analysis process included four main stages: identification of initial themes for grouping data according to conceptual similarities, narrative synthesis of the patterns of results found, and mapping of relationships between themes to produce a conceptual framework for nutrition programs in daycare centers. Quantitative data reported in the articles, such as the percentage increase in energy intake or decrease in stunting prevalence, were presented descriptively to reinforce the thematic results. Meanwhile, qualitative data were analyzed

using content analysis to highlight the social and policy contexts that influence the successful implementation of nutrition programs in daycare centers.

5. Ethical Clearance

This study is a scoping review that uses secondary data from scientific articles that have been published openly. The entire review process was carried out in compliance with scientific research ethics principles and the guidelines of the International Committee of Medical Journal Editors (ICMJE), which cover author responsibility, transparency, and publication originality. All literature sources were cited accurately and in accordance with scientific principles, and the division of roles among authors was established and agreed upon at the initial stage of the research.

Figure 1. PRISMA-ScR Flow Diagram of the Study Selection Process



RESULTS ABD DISCUSSION

The literature search process yielded ten articles that met the inclusion criteria. These articles, published between 2018 and 2025, covered the geographical contexts of Asia and Africa. The research focused on the implementation of nutrition programs, health education, and daycare service integration models in the prevention of stunting in children under five years of age. Variations in social and economic contexts, as well as forms of intervention, demonstrate that nutrition programs in daycare centers not only focus on providing nutritious food but also emphasize strengthening the capacity of families and caregivers as part of a comprehensive strategy to support child growth and development.

Table 1 shows three main patterns of intervention in daycare services, namely nutrition-based interventions, educational and family empowerment interventions, and cross-sector collaborative interventions.

1. Nutrition-Based Interventions

Four studies highlight the importance of providing healthy and balanced meals in daycare as a key factor in reducing stunting. Daycare centers that provide daily menus with energy and protein content appropriate for children's needs show a significant improvement in nutritional status and growth (Gelli et al., 2018; Sakti et al., 2025). Children who participate in nutritious eating programs at early childhood education centers experience relatively faster height growth compared to children who do not participate in similar programs. In addition, the implementation of a menu rotation system tailored to local food ingredients has proven effective in maintaining program sustainability and reducing dependence on imported ingredients. On the other hand, daycare centers that do not have quality control over food actually show a higher risk of malnutrition. This condition shows that the quality and frequency of feeding are far more important than the number of servings alone (Trisnawati et al., 2025).

2. Intervention Educational and Empowering Family

Most studies in Indonesia and Bangladesh show that integrated nutrition education in daycare can improve the knowledge and skills of parents and caregivers. Two-way education, such as small group discussions and family nutrition classes, has been proven to be more effective than one-way education, which is only in the form of lectures. According to Nabila et al. (2024) and Kariuki and Maina (2024), nutrition education in daycare centers not only serves as a means of knowledge transfer, but also encourages the formation of healthy eating habits from an early age, such as children recognizing nutritious foods and reducing their consumption of fast food. Caregivers who receive training through menu planning simulations show increased confidence in preparing healthy meals. Parental involvement in cooking activities with children at daycare also strengthens emotional bonds and raises awareness of the importance of balanced nutrition.

3. Intervention Cross-Sector Collaboration

The success of daycare nutrition programs is highly dependent on cross-sector support. Collaboration between health, education, and community organizations results in a more sustainable service system. Local governments that establish policies integrating nutrition and early childhood education programs tend to have lower stunting rates. Some regions also utilize community empowerment programs through nutrition cadres to ensure the sustainability of activities after the research program is completed. In addition, a collaborative approach facilitates the integration of basic health services such as routine anthropometric examinations,

immunizations, and growth and development monitoring in daycare settings (Noventi, 2020; Akmal et al., 2020).

4. Mapping of Research Areas

Mapping the region aims to provide a geographical overview of the distribution of research. Figure 2 shows a map of the study locations covering two continents, namely Asia and Africa. The light blue areas indicate countries in Asia (Indonesia, Bangladesh, and India), while the orange areas indicate countries in Africa (Malawi, Kenya, and South Africa). Most of the studies were identified in Southeast Asia, particularly Indonesia, which illustrates the high level of attention given to the role of daycare in preventing stunting (Huriah et al., 2021; Madiba et al., 2019).

Figure 2. Geographical Distribution of Daycare Nutrition and Stunting Prevention.

Cross-regional findings indicate that daycare centers serve as strategic nodes in the stunting prevention system. The success of programs depends heavily on the quality of nutritional interventions, the educational capacity of caregivers, and cross-sectoral policy support. Daycare centers that adopt an integrative approach combining the provision of nutritious food, nutrition education for parents, and collaboration with health workers show the highest consistency in improving children's nutritional status and reducing the risk of stunting. Conversely, daycare centers with minimal nutritional supervision and limited sanitation facilities showed varying and less stable results. Thus, the effectiveness of nutrition programs in daycare centers is not only determined by one intervention component, but by the synergy between education, caregiving, and supporting public policies (Madiba et al., 2019).

Table 1. Characteristics Research Reviewed in Scoping Review

Author (Year)	Location	Research Design	Population & Setting	Focus Intervention	Key Results
Gelli et al., 2018	Malawi	Experimental	Children aged 2–5 years in the center education child age early	Giving food nutritious balanced daily	Improvement diversification food and a reduction in stunting by 17.0%
Madiba et al., 2019	South Africa	Observational	Children in urban informal daycare	Analysis pattern food and hygiene environment	The risk of stunting increases consequence low quality food and sanitation
Mistry et al., 2019	Bangladesh	Longitudinal quantitative	Mother and child ages 6–24 months	Counseling nutrition for mothers in the daycare environment	Protein and nutrient intake iron increase after education nutrition structured
Huriah et al., 2021	Indonesia (Yogyakarta)	Experimental	Preschool children in PAUD	Educational integration child age early with education nutrition	Intake energy increased 1 064.00 kcal to 1 182.00 kcal in three month
Akmal et al., 2020	Indonesia (Jakarta)	Qualitative participatory	PAUD tutors and parents	Training making a healthy menu based material local	Increase skills caregiver in designing a balanced menu
Noventi , 2020	Indonesia (East Java)	Policy studies	Department of Health and Education area	Government strategy area in the anti-stunting program	Increase coordination cross daycare program sectors and integration

Author (Year)	Location	Research Design	Population & Setting	Focus Intervention	Key Results
Kariuki & Maina, 2024	Kenya	Survey descriptive	Children in rural daycare	Practice giving food and intake nutrition	Connection positive between timetable regular eating and growth child
Nabila et al., 2024	Indonesia (Semarang)	Qualitative	Rumah Pelita children and daycare caregivers	Education nutrition through games and practice cook	More children recognize food healthy and reduce consumption snacks
Trisnawati et al., 2025	Indonesia (Surabaya)	Quasi-experimental	Mother with child ages 2–4 years	Education nutrition and parenting based community	Knowledge nutrition Mother increase and impact on patterns Eat child
Sakti et al., 2025	Indonesia (Bali)	Mixed-method	Managers and the community local	Mitigation integration stunting risks and prevention	Strengthening resilience family to risk nutrition bad and environmental

Discussion

The results of this study indicate that daycare services play a strategic role in preventing stunting through the integration of three main components, namely the provision of nutritious food, health education, and structured parenting patterns. Daycare-based intervention models are able to bridge the gap between public health programs and early childhood education. In the context of public policy, these results emphasize the importance of synchronizing child nutrition programs with the formal early childhood education system, so that stunting prevention efforts do not rely solely on primary health services (Arieffiani and Ekowanti, 2024). The cross-sectoral approach implemented in several regions of Indonesia shows that collaboration between local governments, health workers, and daycare managers creates a more sustainable intervention mechanism than individual household efforts. This is in line with the paradigm of health promotion based on the social and institutional environment, where children's healthy behaviors are shaped not only by the role of parents but also by the educational community where they interact and develop (Akbar & Huriah, 2022; Banhae et al., 2023).

From a practical perspective, the success of nutrition programs in daycare centers is largely determined by the quality of the human resources involved in their implementation. Caregivers and early childhood educators not only act as supervisors, but also as agents of change in nutritional behavior. Targeted training that covers healthy menu planning, food safety, and hygienic behavior has been shown to strengthen the impact of interventions on children's eating behaviors (Yusriadi et al., 2024; Christian et al., 2020).

In addition, experiences from various countries in Asia show that participatory nutrition education approaches, such as cooking activities with children or educational games, are more effective in shaping healthy eating habits than one-way counseling methods (Wulandari et al., 2021). The implication for public health practice is the need to place daycare as part of a community-based nutrition system, where nutrition promotion is integrated with early childhood care and education systems. Strengthening the capacity of nutrition cadres, improving the competence of caregivers, and continuous collaboration with community health centers are important elements that need to be institutionalized in national policies to reduce stunting (Uliyanti et al., 2017).

The policy implications of these findings suggest that the government needs to establish national standards for nutrition services in daycare centers as part of an integrated stunting prevention strategy. These standards should include guidelines for balanced menus, feeding frequency, regular anthropometric measurements, and a system for monitoring sanitation and food safety (Motbainor et al., 2015). In addition, empowering families through educational activities in daycare centers has been shown to reinforce healthy nutritional behaviors after children return home. This approach has been successful in several integrative models at the local level and has the potential to be adopted nationally through evidence-informed policy. Thus, interventions that originate in daycare centers not only function as technical nutrition programs, but can also transform into social movements that foster a culture of healthy eating at the community level (Aramico et al., 2020; Sari, 2022).

From a scientific development perspective, the results of this study open up opportunities for further research exploring the long-term impact of nutrition programs in daycare on children's physical growth, cognitive development, and academic achievement. Future studies also need to investigate the relationship between the quality of caregiver-child interactions and children's nutritional intake and eating behaviors, as interpersonal relationships have the potential to

mediate the effectiveness of interventions (Remans et al., 2011; Bhutta et al., 2013). To gain a more comprehensive understanding, a mixed-method approach combining quantitative and narrative data needs to be applied to explore the social dynamics that influence the success of the program (Muluye et al., 2020; Sukmawati, 2020). In addition, health economic analysis is still needed to assess the cost efficiency of daycare-based nutrition interventions, so that the results can form the basis for more rational policy planning at the national and regional levels. Cross-country comparative studies are also recommended to identify variations in program implementation based on social, economic, and cultural contexts, so that intervention models can be adaptively tailored to local needs (Wulandari et al., 2021; Arsyad et al., 2020).

Although this study provides a comprehensive overview of the implementation of nutrition programs in daycare centers, there are several limitations that need to be considered. First, variations in research design, sample size, and measurement methods between articles make it difficult to directly compare results. Second, most of the studies analyzed were local-scale studies with a limited number of respondents, so generalizations to the national population must be made with caution. Third, the data sources only came from publicly available online publications, so the potential for publication bias could not be completely avoided. Fourth, methodologically, scoping reviews are not designed to assess the quality or strength of evidence from each primary study in depth. Thus, the results of this study are more appropriately viewed as knowledge mapping that describes trends and directions in research in the field of daycare-based child nutrition, rather than as conclusive causal findings.

CONCLUSION

This study confirms that daycare services play a strategic role in preventing stunting in children under five years of age. Daycare can be an effective intervention space because it combines three important elements, namely the provision of nutritious food, nutrition education for caregivers and parents, and cross-sector support between the education and health sectors. This integrative approach strengthens children's nutritional resilience, builds healthy eating habits from an early age, and ensures optimal growth and development during the golden age. The practical implications of this study's findings are the need to strengthen national policies that make daycare a part of the community nutrition service system. The government needs to develop minimum standards for nutrition and sanitation in daycare centers, train caregivers in child nutrition management, and involve families in ongoing education programs. Collaborative efforts between community health centers, early childhood education institutions, and local governments will accelerate the reduction of stunting rates while improving the quality of Indonesia's human resources in the future.

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