

Analysis of nutritional status of children at state elementary School Kampung Rawa 02 Central Jakarta

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ABSTRACT

Nutritional status is a crucial indicator influencing children's growth and development, health, and academic achievement. Nutritional issues in elementary school-aged children remain a public health issue, with both undernutrition and overnutrition and obesity contributing to growth disorders and the risk of future disease. To analyze the nutritional status of children at SDN Kampung Rawa 02, Central Jakarta, and the factors influencing it. This study used a quantitative cross-sectional design. The sample consisted of 148 students in grades 4–6. Data were analyzed using the chi-square test. Data were collected through questionnaires and BMI/Ag measurement using a microtoise and scales. Univariate and bivariate analyses were performed. The proportion of children with nutritional status showed undernutrition (7.4%), overnutrition (47.3%), and obesity (15.5%). The majority of respondents reported poor eating and drinking habits (56.1%), insufficient physical activity (66.2%), an unsupportive environment (55.4%), and insufficient family involvement (60.1%). Bivariate analysis showed a significant relationship between knowledge level ($p=0.02$), eating and drinking behavior ($p=0.006$), physical activity ($p=0.01$), environment ($p=0.03$), and family role ($p=0.01$) and children's nutritional status. The nutritional status of children at SDN Kampung Rawa 02, Central Jakarta, indicates nutritional problems, including undernutrition, overnutrition, and obesity. Factors such as knowledge level, eating and drinking behavior, physical activity, environment, and family role play a role in influencing children's nutritional status. Nutrition education and school and family support are needed to maintain children's nutritional status.

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INTRODUCTION

Nutrition remains a major global public health issue, including in Indonesia. Children are particularly vulnerable to nutritional problems, both undernutrition and overnutrition. The main

nutritional problems still prevalent in children include stunting, wasting, overweight, and obesity (Karenina et al., 2023).

Global data shows that child nutrition has not significantly decreased and has even tended to increase over the past two decades. According to UNICEF and WHO reports, an estimated 150.2 million children suffer from stunting, 42.8 million from wasting, and 35.5 million from overweight or obesity (WHO & Others, 2016).

In Indonesia, the nutritional status of school-age children remains a serious concern. According to the 2023 Indonesian Health Survey (SKI), the prevalence of undernourished children aged 5–12 was 7.5%, normal nutrition 69.4%, overnutrition 11.9%, and obesity 7.8%. A similar situation was also found in the Jakarta Province. The 2023 SKI report shows that the prevalence of undernutrition among schoolchildren in DKI Jakarta reached 6.7%, normal nutritional status at 63%, and overnutrition at 14.6%. This data indicates that nutritional problems, particularly overnutrition, remain quite high in urban areas (Kemenkes, 2023).

Given the high prevalence of nutritional problems among school-age children, identifying the risk factors associated with nutritional status is urgently needed to support effective school health programs. Understanding these factors enables schools and health authorities to design targeted interventions, implement early preventive strategies, and allocate resources efficiently. Furthermore, evidence on nutritional risk factors can guide nutrition education, promote healthy behaviors, and contribute to improving children's health, growth, and academic performance (WHO, 2021; UNESCO et al., 2023).

Children's nutritional status is a crucial indicator reflecting the quality of their health, growth, and well-being. Therefore, it is a priority in the Sustainable Development Goals (SDGs), particularly point 2, which aims to end hunger and improve the nutritional status of the community (BAPPENAS, 2020). School-age children are in a phase of rapid growth and development, requiring optimal nutritional support for optimal physical, cognitive, and socio-emotional development (Al Huwadiy et al., 2024).

Good and balanced nutrition plays a crucial role in improving children's quality of life and health. Children with optimal nutritional status have the ability to grow and develop optimally, learn effectively, contribute positively to their social environment, and have greater resilience to disease, natural disasters, and various global crises (UNICEF, 2020). Improving children's nutritional status is Indonesia's national commitment to support the achievement of SDGs point 2 (BAPPENAS, 2020).

Nutritional status describes a person's health condition and reflects their success in meeting their nutritional needs (Saputro et al., 2024). Nutritional status reflects the success in meeting an individual's nutritional needs and reflects the body's health condition, which is influenced by nutrient intake from food and beverages as needed. At school age, good nutritional status is essential because children begin to experience changes in lifestyle, activity, and eating habits that can affect their health and growth (Al Huwadiy et al., 2024).

Nutritional status assessment is an evaluation process to determine a person's nutritional adequacy and is used as a basis for planning nutritional interventions (Fithria et al., 2025). One commonly used indicator in school-age children is the Body Mass Index for Age (BMI/A), which categorizes nutritional status into undernutrition, normal nutrition, overnutrition, and obesity (Kemenkes, 2020).

The impact of nutritional problems on children is complex. Malnutrition can lead to decreased comprehension, impaired concentration in learning, suboptimal physical growth, a weakened immune system, and impaired brain structure and function (Tomasoa et al., 2021). Meanwhile, overnutrition and obesity are also serious public health concerns because they can increase the risk of degenerative diseases, such as hypertension, dyslipidemia, insulin resistance, impaired glucose metabolism, impaired liver function, and psychological and social problems in children (Arza et al., 2021).

Fithria et al., (2025) stated that optimal nutritional status in children aged 9–12 years is crucial to support physical growth, brain development, bone health, immune system function, as well as academic achievement and social-emotional development. The Indonesian government has implemented various programs to improve children's nutritional status, including the "Isi Piringku" (My Plate), Supplementary Food Provision (PMT), Free Nutritious Meals (MBG), and Healthy School Canteens. However, child nutritional problems persist, particularly in urban areas with high population densities.

Previous studies have reported that children's nutritional status is associated with various determinants, including nutrition knowledge, dietary behavior, physical activity, family support, and environmental factors. However, the findings remain inconsistent regarding which factors have the greatest influence on the nutritional status of school-aged children. Most studies have focused on only one or a few determinants, whereas limited research has comprehensively examined behavioral, environmental, and family-related factors simultaneously, particularly among elementary school children in urban Indonesia. Identifying the dominant factors is essential for prioritizing effective school-based nutrition interventions and developing evidence-based strategies to improve children's nutritional status. Therefore, this study aims to identify the dominant factors influencing the nutritional status of school-aged children at SDN Kampung Rawa 02, Central Jakarta.

Researchers' observations at SDN Kampung Rawa 02, Central Jakarta, found limited school space due to its location adjacent to the Kampung Rawa Village Office and relatively narrow access. A preliminary study of 30 respondents revealed that 17 students (56.6%) had normal nutrition, 4 students (13%) were overweight, 6 students (20%) were obese, and 3 students (10%) were malnourished. These findings indicate that a significant proportion of students still suffer from inadequate nutritional status, both overweight and underweight. This condition can impact children's growth and development and academic achievement at school.

RESEARCH METHOD

This study employed a quantitative approach with an observational analytical study design using a cross-sectional approach. In this study, the population used was all students in grades 4 to 6 at SDN Kampung Rawa 02 Central Jakarta in the 2025/2026 academic year with a total of 235 students.

The sample size was calculated using the Lemeshow formula. To anticipate incomplete responses, an additional 10% was added, bringing the minimum required sample to 148 respondents. In practice, this study obtained 108 respondents who met the inclusion criteria and were subsequently analyzed. The sampling process in this study used a purposive sampling technique. The data instruments used in this study consisted of an informed consent form, a scale and microtoise, and a questionnaire. The questionnaire assessed age, sex, knowledge, eating and drinking behaviors, physical activity, family role, and environmental factors. Eating and drinking behaviors were assessed based on meal and beverage consumption, while family role and environmental factors were assessed based on parental support and the home and school environments. Nutritional status was determined using BMI-for-age according to the WHO 2007 growth reference.

Data analysis was conducted in stages through univariate, bivariable, and multivariable analyses. Univariate analysis was used to describe the frequency distribution. This analysis was applied to examine the relationship between two types of variables: the influence of knowledge level, eating and drinking behavior, physical activity, environment, and family role (as independent variables) on nutritional status (as dependent variable) in elementary school children at SDN Kampung Rawa 02, Central Jakarta. The bivariate analysis in this study used the chi-square test to measure the relationship between each variable and nutritional status in elementary school children.

RESULT AND DISCUSSIONS

Univariate Analysis

Table 1. Frequency distribution of nutritional status of children in grades 4-6 at SDN Kampung Rawa 02 Central Jakarta

Nutritional status	Frequency (n)	Percentage (%)
Undernutrition	11	7,4
Normal nutrition	44	29,7
Overnutrition	70	47,3
Obesity	23	15,5
Total	148	100

Table 2. Frequency distribution of knowledge levels at SDN Kampung Rawa 02 Central Jakarta

Knowledge Level	Frequency (n)	Percentage (%)
Poor	57	38,5
Sufficient	71	48
Good	20	13,5
Total	148	100

Table 3. Frequency distribution of eating and drinking behavior at SDN Kampung Rawa 02 Central Jakarta

Eating and Drinking Behavior	Frequency (n)	Percentage (%)
Poor	83	56,1
Good	65	43,9
Total	148	100

Table 4. Distribution of physical activity frequency at SDN Kampung Rawa 02 Central Jakarta

Aktivitas Fisik	Frequency (n)	Percentage (%)
Poor	98	66,2
Good	50	33,8
Total	148	100

Table 5. Environmental frequency distribution at SDN Kampung Rawa 02 Central Jakarta

Environment	Frequency (n)	Percentage
Poor	82	55,4
Good	66	44,6
Total	148	100

Table 6. Frequency distribution of family roles at SDN Kampung Rawa 02 Central Jakarta

Family Roles	Frequency (n)	Percentage (%)
Poor	89	60,1
Good	59	39,9
Total	148	100

Bivariate Analysis

Table 7. Relationship between knowledge level and children's nutritional status at SDN Kampung Rawa 02, Central Jakarta

Children's Nutritional Status											
Knowledge Level	Malnutrition		Normal Nutrition		More nutrition		Obesity		Total		P-Value
	n	%	n	%	N	%	n	%	n	%	
not enough	2	3,5	10	17,5	35	61,4	10	17,5	57	100	0,02
Enough	5	7	26	36,6	29	40,8	11	15,5	71	100	
Good	4	20	8	40	6	30	2	10	20	100	
Total	11	7,4	44	29,7	70	47,3	23	15,5	148	100	

The results of the bivariate analysis using the chi-square test showed a p-value of 0.02 ($p < 0.05$), which means there is a significant relationship between the level of knowledge and the nutritional status of children at SDN Kampung Rawa 02 Central Jakarta.

Table 8. The relationship between eating and drinking behavior and the nutritional status of children at SDN Kampung Rawa 02, Central Jakarta

Eating and Drinking Behavior	Nutritional Status of Children										P-Value
	Malnutrition		Normal Nutrition		More nutrition		Obesity		Total		
	n	%	N	%	n	%	N	%	n	%	
not enough	8	9,6	15	18,1	45	54,2	15	18,1	83	100	0,006
Good	3	4,6	29	44,6	25	38,5	8	12,3	65	100	
Total	11	7,4	44	29,7	70	47,3	23	15,5	148	100	

Table. 9 The relationship between physical activity and nutritional status of children at SDN Kampung Rawa 02, Central Jakarta

Physical Activity	Nutritional Status of Children										P-Value
	Malnutrition		Normal Nutrition		More nutrition		Obesity		Total		
	N	%	n	%	n	%	n	%	n	%	
not enough	9	9,2	21	21,4	49	50	19	19,4	98	100	0,01
Good	2	4	23	46	21	42	4	8	50	100	
Total	11	7,4	44	29,7	70	47,3	23	15,5	148	100	

Table 10. The relationship between the environment and the nutritional status of children at SDN Kampung Rawa 02, Central Jakarta

Nutritional Status of Children											P-Value
Environment	Malnutrition		Normal Nutrition		More nutrition		Obesity		Total		
	N	%	n	%	N	%	N	%	N	%	
not enough	5	6,1	17	20,7	45	54,9	15	18,3	82	100	0,03
Good	6	9,1	27	40,9	25	37,9	8	12,1	66	100	
Total	11	7,4	44	29,7	70	47,3	23	15,5	148	100	

Table 11. The relationship between family roles and children's nutritional status at SDN Kampung Rawa 02, Central Jakarta

Children's Nutritional Status											
Family Roles	Malnutrition		Normal Nutrition		More nutrition		Obesity		Total		P-Value
	N	%	n	%	N	%	n	%	N	%	
not enough	7	7,9	18	20,2	49	55,1	15	16,9	89	100	0,01
Good	4	6,8	26	44,1	21	35,6	8	13,6	59	100	
Total	11	7,4	44	29,7	70	47,3	23	15,5	148	100	

These findings imply that school-based obesity prevention programs should integrate nutrition education, healthy eating promotion, regular physical activity, family involvement, and supportive school environments to improve children's nutritional status.

The Relationship Between Knowledge Level and Nutritional Status of Children at SDN Kampung Rawa 02, Central Jakarta

Based on research findings on 148 children at SDN Kampung Rawa 02, Central Jakarta, 48% had adequate knowledge, while 38.5% had insufficient knowledge. The highest proportion of overweight and obese children was found in the group with insufficient knowledge (61.4%) (17.5%). Conversely, the highest proportion of underweight children was found in the group with good knowledge (20%). Bivariate analysis showed a significant relationship between knowledge level and nutritional status.

Knowledge also plays a role in fostering individual responsibility for healthy eating habits (Habib-Mourad et al., 2020). The level of knowledge regarding food nutrition can be obtained through personal experience or from the experiences of others, either through formal learning processes or information received from the surrounding environment (Okta & Ningrum, 2024).

This research aligns with research conducted by Wang et al. (2022a), which stated that approximately 80% of children in China had sufficient knowledge (46.80%) and insufficient knowledge (22.21%). Another study conducted at Public Elementary School 74 in Bengkulu City showed that out of 79 respondents, 22 students (27.8%) had insufficient knowledge, while more than half, 43 students (54.4%), had sufficient knowledge (Ayu et al., 2025).

Errors in food selection and low levels of knowledge can contribute to nutritional problems, ultimately impacting an individual's nutritional status (Wangi, 2024). Similar findings have also been reported in children and adolescents in China, where higher levels of dietary knowledge were associated with a lower risk of overweight and obesity. This confirms that a good understanding of food choices can reduce the prevalence of overnutrition in children ((Ługowska & Kolanowski, 2022).

A qualitative study conducted by Gutkowska et al. (2025) stated that the level of knowledge of elementary school children is still inadequate, necessitating the strengthening of nutrition education both within the family and school environment to improve children's eating behavior. The role of parents is also a crucial factor, as their knowledge and attitudes contribute to the introduction of healthy foods and the prevention of overweight in children (Zhong et al., 2025).

The Relationship between Eating and Drinking Behavior and the Nutritional Status of Children at SDN Kampung Rawa 02, Central Jakarta

Based on research findings on 148 children at SDN Kampung Rawa 02, Central Jakarta, 56.1% exhibited poor eating and drinking habits. The proportion of overweight children was found in the group with poor eating and drinking habits (54.2%), and obesity was also highest in the group with poor eating and drinking habits (18.1%). Among children with underweight status, the highest proportion was found in the group with poor eating and drinking habits (9.6%). Bivariate analysis showed a significant relationship between eating and drinking behavior and nutritional status in children.

In overweight and obese children, the hormone leptin, which plays a role in regulating hunger and satiety, often does not function optimally. Although leptin levels increase with the increase in fat tissue, impaired leptin responsiveness makes children feel hungry more easily and tends to overconsume food and drinks, contributing to weight gain (Obradovic et al., 2021). As children gain weight, leptin levels will also increase, which causes children's appetite to be uncontrollable (Hu et al., 2025). Eating habits influence nutrient intake and the incidence of overweight through various behavioral aspects, such as meal frequency, quantity consumed, eating speed, and snacking habits (Lim & Lee, 2024).

Research in China shows that the majority of children have poor eating and drinking behaviors, primarily characterized by picky eating (71.6%) and frequent nighttime snacking (55.1%) (Lim & Lee, 2024). A quantitative study conducted by Selvia et al. (2025) showed that the majority of students at MI Miftahul Falah, Jepara Regency, still have poor eating patterns (49.4%), which impacts their nutritional status. Inadequate eating and drinking patterns in school-age children are also associated with the risk of poor nutritional status, such as stunting and wasting. Research conducted by Zeinalabedini (2023) shows that children with low-diversity and low-intensity diets are more likely to experience poor nutritional status than children with more diverse diets.

The Relationship Between Physical Activity and Nutritional Status of Children at SDN Kampung Rawa 02, Central Jakarta

Based on research findings on 148 children at SDN Kampung Rawa 02, Central Jakarta, 66.2% reported insufficient physical activity. The proportion of overweight and obese children was found in the low physical activity group (50%) (19.4%). Among children with low nutritional status, the highest proportion was also found in the low physical activity group (9.2%). Bivariate analysis showed a significant relationship between physical activity and nutritional status in children.

Children need to achieve a balance between energy intake and energy expenditure through adopting a healthy diet, increasing physical activity, and limiting screen time (Chaput et al., 2020). These efforts are not only aimed at children but also require the involvement of all family members. For children aged 6 years, the WHO recommends at least 60 minutes of moderate to vigorous intensity physical activity daily, including exercises to strengthen muscles and bones, three times a week (WHO, 2020b).

The World Health Organization states that approximately 80% of school-age children have not reached the recommended levels of physical activity (WHO, 2021b). Research conducted by Rizkanto et al. (2023) on elementary school students in Surabaya City showed that the physical activity of most respondents was low. Of the 196 students, 46.42% were classified as having insufficient physical activity. Meanwhile, research conducted by Azzahra et al. (2022) also showed that children with overweight had low levels of physical activity (9.8%).

These results align with a systematic review conducted by Urtubia et al. (2025), which showed that physical activity-based interventions can reduce Body Mass Index (BMI) and improve body composition in children aged 6–12 years, especially when families and schools are actively involved. Another study by Widiani (2020) also demonstrated a significant relationship between children's physical activity patterns and nutritional status. Higher levels of physical activity are known to play a role in reducing the risk of being overweight and contribute to improvements in body composition, health, and fitness in children (Ługowska & Kolanowski, 2022).

Ługowska et al., (2022) also stated that increasing the duration of physical activity in schools by increasing the number of hours of physical education lessons has a positive impact on children's body mass index and reduces the risk of overnutrition in children. Physical activity is an important component of the body's energy balance, as low physical activity can reduce daily energy expenditure and affect children's metabolic processes and appetite regulation (Hutagalung et al., 2025). Several studies have shown that children with low levels of physical activity are at risk of being underweight or malnourished if their food intake and lifestyle do not support the energy needs for growth (Uzdah et al., 2025).

The Relationship Between the Environment and the Nutritional Status of Children at SDN Kampung Rawa 02, Central Jakarta

Based on research findings on 148 children at SDN Kampung Rawa 02, Central Jakarta, 55.4% had poor environments. The proportion of overweight and obese children was found in the poor environment group (54.9%) (18.3%). Conversely, the highest proportion was found in the underweight and healthy environment group (9.1%). Bivariate analysis showed a significant relationship between the environment and children's nutritional status.

The environment is understood as a collection of social and physical factors within the family, including food availability, family routines, parental knowledge, and parenting styles and daily practices that can support or hinder children's healthy behaviors related to diet and physical activity (De Vries Mecheva et al., 2023). Conceptually, the main dimensions of the environment include food availability, accessibility, and affordability (Sawyer et al., 2021).

Food choices are shaped by the interaction of the physical, economic, political, and sociocultural contexts, including the opportunities and conditions surrounding them. The attractiveness of the food environment is also an important factor in comparing healthy and

unhealthy foods (Bassi et al., 2021). The food environment encompasses the external environment that determines food availability, pricing, marketing, and advertising. The food environment also encompasses personal factors such as purchasing power, access, and attractiveness to food (Jia et al., 2023).

Unhealthy environments, both at home and at school, have the potential to increase the prevalence of overweight and obesity in children (Smagge et al., 2022). Schools play a strategic role in shaping children's nutritional health by instilling healthy lifestyle habits from an early age, such as nutrition education, providing healthy foods, and providing opportunities for regular physical activity (Saavedra & Prentice, 2023).

A generally good environment is not necessarily sufficient to protect children from malnutrition if nutritional intake and access to quality food are inadequate or other nutritional disorders occur. A child's nutritional status is essentially determined by various interacting factors, including the quality of consumption patterns, the child's health condition, and family dynamics that directly influence the fulfillment of adequate energy and nutrient needs to support growth and development (Asmare et al., 2025).

The Relationship Between Family Roles and Children's Nutritional Status at SDN Kampung Rawa 02, Central Jakarta

Based on the results of a study of 148 children at SDN Kampung Rawa 02, Central Jakarta, 60.1% had inadequate family support. The proportion of overweight and obese children was found in the group with inadequate family support (55.1%) (16.9%). Among children with underweight, the highest proportion was also found in the group with inadequate family support (7.9%). Bivariate analysis showed a significant relationship between family support and nutritional status in children.

The family is the most important social environment for children, as it is within this environment that children first receive education, guidance, and support. Furthermore, children spend most of their time within the family environment, thus significantly influencing their development (Candra et al., 2024). Parents' diets, physical activity levels, and sedentary behavior significantly shape children's lifestyle choices and impact their weight status (Gupta et al., 2025). Parents tend to be role models for their children in imitating their eating habits, activity levels, and sedentary time (Tomayko et al., 2021).

Research conducted by Swinburn (2011) in Trindade et al. (2025) states that extended families can provide additional support, but also have the potential to create inconsistencies in eating habits and feeding practices due to cultural differences and intergenerational perspectives. Family structure also influences the risk of overnutrition in children. Single-parent families, for example, often face financial and time constraints, making it more difficult to provide healthy home-cooked meals and ensure children engage in physical activity. This situation can increase reliance on convenience foods, which are generally high in sugar, fat, and calories (Trindade et al., 2025).

Parenting styles and feeding practices influence children's eating behaviors and nutritional status. Inconsistent parenting and minimal parental involvement can lead to malnutrition or undernutrition in children from early childhood through school age (Nadirawati et al., 2025).

CONCLUSION

The results of the bivariate analysis show that the level of knowledge, eating and drinking behavior, physical activity, environment, and family role have a significant relationship with children's nutritional status. Further studies with larger samples and multivariable analyses are recommended to identify the dominant factors influencing children's nutritional status and to support more effective school-based interventions.

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Schools should strengthen school health programs by regularly monitoring students' nutritional status and providing healthy, safe food options. This study provides evidence to support school health and nutrition policies by identifying the dominant factors influencing children's nutritional status. The findings can guide the development of targeted nutrition interventions in school settings. Future studies with larger sample sizes and multivariable analyses are recommended to identify the dominant factors influencing children's nutritional status and support more effective school-based interventions.

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