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The Relationship Between Sleep Patterns and Junk-Food Consumption and Nutritional Status Among Kindergarten Children in Makassar

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ABSTRACT

Introduction: The nutritional status of children in Indonesia presents a public health issue, characterized by high malnutrition rates. Factors affecting children's nutrition include irregular sleep patterns and high junk food intake. This study investigates the correlation between these factors and the nutritional status of kindergarten children in Makassar. **Method:** This study used a cross-sectional design involving 151 kindergarten children from five areas in Makassar City. Data collection was carried out through the Pittsburgh Sleep Quality Index (PSQI) sleep pattern questionnaire, the Food Frequency Questionnaire (FFQ) junk food consumption frequency questionnaire, as well as measuring nutritional status based on the weight for height (WFH) index. Data analysis used the Chi-Square test. **Results:** The study results indicate a significant relationship between sleep patterns (p = 0.008) and junk food consumption (p = 0.014) with children's nutritional status. Children with adequate sleep generally exhibit better nutritional status, whereas poor sleep correlates with poorer status. Short sleep duration may disrupt appetite regulation through hormonal changes in ghrelin and leptin, impacting nutritional health. While junk food consumption relates to nutritional status, it is not solely indicative of malnutrition, as overall food intake balance also plays a role. **Conclusion:** These findings highlight that sleep patterns and junk food consumption are crucial factors in maintaining the nutritional status of young children, suggesting that establishing regular sleep and controlling junk food intake can support optimal growth and development.

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INTRODUCTION

Adequate nutrition plays a crucial role in supporting physical growth and neurocognitive development during early childhood. Nutrition is an essential component required by the body, particularly for supporting the development of the nervous system and brain, as well as enhancing cognitive function and intelligence. Ensuring an adequate and appropriate nutritional intake plays a fundamental role in enabling children to achieve optimal growth and development in accordance with their genetic potential (Amalia et al., 2023).

Currently, nutritional problems are commonly encountered among preschool-aged children. Preschool children attending kindergarten are more frequently exposed to nutrition-related health problems and are considered a vulnerable population. Kindergarten-aged children, generally between 4 and 6 years of age, are particularly susceptible to malnutrition. This period represents a critical stage of childhood growth and development, particularly in terms of language, cognitive, and emotional development (Apriliani et al. 2021).

The nutritional status of children in Indonesia remains a growing public health concern, with malnutrition rates continuing to be high. According to the 2023 Indonesian Health Survey, the nutritional status of children aged 5–12 years based on body mass index-for-age (BMI-for-age) indicated that 3.5% were severely undernourished, 7.5% were undernourished, 69.4% had normal nutritional status, 11.9% were overweight, and 7.8% were obese. These data indicate that the overall prevalence of malnutrition reached 30.7%(Munira et al., 2023).

Nutritional problems in Makassar City have become a serious public health concern. Data from the Makassar City Health Office in June 2024 indicated a prevalence of wasting among children under five years of age of 2.37%, obesity of 0.34%, and overweight of 0.75%. These figures demonstrate the presence of a double burden of malnutrition that requires particular attention. This phenomenon has become increasingly complex amid changing urban lifestyles, including increased consumption of fast food (junk food) and insufficient sleep among children. Both factors have considerable potential to influence children's nutritional status from an early age. However, local studies specifically examining the relationship between junk food consumption patterns, sleep patterns, and children's nutritional status, particularly in Makassar City, remain limited. Malnutrition is a common nutritional problem among children. If not addressed promptly, it may have long-term consequences for their health and well-being. Several studies have indicated that urban areas have a higher risk of childhood obesity compared with rural areas. In Makassar City, for example, the prevalence of obesity has been reported to be among the highest, reaching 11.82% (Sherina et al., 2024).

Nutritional problems among children are currently associated with unhealthy dietary habits, particularly frequent consumption of junk food. Junk food refers to foods that are high in carbohydrates but contain relatively low amounts of protein, vitamins, and minerals. These foods are often consumed as snacks, with food additives intentionally incorporated to enhance aroma, texture, taste, and appearance, as well as to extend shelf life. Such foods are highly appealing to preschool-aged children. Frequent consumption of junk food may contribute to nutritional problems in children, particularly overweight and obesity (Djamaluddin et al., 2022).

In addition to junk food consumption, poor sleep patterns may also affect children's nutritional status. Sleep plays an important role in physiological recovery and maintaining the balance of various organ systems in the body. Beyond providing restorative effects, sleep contributes to the regulation of normal body temperature and energy conservation.

Children generally require approximately 10–12 hours of sleep per day. Irregular sleep patterns are strongly associated with disturbances in the circadian sleep–wake cycle, which may be influenced by psychological factors, lifestyle, and changes in melatonin secretion during childhood (Dayanti et al., 2024). Sleep quality may subsequently affect children's nutritional status. According to the National Sleep Foundation, children's sleep quality may decline when they do not obtain sufficient sleep. Poor sleep patterns over the long term may contribute to malnutrition, depression, and fatigue (Putra et al., 2022).

Nutritional imbalance and poor sleep quality may interfere with appetite regulation and hormonal production, thereby negatively affecting children's nutritional status (Putra et al., 2022). The foregoing discussion indicates that irregular sleep patterns and excessive consumption of junk food may influence children's nutritional status. Therefore, this study was conducted to analyze the association between sleep patterns and junk food consumption and the nutritional status of kindergarten children in Makassar.

LITERATURE REVIEW

Nutritional status is an indicator of the adequacy of nutritional requirements, determined by the balance between nutrient intake and the body's physiological needs. It plays an important role in supporting physiological functions, metabolic processes, as well as growth and development (Wangi, 2024). Childhood is a critical period of growth and development; therefore, maintaining an appropriate nutritional status is essential to support children's health and physical development. Children are considered a vulnerable population susceptible to nutritional problems. Adequate nutrition can help prevent various infectious diseases and support optimal growth. Kindergarten-aged children, generally between 4 and 6 years of age, are particularly vulnerable to malnutrition (Apriliani et al,. 2021).

According to the World Health Organization (WHO), millions of children in this age group experienced nutritional deficiencies, including 47 million children who were wasted, 14.3 million who were severely wasted, and 144 million who were stunted in 2020. Consequently, malnutrition has become a major contributing factor to the high mortality rate among children under five worldwide, with an estimated 400,000 deaths annually (Debela et al., 2023). Children's dietary habits play an important role in supporting growth and development and are directly associated with their nutritional status. The nutritional content of consumed foods also influences children's health and cognitive development. Children with inadequate nutritional intake are at greater risk of developing various diseases and infections. Furthermore, insufficient nutrient intake may result in conditions such as underweight, stunting, and malnutrition (Sulfiyani et al., 2023).

A child's nutritional status is determined by their overall health and nutritional condition. Assessment of children's nutritional status involves evaluating various aspects, including physical growth, nutritional intake, and general health. Adequate nutrition is essential for children's growth, development, and overall well-being (Lay et al., 2021). Nutritional status is categorized into five levels: severe undernutrition, undernutrition, normal nutritional status, overweight, and obesity, with Indonesian anthropometric standards referring to the WHO-NCHS reference. For preschool-aged children, nutritional status is more effectively assessed using anthropometric indicators based on weight-for-height (WFH) (Nurmaliza, 2019).

The weight-for-height (WFH) index is an anthropometric indicator used to assess acute nutritional status in kindergarten-aged children (4–6 years), as it is sensitive to changes in body weight resulting from dietary intake and illness and does not depend on accurate age determination. This indicator is effective for the early detection of wasting and excess body weight and is therefore widely used for screening in healthcare settings, such

as community health posts (posyandu) and schools. In practice, children aged ≤5 years are generally assessed using growth charts developed by the World Health Organization (WHO), whereas children aged >5 years may be assessed using growth charts from the Centers for Disease Control and Prevention (CDC), which are more appropriate for older age groups. The selection of growth charts is based on differences in age coverage and the growth-reference approaches used in each standard. Therefore, the use of WFH remains relevant for assessing the nutritional status of preschool-aged children, with the reference standard adjusted according to the child's age group (Kemenkes R.I, 2020).

CDC WFH Formula

Sleep is a natural physiological state characterized by reduced consciousness, diminished responsiveness to external stimuli, and decreased motor and metabolic activity. Sleep is not merely a passive state but an active process involving complex regulatory mechanisms in the brain that facilitate energy restoration, tissue repair, metabolic regulation, memory consolidation, and emotional balance (Mardlatillah, 2023). Several factors can affect sleep patterns, including genetic factors, parents or caregivers, sleep disorders and medical conditions, sleep habits and the sleep environment, screen exposure, and time management (Fadzil, 2021).

Table 1 *Classification of Nutritional Status Based on Weight-for-Height According to WHO 2006 and CDC 2000* (Damayanti et al., 2011)

Nutritional Status	WFH (% median)	WFH (WHO 2006)
Obesity	>120	> +3 SD
Overweight	>110	> +2SD hingga +3 SD
Normal Nutritional Status	>90	+2 SD hingga -2 SD
wasting	70-90	< -2 SD hingga -3 SD
Severe wasting	<70	< -3 SD

Note: Weight-for-Height (WFH) = (Actual body weight / Ideal body weight for height) × 100%

Literally, "junk" refers to waste or discarded material, whereas "food" refers to something consumed as nourishment. Thus, junk food generally refers to foods with low nutritional value. The term is used because these foods typically have poor nutritional content and do not adequately meet the body's nutritional requirements for growth and development, thereby potentially exerting adverse effects on health (Tanjung et al., 2022). Junk food generally contains high levels of sugar, salt, and fat but relatively low amounts of protein, fiber, vitamins, and minerals (Annisa et al., 2022). According to the World Health Organization (WHO), types of junk food that may be harmful when consumed excessively include processed foods that have undergone processes such as canning, baking, or freezing, as well as foods containing synthetic or natural preservatives intended to extend shelf life without altering their taste (Tanjung et al., 2022).

METHOD

This study employed a quantitative research method with an observational analytical cross-sectional design. The study was conducted from November to December 2024 at several kindergartens in Makassar, namely TK Insan Cemerlang, TK Insani, TK Nusa, TK Islam Akifah, and TK Islam Nurul Yaqin, following ethical approval under reference number No. E079/KEPK/FKIK/XI/2024. The study population comprised all active students enrolled in the five participating kindergartens, totaling 242 children. The

sample size was determined using the Slovin formula with a 5% margin of error and a 95% confidence level, as follows:

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{242}{1 + 242\ (0.05^2)}$$

$$n = \frac{242}{1 + 0{,}605}$$

$$n = \frac{242}{1{,}605}$$

$$n = 150{,}77\ = 151 \text{ sample}$$

Where:
n = sample size
e = margin error
N = population size

Based on the calculation, the required sample size was 151 children. Sampling was conducted using a purposive sampling technique, in which participants were selected based on specific characteristics relevant to the study objectives. The sampling procedure was initiated by identifying students who met the inclusion criteria and did not meet any exclusion criteria. Subsequently, the sample size for each kindergarten was determined proportionally according to the number of students enrolled at each school.

The inclusion criteria were active students aged 4–6 years who were registered as kindergarten students during the 2024/2025 academic year, whose parents or guardians provided informed consent to participate, children who were physically and mentally healthy, and children who did not consume excessive amounts of formula milk. The exclusion criteria included students who were absent during data collection, parents or guardians who did not complete the questionnaire, and students who were participating in physical extracurricular activities at the time of data collection.

The variables in this study consisted of independent and dependent variables. The independent variables were sleep patterns and junk food consumption habits, while the dependent variable was children's nutritional status. Sleep patterns were defined as children's sleep characteristics assessed using the seven components of sleep quality in the Pittsburgh Sleep Quality Index (PSQI), comprising subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component was scored from 0 to 3, with the component scores summed to obtain a total score. A total score of ≤5 was categorized as a good sleep pattern, whereas a score >5 was categorized as a poor sleep pattern. Junk food consumption was defined as the frequency of junk food consumption during the preceding month, assessed using a Food Frequency Questionnaire (FFQ). Frequent consumption was defined as a score of ≥42.5, whereas infrequent consumption was defined as a score of <42.5. Nutritional status was defined based on children's nutritional condition as determined from body weight and height measurements. Nutritional status was subsequently assessed using the weight-for-height (WFH) index and categorized into normal nutritional status and malnutrition.

Data were collected using several instruments, including a digital weighing scale to measure body weight, a microtoise stadiometer to measure height, an FFQ questionnaire

to assess the frequency of junk food consumption, and the PSQI questionnaire to assess sleep patterns. The study used primary data obtained directly from anthropometric measurements and questionnaires completed by the respondents. Anthropometric measurements were performed directly while ensuring appropriate body positioning throughout the measurement procedure. Body weight was measured using a digital weighing scale with the child standing upright and both feet positioned on the scale. Height was measured using a microtoise stadiometer with the child standing upright, facing straight ahead, and both feet positioned appropriately. The same measurement procedures were applied to all respondents to ensure consistency of the measurements.

Potential selection bias may have occurred due to the use of purposive sampling. This bias was minimized by consistently applying the inclusion and exclusion criteria across all study sites. In addition, the use of parent-completed questionnaires may have introduced information bias or recall bias, particularly in recalling children's sleep patterns and frequency of junk food consumption. These potential biases were minimized by using instruments that had been previously employed in research and by asking questions based on a predefined recall period.

Before analysis, the data were checked to ensure the completeness of the questionnaires and anthropometric measurements. Respondent data with incomplete questionnaires were excluded from the analysis in accordance with the exclusion criteria. Complete data were subsequently subjected to editing, coding, and data entry before statistical analysis was performed using a computer.

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 25. Univariate analysis was performed to describe the characteristics of the respondents and the distribution of each study variable, namely nutritional status, sleep patterns, and junk food consumption. Categorical data were presented as frequencies (n) and percentages (%). Bivariate analysis was conducted to determine the association between sleep patterns and nutritional status, as well as between junk food consumption habits and nutritional status. Sleep patterns were categorized as good or poor, junk food consumption as infrequent or frequent, and nutritional status as normal or malnutrition. Associations between variables were analyzed using the Chi-square test. Statistical significance was set at $\alpha = 0.05$, with results considered statistically significant when the p-value was <0.05.

RESULTS AND DISCUSSION

This study involved patients with chronic kidney failure undergoing hemodialysis at the Hemodialysis Unit of Koja Regional General Hospital (RSUD Koja). The findings are presented in stages, covering respondent characteristics, an overview of the study variables, and the results of the analysis regarding the relationships between variables. The findings obtained from the data analysis are presented in Table 2.

Table 2 indicates that out of 151 respondents, 96 children (63.6%) were 5 years old, with a majority being female (53.6%, or 81 children). The largest group attended TK Insan Cemerlang (45.7%, or 69 children). Most parents were self-employed (36.4%, or 55 respondents), and 76.2% had a middle-income level (115 respondents). Regarding education, 54.3% of parents had completed secondary education (82 respondents). Ethnically, 54.3% of the respondents were Makassar, and all identified as Muslim (100%).

Table 2 Distribution of Characteristics of Kindergarten Children in Makassar (N= 151)

Characteristics	Categories	Frequency (n)	Percentage (%)
Age	4 years	6	4.0
	5 years	96	63.6
	6 years	49	32.5
Sex	Female	81	53.6
	Male	70	46.4
School	TK Islam Nurul Yaqin	15	9.9
	TK Islam Akifah	14	9.3
	TK Nusa	25	16.6
	TK Insani	28	18.5
	TK Insan Cemerlang	69	45.7
Parental Occupation	Housewife/Daily worker	50	33.1
	Self-employed/entrepreneur	55	36.4
	Employee	19	12.6
	Civil servant	22	14.6
	Military/Police	5	3.3
Parental Income	Lower-income	23	15.2
	Middle-income	115	76.2
	Upper-income	13	8.6
Parental Education	Primary school	4	2.6
	Secondary school	82	54.3
	High school	65	43.1
	Makassar	82	54.3
	Bugis	64	42.4
	Toraja	2	1.3
	Mandar	2	1.3
	Buton	1	0.7
	Muslim	151	100

A total of 151 samples were analyzed using univariate analysis to identify the characteristics and distribution of the study variables. Univariate analysis was performed for the dependent variable, namely nutritional status, and the independent variables, namely sleep patterns and junk food consumption.

Table 3. Distribution of Study Variables Among Kindergarten Children in Makassar (N= 151)

Variables	Categoris	Frequency (n)	Percentage(%)
Nutritional Status	Normal	66	43.7
	Malnutrition	85	56.3
Sleep Pattern	Good	87	57.6
	Poor	64	42.4
Junk Food Consumption	Infrequent	90	59.6
	Frequent	61	40.4

According to the data presented in Table 3, 85 children (43.7%) were classified as having malnutrition. A total of 87 children (57.6%) had good sleep patterns, while 90 children (59.6%) were categorized as having infrequent junk food consumption.

Table 4. Statistical Analysis of the Association Between Sleep Patterns and Junk Food Consumption and Nutritional Status (N= 151)

Variables	Nutritional Status						P-value
	Normal		Malnutrition				
	n	%	n	%	N	%	
Sleep Pattern							
Good	46	52,9	41	47,1	87	100,0	0,008
Poor	20	31,3	44	68,8	64	100,0	
Junk Food Consumption							
Infrequent	32	35,6	58	64,4	90	100,0	0,014
Frequent	34	55,7	27	44,3	61	100,0	

As indicated in the findings, a statistically significant association was observed between sleep patterns and nutritional status among kindergarten children in Makassar ($p = 0.008$). Of the 87 children with good sleep patterns, 52.9% had normal nutritional status, while 68.8% of the 64 children with poor sleep patterns were classified as malnourished. Additionally, a significant link was found between junk food consumption and nutritional status ($p = 0.014$). Children who consumed junk food infrequently had a higher malnutrition rate (64.4%) compared to those who consumed it frequently, who had a higher rate of normal nutritional status (55.7%) (Table 4).

Pattern and Malnutition Status

The majority of kindergarten children in Makassar were classified as having malnutrition, which may be influenced by various factors. Parents and families play an important role in ensuring adequate nutritional intake and maintaining food hygiene. In addition, parents are encouraged to actively seek information regarding nutrition to support children's growth and development according to their age. These findings are consistent with a study conducted by Sitompul et al. in 2020, which reported that the majority of children at BOPKRI Gondokusuman Kindergarten in Yogyakarta experienced malnutrition, with a prevalence of 56.7% (Sitompul et al., 2020).

Most kindergarten children in Makassar had good sleep patterns. However, the proportion of children with poor sleep patterns was also relatively high. These findings are consistent with a study conducted by Dayanti et al. in 2024, which reported that the majority of respondents had an optimal sleep duration. This may be attributed to the fact that children with good sleep patterns generally obtain approximately 10–12 hours of sleep per day. Poor sleep patterns may be influenced by several factors, including psychological factors, lifestyle, and disruption of the circadian rhythm associated with changes in melatonin secretion (Dayanti et al., 2024).

Junk food consumption among kindergarten children in Makassar was predominantly categorized as infrequent. This finding is supported by a study conducted by Putri et al. in 2022, which reported that most children had a low level of junk food consumption. This finding suggests that their dietary habits were relatively healthy due to limited consumption of unhealthy foods. One factor that may contribute to low junk food consumption among children is the active role of schools in monitoring students' snacking habits (Putri et al., 2022).

This study demonstrated a statistically significant association between sleep patterns and nutritional status among kindergarten children in Makassar. Children with good sleep patterns generally had better nutritional status, whereas those with poor sleep

patterns tended to experience malnutrition. This may be influenced by shorter sleep duration, which can increase ghrelin levels and decrease leptin levels, thereby affecting eating patterns and children's nutritional status (Tsaniya et al., 2022).

These findings are consistent with a study conducted by Tsaniya et al. in 2022, which demonstrated a significant association between sleep quality and nutritional status, with a p-value of 0.000 and a correlation coefficient (r) of −0.618. These findings indicate a statistically significant and strong association between sleep quality and nutritional status. The negative correlation suggests that children with poorer sleep quality tended to have higher nutritional status scores, potentially reflecting overweight or obesity, and vice versa (Tsaniya et al., 2022).

In contrast, a study conducted by Dayanti et al. in 2024 reported that sleep duration was not significantly associated with nutritional status among preschool-aged children ($p = 0.49$). This finding suggests that sleep duration may represent an indirect factor influencing children's nutritional status. Factors with more direct effects include nutritional intake and the presence of infectious diseases. In addition to these primary factors, several indirect factors may also influence children's nutritional status. Family socioeconomic conditions, parental educational attainment, and parental knowledge of nutrition play important roles in food selection and the provision of nutritious meals. Household income determines the ability to provide healthy foods, while parenting practices influence children's eating habits. Poor environmental sanitation may increase the risk of infectious diseases that interfere with nutrient absorption, while household food security ensures adequate availability and quality of food. Furthermore, health-seeking behaviors, such as routine health examinations, are important for the early detection and management of nutritional problems. Collectively, these factors contribute significantly to children's nutritional status and support their growth and development (Dayanti et al., 2024). In contrast to the aforementioned study, the present study attempted to minimize potential confounding by applying consistent inclusion and exclusion criteria across participants and study sites. Consequently, the findings demonstrated a statistically significant association between sleep patterns and nutritional status among kindergarten children in Makassar.

Junk Food Consumption and Malnutition Status

The findings of this study demonstrated a significant association between junk food consumption and nutritional status among kindergarten children in Makassar. Children who infrequently consumed junk food tended to have a higher proportion of malnutrition, whereas children with normal nutritional status were more commonly found among those who frequently consumed junk food. These findings indicate that junk food consumption is not necessarily directly associated with an increased risk of malnutrition in children. One possible explanation is that children who frequently consume junk food may also receive adequate nutritional intake from other food sources, whereas those who infrequently consume junk food may have less balanced dietary patterns or may be influenced by other factors, such as socioeconomic conditions and family dietary practices.

Nevertheless, the overall quality of children's dietary intake remains important. Excessive junk food consumption may have adverse long-term health consequences. Junk food may contain various substances that can be harmful when consumed excessively. One potential concern is the presence of food additives, excessive consumption of which may adversely affect liver health and potentially increase the risk of liver-related disorders. The high sodium content of many junk foods may also contribute to hypertension, kidney disorders, and an increased risk of early cardiovascular complications. In addition, high levels of saturated fat and sugar may contribute to diabetes, overweight, obesity, dental caries, and elevated blood cholesterol levels. Therefore, it is important to provide education

to parents and teachers regarding balanced dietary practices and the importance of consuming a variety of nutritious foods to maintain the nutritional status of young children (Tanjung et al., 2022).

The findings of this study are consistent with research conducted by Damayanti et al. in 2022, which demonstrated a significant association between junk food consumption and nutritional status among children aged 5–6 years at Cahaya Klapanunggal Islamic Kindergarten, Bogor ($p = 0.001$). Overweight and obesity are influenced by multiple factors, including limited parental knowledge regarding nutrition. Such perceptions and inadequate nutritional knowledge may increase the risk of nutritional problems among children (Damayanti, 2022).

A study with contrasting findings was conducted by Dayanti et al. in 2024, which reported no statistically significant association between junk food consumption habits and nutritional status among preschool-aged children at PAUD Permata Bunda, Bengkulu City (*p* = 0.62). This may have been influenced by several factors, including peer influence, which can modify children's dietary patterns and eating behaviors. Environmental factors, both social and physical, also contribute to the development of eating habits, while household financial resources affect the availability of nutritious foods. Social support from family and the community may increase awareness of healthy dietary practices, whereas parents' nutritional knowledge influences their decisions regarding the optimal fulfillment of children's nutritional needs. Consistent parental supervision in food selection and monitoring children's nutritional intake plays an important role in maintaining nutritional balance and overall health. These factors interact with one another and collectively contribute to children's nutritional status (Dayanti et al., 2024). Several of these factors were controlled in the present study through the application of consistent inclusion and exclusion criteria, particularly with regard to environmental conditions, financial circumstances, and parental nutritional knowledge, to minimize potential bias. Therefore, the present study identified a significant association between junk food consumption habits and nutritional status among kindergarten children in Makassar.

This study did not comprehensively assess children's overall dietary patterns or environmental sanitation. Therefore, junk food consumption may not necessarily be directly associated with an increased risk of malnutrition among children.

CONCLUSION

Based on the findings of this study, it can be concluded that the majority of kindergarten children in Makassar were classified as having malnutrition. Significant associations were identified between sleep patterns and junk food consumption and children's nutritional status. Children with good sleep patterns tended to have better nutritional status, whereas poor sleep patterns may interfere with appetite regulation and consequently potentially affect nutritional status. Junk food consumption was also associated with nutritional status, although children's nutritional status may additionally be influenced by the overall balance of dietary intake. Therefore, parents are encouraged to pay greater attention to the regularity of children's sleep patterns and the frequency of junk food consumption. Schools are also encouraged to strengthen education regarding balanced nutrition and healthy sleep patterns and to implement healthy food programs. Future research should investigate other factors that may influence children's nutritional status, such as overall dietary patterns, physical activity, and environmental sanitation.

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