



Relationship Between Free Nutritious Meal Program (MBG) Energy Contribution with Daily Energy Requirements and Nutritional Status Among Students of Wawo Junior High School, Bima District

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Abstract

Background: The Free Nutritious Meal Program is a school-based nutrition intervention designed to support students' energy intake and nutritional status. Variations in students' consumption of the provided meals may influence the program's contribution to daily energy adequacy and nutritional outcomes. **Objective:** This study aimed to examine the association between the energy contribution of a Free Nutritious Meal Program, daily energy adequacy, and nutritional status among students of SMP Negeri 2 Wawo (Junior High School), Bima Regency. **Methods:** A cross-sectional study was conducted among 102 students selected through stratified random sampling. Data were collected using two non-consecutive 24-hour dietary recalls and anthropometric measurements. Data were analyzed using descriptive statistics and Pearson correlation tests. **Results:** The energy contribution of the Free Nutritious Meal Program was significantly associated with daily energy adequacy ($p = 0.003$). Daily energy adequacy was significantly associated with students' nutritional status ($p < 0.001$). In addition, a significant association was found between the program's energy contribution and nutritional status ($p = 0.010$). **Conclusion:** The energy contribution of the Free Nutritious Meal Program was associated with daily energy adequacy and nutritional status among junior high school students. These findings may support the development of school-based nutrition interventions and community nutrition monitoring programs to improve adolescent nutritional health in rural areas.

Keywords

Free Nutritious Meal, MBG, Daily energy requirements, Nutritional status

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1. BACKGROUND

Nutritional issues among school-age children and adolescents remain a significant public health issue in many

countries. Adolescence, particularly during junior high school (SMP), is a period of rapid growth characterized by increased energy and nutrient needs to support physical growth, cognitive development,

and daily activities. An imbalance between energy intake and energy needs in this age group can impact nutritional status, learning ability, concentration, and long-term health. Therefore, meeting the daily energy needs of school-age children is a primary focus of school-based nutrition interventions (Erkan, 2020).

Globally, nutritional problems in children and adolescents remain quite high. The World Health Organization reports that by 2024, approximately 148 million children will experience stunting, 45 million children will experience wasting, and more than 390 million children and adolescents will be overweight and obese. This situation indicates a double burden of malnutrition, namely the simultaneous occurrence of undernutrition and overnutrition within the same population (WHO, 2024). Furthermore, the 2023 Global Nutrition Report states that the increase in the prevalence of overweight and obesity in children and adolescents is occurring faster than the decrease in malnutrition, particularly in developing countries (Global Nutrition Report, 2023).

To address these issues, various countries have developed school feeding programs as school-based nutrition interventions. School meal programs are considered effective in increasing

children's access to nutritious food and helping meet students' daily energy needs while at school. Research by Zailani et al. (2023) shows that school meals account for approximately 26.1%–35.8% of the daily energy requirements of school-aged children. Similarly, the Food and Agriculture Organization (FAO) explains that a main school meal is ideally designed to meet approximately 30–35% of students' daily energy needs (FAO, 2019).

In Indonesia, the problem of nutrition among adolescents remains a serious concern. Data from the 2023 Indonesian Nutritional Status Survey (SSGI) showed national prevalences of stunting (21.5%), wasting (7.7%), and underweight (16.9%) (Kemenkes RI, 2023). Furthermore, the 2018 Basic Health Research (Riskesdas) reported that the prevalence of underweight among adolescents aged 13–15 years was 8.7%, while the prevalence of overnutrition and obesity reached 16.0% (Kemenkes RI, 2018). These conditions indicate that undernutrition and overnutrition problems still occur among adolescents in Indonesia. As part of the government's efforts to improve schoolchildren's nutritional status, the Free Nutritional Meal Program (MBG) provides nutritious, balanced meals in school settings. This program is expected to help meet students'

daily energy needs through the energy contribution from food provided at school (FAO, 2019; Kemenko PMK RI, 2024)

School feeding programs are increasingly recognized within the school food environment framework, which emphasizes schools' role in shaping dietary behaviors and improving nutritional outcomes among children and adolescents (FAO, 2019). By providing nutritious foods and increasing access to healthy meals during school hours, school-based feeding programs can improve daily energy intake and support better nutritional status among students (Zailani et al., 2023). In this context, the Free Nutritious Meal Program (MBG) represents a school-based nutrition intervention that may influence students' daily energy adequacy and nutritional status.

However, the energy contribution of the Free Nutritional Meal Program varies from student to student, depending on the amount of food actually consumed. Some students consume the entire meal, while others do not finish the food provided. This difference in consumption can affect the MBG's contribution to meeting students' daily energy needs. Over time, an imbalance between energy intake and energy needs can impact students' nutritional status. Previous research has shown that energy sufficiency is associated with adolescent

nutritional status, as indicated by the Body Mass Index for Age (BMI/U) (Putri & Anwar, 2019; Sari et al., 2020).

West Nusa Tenggara Province still faces significant nutritional challenges. According to the 2023 Indonesian Health Survey (SKI), the prevalence of stunting in West Nusa Tenggara Province was 24.6% (Kemenkes RI, 2024). This condition is reinforced by the 2023 NTB Provincial Health Profile, which states that socioeconomic factors, family food consumption patterns, and limited access to nutritious food remain major challenges in several rural areas (Dinas Kesehatan Provinsi NTB, 2023). At the local level, data from the Wawo Community Health Center (Puskesmas) work area shows that cases of malnutrition, undernutrition, wasting, underweight, and overnutrition are still found in children and adolescents. SMP Negeri 2 Wawo, one of the schools participating in the Free Nutritional Meal Program, is a relevant location for assessing the relationship between the MBG energy contribution and meeting students' daily energy needs and nutritional status. To date, research examining the relationship between the Free Nutritional Meal Program's energy contribution and the daily energy needs and nutritional status of junior high school students, particularly in

rural areas such as Wawo District, Bima Regency, is still limited.

Based on the description, this study aims to analyze the relationship between the energy contribution of the Free Nutritional Meal Program (MBG) with the daily energy needs and nutritional status of students at SMP Negeri 2 Wawo, Bima Regency.

2. METHODS

Types and Design of Research

This study is quantitative and uses a cross-sectional design. A cross-sectional design was used to determine the relationship between the energy contribution of the Free Nutritional Meal Program (MBG) and students' daily energy needs and nutritional status. The study was conducted at SMP Negeri 2 Wawo, Bima Regency, from April 20 to May 13, 2025.

Research Population and Sample

The population in this study was all 137 students of SMP Negeri 2 Wawo, Bima Regency, who received the Free Nutritional Meal Program (MBG). The research sample consisted of 102 respondents determined using the Slovin formula. The sampling technique used was stratified random sampling by grade level, namely grades VII, VIII, and IX. This

technique was used to ensure that each student in each stratum had an equal opportunity to be selected as a research respondent.

Research Variables

The independent variable in this study was the energy contribution of the Free Nutritional Meal Program (MBG). In contrast, the dependent variables included meeting daily energy needs and students' nutritional status. The MBG energy contribution was measured as the percentage of energy consumed by students from MBG food relative to their individual daily energy needs. MBG energy contribution categories were divided into insufficient if $<30\%$, sufficient if $30-35\%$, and excessive if $>35\%$ (FAO, 2019; Kemenkes RI, 2024).

Fulfillment of daily energy needs is measured by comparing total daily energy intake with the energy requirements defined by the Recommended Dietary Allowance (RDA). The level of fulfillment of energy needs is categorized as insufficient ($<80\%$ of the RDA), sufficient ($80-110\%$ of the RDA), or excessive ($>110\%$ of the RDA) (Adani et al., 2020; WNPG, 2014). Student nutritional status is assessed using the Body Mass Index for Age (BMI/A) indicator based on the WHO AnthroPlus Z-score and categorized

according to the standards of Minister of Health Regulation Number 2 of 2020.

Data Quality Assurance

To ensure data quality, all data collection procedures were conducted using standardized protocols. Anthropometric measurements were performed using calibrated instruments, including a digital weighing scale and a microtoise, to minimize measurement errors. Dietary intake data were collected through two non-consecutive 24-hour dietary recalls using a structured interview approach. Completed questionnaires and recall forms were checked for completeness and consistency before data entry. Data cleaning procedures were also conducted to identify and correct incomplete or inconsistent records prior to statistical analysis.

Data Processing and Analysis

The collected data were processed through editing, coding, entry, and cleaning stages before analysis. Data analysis was performed univariately to describe the distribution of each research variable and bivariately to determine relationships among them. Data normality was tested using the Kolmogorov-Smirnov test. Analysis of relationships between variables was performed using the Pearson test with $\alpha = 0.05$. The results of the

analysis are presented in tabular and narrative form.

Research Ethics

This research has adhered to research ethics principles by maintaining the confidentiality of respondents' identities and obtaining their consent before data collection.

3. RESULTS

This study was conducted on 102 students of SMP Negeri 2 Wawo, Bima Regency, who received the Free Nutritional Meal Program (MBG). The results included univariate and bivariate analyses describing respondents' characteristics, the distribution of MBG energy contributions, daily energy needs, students' nutritional status, and the relationships among the study variables.

Respondent characteristics

Based on the research results shown in Table 1, the largest number of respondents was 15 years old, with 29 respondents (28.4%), while the smallest number was 14 years old, with 23 respondents (22.5%). Respondents aged 12 years numbered 26 people (25.5%), and those aged 13 years numbered 24 people (23.5%). By gender, there were more female respondents than male respondents: 55 (53.9%) females and 47 (46.1%) males.

Table 1. Respondent characteristics

Characteristics	Category	Frequency (n)	Percentage (%)
Age	12	26	25.5
	13	24	23.5
	14	23	22.5
	15	29	28.4
Gender	Woman	55	53.9
	Man	47	46.1

Distribution of Nutritional Status, Energy Contribution of the Free Nutritional Meal Program (MBG), and Fulfillment of Daily Energy Needs

Based on the research results shown in Table 2, the nutritional status of students is dominated by undernutrition, with 50 respondents (49%), followed by normal nutritional status with 46 respondents (45.1%) and overnutrition with 6 respondents (5.9%). In addition, most students (100 respondents, 98%)

receive insufficient energy from the Free Nutritional Meal Program, while only 2 respondents (2%) receive sufficient energy. The level of fulfillment of students' daily energy needs is also dominated by the insufficient category, with 70 respondents (68.6%), while the sufficient category is 32 respondents (31.4%). These results indicate that most students still do not meet their daily energy needs according to the Nutritional Adequacy Intake (AKG).

Table 2. Distribution of Nutritional Status, Energy Contribution of the Free Nutritional Meal Program (MBG), and Fulfillment of Daily Energy Needs

Characteristics	Category	Frequency (n)	Percentage (%)
Nutrition Status	Malnutrition	50	49
	Normal Nutrition	46	45.1
	Overnutrition	6	5.9
MBG Energy Contribution	Not enough	100	98
	Enough	2	2
Fulfilling Daily Energy Needs	Not enough	70	68.6
	Enough	32	31.4

Analysis of the relationship between MBG energy contribution and the fulfillment of daily energy needs.

Based on the research results that can be seen in Table 3, of the 100 respondents with the MBG energy contribution category less, as many as 69 respondents (67.6%) have a level of fulfillment of daily

energy needs in the category less, and 31 respondents (30.4%) are included in the sufficient category. Meanwhile, in the category of sufficient MBG energy contribution, 2 respondents (2%) are included: 1 respondent (1%) has a level of fulfillment of daily energy needs in the less category, and 1 respondent (1%) is in the

sufficient category. The Pearson test results show a p-value of 0.003, indicating a relationship between the energy contribution of the Free Nutritional Meal

Program (MBG) and the fulfillment of students' daily energy needs at SMP Negeri 2 Wawo, Bima Regency.

Table 3. Analysis of the relationship between MBG energy contribution and the fulfillment of daily energy needs

MBG Energy Contribution	Daily Intake				Total		p-value
	Not enough		Enough		F	%	
	F	%	F	%			
Not enough	69	67.6	31	30.4	100	98	0.003
Enough	1	1	1	1	2	2	
Total	70	68.6	32	31.4	102	100	
The Pearson test results show a p-value = 0.003 ($\alpha < 0.05$) with a correlation coefficient value (r) = 0.287.							

The Pearson test results show a p-value = 0.003 ($\alpha < 0.05$) with a correlation coefficient value (r) = 0.287.

Analysis of the relationship between meeting daily energy needs and students' nutritional status

Based on the research results shown in Table 4, among the 70 respondents with low fulfillment of daily energy needs, 48 (47.1%) had undernutrition status, and 22 (21.6%) had normal nutritional status. No respondents had an overnutrition status. In the category of sufficient fulfillment of

daily energy needs, 32 respondents were included: 2 (2%) had undernutrition status, 24 (23.5%) had normal nutritional status, and 6 (5.9%) had overnutrition status. The Pearson test results showed a p-value <0.001, which means there is a relationship between the fulfillment of daily energy needs and the nutritional status of students of SMP Negeri 2 Wawo, Bima Regency.

Table 4. Analysis of the relationship between meeting daily energy needs and students' nutritional status

Fulfilling Daily Energy Intake	Malnutrition		Nutritional status		Overnutrition		Total		p-value
	F	%	F	%	F	%	F	%	
Not enough	48	47.1	22	21.6	0	0	70	68.6	<0.001
Enough	2	2	24	23.5	6	5.9	32	31.4	
Total	50	49	46	45.1	6	5.9	102	100	

The Pearson test results show a p-value < 0.001 ($\alpha < 0.05$) with a correlation coefficient value (r) = 0.451.

Analysis of the relationship between meeting daily energy needs and students' nutritional status

Based on the research results that can be seen in Table 5, of the 100 respondents with the MBG energy contribution

category of less, as many as 49 respondents (48%) had undernutrition status, 45 respondents (44.1%) had normal nutritional status, and 6 respondents (5.9%) had overnutrition status. In the sufficient MBG energy contribution

category, 2 respondents (2%) were identified; 1 (1%) had undernutrition and 1 (1%) had normal nutritional status. There were no respondents with an overnutrition status in this category. The Pearson test yielded a p-value of 0.010, indicating a

relationship between the energy contribution of the Free Nutritional Meal Program (MBG) and students' nutritional status at SMP Negeri 2 Wawo, Bima Regency.

Table 5. Analysis of the relationship between meeting daily energy needs and students' nutritional status

Energy contribution	Nutritional status						Total		p-value
	Malnutrition		Normal Nutrition		Overnutrition				
	F	%	F	%	F	%	F	%	
Not enough	49	48	45	44.1	6	5.9	100	98	0.010
Enough	1	1	1	1	0	0	2	2	
Total	50	49	46	45.1	6	5.9	102	100	
The results of the Pearson test show a p-value = 0.010 ($\alpha < 0.05$) with a correlation coefficient value (r) = 0.255									

The results of the Pearson test show a p-value = 0.010 ($\alpha < 0.05$) with a correlation coefficient value (r) = 0.255

4. DISCUSSION

The present study found that undernutrition remained the predominant nutritional problem among students at SMP Negeri 2 Wawo, Bima Regency. This finding indicates that nutritional challenges among adolescents persist despite ongoing efforts to improve nutritional status through school-based nutrition interventions. Adolescence is a critical period characterized by rapid physical growth and increased nutritional requirements, making adequate dietary intake essential for maintaining optimal nutritional status (WHO, 2023; Wells et al., 2020). Nutritional status reflects the cumulative effects of dietary intake, nutrient utilization, and environmental influences over time (Wells et al., 2020).

In addition to dietary intake, nutritional status may also be influenced

by household food availability, parental education, socioeconomic conditions, and dietary practices outside school hours. These factors may contribute to differences in nutritional outcomes among adolescents and should be considered when interpreting this study's findings. These contextual factors may explain why some students maintained normal nutritional status despite inadequate energy intake from the school meal program.

Most students received an energy contribution from the Free Nutritious Meal Program that did not reach the expected level of daily energy adequacy. This finding suggests that the program's nutritional benefits may be influenced by actual food consumption during school hours rather than by menu planning alone. Based on the dietary recall results, some students did not consume all the foods

provided through the program, which may have reduced the energy obtained from school meals.

According to the FAO (2019), school meal programs should ideally provide approximately 30–35% of the daily energy needs of school-age children. This percentage aligns with the Free Nutritional Meal Program standards set by the Indonesian Ministry of Health (2024). However, the amount of energy students actually obtain is significantly influenced by their actual consumption of the food provided. Sari (2023) reports that students' energy consumption from school meal programs can vary depending on their tastes, appetites, and eating habits.

These findings highlight the importance of meal acceptance in determining the effectiveness of school feeding programs. Even when nutritionally adequate meals are provided, the expected nutritional benefits may not be realized if students do not consume them as intended. Therefore, program effectiveness depends not only on food provision but also on students' acceptance and consumption of the meals provided.

The bivariate analysis showed a relationship between the energy contribution of the Free Nutritional Meal Program (MBG) and students' daily energy needs (p -value = 0.003). These results

indicate that the greater the MBG energy contribution students consume, the more their daily energy needs are met. In this study, most students had an MBG energy contribution in the low category, so that the fulfillment of students' daily energy needs was also still dominated by the low category. This condition indicates that a low MBG energy contribution can contribute to low total daily energy intake among students.

The observed association suggests that school meal programs can make a meaningful contribution to students' overall dietary intake when the provided meals are consumed as intended. This finding supports the role of school-based nutrition interventions in improving dietary adequacy among adolescents, particularly in settings where access to nutritious foods may be limited (FAO, 2019)

The results of this study align with those of Zailani et al. (2023), which showed that school meals contribute to students' daily energy needs and have the potential to support the energy sufficiency of school-aged children. Tossou et al. (2025) also reported that the contribution of school meal programs is associated with a better energy consumption profile in schoolchildren. Furthermore, research by Anugraheni et al. (2020) showed that the

energy contribution of school meals can help increase students' total daily energy intake when consumed optimally.

Further research results showed a relationship between meeting daily energy needs and students' nutritional status (p -value < 0.001). Of the 70 respondents with insufficient daily energy needs, 48 (47.1%) had poor nutritional status. Meanwhile, in the category of sufficient daily energy needs, the majority of respondents had a normal nutritional status.

Beal et al. (2021) stated that nutritional status results from the interaction between food intake and nutrient utilization. Wells et al. (2020) also emphasized that energy imbalances persisting over time will be reflected in changes in anthropometric indicators, including BMI/Age. Therefore, adequate energy intake can help maintain normal nutritional status, whereas persistent energy deficits can increase the risk of malnutrition. These findings reinforce the importance of adequate energy intake in supporting healthy growth and maintaining optimal nutritional status during adolescence.

The results of this study also showed a relationship between the energy contribution of the Free Nutritional Meal Program (MBG) and students' nutritional status (p -value = 0.010). Of the 100

respondents with MBG energy contributions in the insufficient category, 49 respondents (48%) had malnutrition. These results indicate that the MBG Program's energy contribution supports students' nutritional status by providing energy during school hours. Although a statistically significant relationship was observed, the relatively modest strength of the association indicates that multiple determinants beyond school meal consumption alone influence nutritional status. Household dietary intake, food security, physical activity, and socioeconomic factors may also contribute to variations in nutritional status among adolescents.

The results of this study align with those of Zailani et al. (2023), which showed that school meals contribute to daily energy intake and have the potential to support the nutritional status of school-aged children. Tossou et al. (2025) also reported that consistent energy contributions from school meal programs are associated with more stable anthropometric profiles in schoolchildren. Furthermore, Pramesthi et al. (2025) demonstrated that school meal interventions can increase energy intake and the quality of students' consumption patterns, potentially supporting

improvements in nutritional status in the medium and long term.

5. CONCLUSION

Based on the results of the study, it can be concluded that most students of SMP Negeri 2 Wawo, Bima Regency have an energy contribution of the Free Nutritional Meal Program (MBG) in the insufficient category, the level of fulfillment of daily energy needs in the insufficient category, and nutritional status in the malnutrition category. The results of the analysis show that there is a relationship between the energy contribution of the Free Nutritional Meal Program (MBG) and the fulfillment of students' daily energy needs, there is a relationship between the fulfillment of daily energy needs and students' nutritional status, and there is a relationship between the energy contribution of the Free Nutritional Meal Program (MBG) and the nutritional status of students of SMP Negeri 2 Wawo, Bima Regency. Therefore, it is necessary to optimize the implementation of the Free Nutritional Meal Program by improving menu quality and variety, and by educating students, so that the program's energy contribution can better support the fulfillment of daily energy needs and improve students' nutritional status.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author and may be obtained upon reasonable request.

REFERENCES

- Adani, V., Pangestuti, D. R., & Rahfiludin, M. Z. (2020). Hubungan Asupan Makanan (Karbohidrat, Protein Dan Lemak) Dengan Status Gizi Bayi Dan Balita. *Jurnal Kesehatan Masyarakat (e-Journal)*, 4(3), 261–271. <https://doi.org/10.14710/jkm.v4i3.12902>
- Anugraheni, D. D., Mulyana, B., & Farapti, F. (2020). Kontribusi Bekal Makanan Dan Total Energi Terhadap Status Gizi

- Pada Anak Sekolah Dasar. *Amerta Nutrition*, 3(1), 52. <https://doi.org/10.20473/amnt.v3i1.2019.52-57>
- Beal, T., Tumilowicz, A., & Sutrisna, A. R. (2021). A global review of energy balance and the double burden of malnutrition. *The Lancet Global Health*, 9(6), e708–e718. [https://doi.org/10.1016/S2214-109X\(21\)00102-1](https://doi.org/10.1016/S2214-109X(21)00102-1)
- Dinas Kesehatan Provinsi Nusa Tenggara Barat. (2023). *Profil Kesehatan Provinsi Nusa Tenggara Barat 2023*. <https://dinkes.ntbprov.go.id>
- Erkan, T. (2020). Adolescent nutrition. In *Turk Pediatri Arsivi* (Vol. 46, Number SUPPL.1, pp. 49–53). <https://doi.org/10.4274/tpa.46.34>
- Food and Agriculture Organization. (2019). *School Feeding and Nutrition Programmes*. <https://www.fao.org/3/i9310en/I9310EN.pdf>
- Global Nutrition Report. (2023). *Global Nutrition Report 2023*. <https://globalnutritionreport.org/reports/2023-global-nutrition-report/>
- Kementerian Kesehatan Republik Indonesia. (2018). *Laporan Nasional Riset Kesehatan Dasar (Riskesdas) 2018*. <https://www.litbang.kemkes.go.id/laporan-riset-kesehatan-dasar-ris-kesdas/>
- Kementerian Kesehatan Republik Indonesia. (2023). *Survei Status Gizi Indonesia 2023*. <https://www.kemkes.go.id/>
- Kementerian Kesehatan Republik Indonesia. (2024). *Survei Kesehatan Indonesia 2023*. <https://www.kemkes.go.id/>
- Kementerian Kesehatan Republik Indonesia (Kemenkes RI). (2024). *Standar Gizi dan Makanan Program Makan Bergizi Gratis*. In *Journal GEEJ* (Vol. 7, Number 2). Direktorat Jenderal Kesehatan Masyarakat.
- Kementerian Kesehatan RI. (2020). *Peraturan Menteri Kesehatan tentang Standar Antropometri Anak*. *Kaos GL Dergisi*, 8(75), 147–154. <https://jdih.kemkes.go.id/documents/peraturan-menteri-kesehatan-nomor-2-tahun-2020>
- Kementerian Koordinator Bidang Pembangunan Manusia dan Kebudayaan RI. (2024). *Program Makan Bergizi Gratis sebagai Strategi Peningkatan Gizi Anak Sekolah*. <https://www.kemenkopmk.go.id>

- Pramesthi, I. L., Wiradnyani, L. A. A., Anggraini, R., Februhartanty, J., Widayat, W., Waluyo, B. H., Wahyunto, A. T., Mansyur, M., & Fahmida, U. (2025). Evaluating the Impact of Indonesia's National School Feeding Program (ProGAS) on Children's Nutrition and Learning Environment: A Mixed-Methods Approach. *Nutrients*, 17(22), 3575. <https://doi.org/10.3390/nut17223575>
- Putri, R. M., & Anwar, F. (2019). Asupan Energi dan Hubungannya dengan Status Gizi Remaja. *Jurnal Gizi Dan Pangan*, 14(1), 11–18. <https://journal.ipb.ac.id/index.php/jgizipangan/article/view/24334>
- Sari, D. P., Yuniarti, Y., & Handayani, S. (2020). Hubungan Asupan Energi dengan Status Gizi Siswa Sekolah Menengah. *Jurnal Gizi Klinik Indonesia*, 16(4), 165–172. <https://journal.ugm.ac.id/jgki/article/view/50547>
- Sari, M. et al. (2023). Analisis Program Makan Bergizi Gratis terhadap Asupan Energi Siswa Sekolah. *Media Gizi Indonesia*.
- Tossou, M. W., Ainin, A., Avedel, A. A. O., Soetone, E. N., Turunibumwe, I., Hevinouyoue, A., Boyika, B., Achamou, M., & Fanou-Fogny, N. (2025). The contribution of school feeding programs to children's energy and nutrient intakes in six selected departments of Benin. *World Nutrition*, 16(3), 132–139. <https://doi.org/10.26596/wn.2025163132-139>
- Wells, J. C. K., Sawaya, A. L., Wibaek, R., Mwangome, M., Poullas, M. S., Yajnik, C. S., & Demaio, A. (2020). The double burden of malnutrition: Aetiological pathways and consequences for health. *The Lancet*, 395(10217), 75–88. [https://doi.org/10.1016/S0140-6736\(19\)32472-9](https://doi.org/10.1016/S0140-6736(19)32472-9)
- WNPG. (2014). Pemantapan Ketahanan Pangan dan Perbaikan Gizi Berbasis Kemandirian dan Kearifan Lokal. *Prosiding*, 543–550. <http://repository.ipb.ac.id/handle/123456789/75718>
- World Health Organization. (2023). Malnutrition Fact Sheet. <https://www.who.int/news-room/fact-sheets/detail/malnutrition>
- Zailani, H., Owolabi, O. A., & Sallau, A. B. (2023). Contribution of school meals to the recommended nutrient and energy intake of children enrolled in the National Homegrown School Feeding Program in Zaria, Nigeria.

Archives de Pdiatrie / Arch Pediatr,
30(7), 471-476. <https://doi.org/10.1016/j.arcped.2023.07.004>