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Factors Associated with Toddler Nutritional Status and Stunting: A Cross-Sectional Study of Maternal Knowledge, Parenting Styles, and Family Support

Desmon Wirawati[1]*, Fischa Awalin[1], Sumarmi[2]

[1] Department of Nursing, Universitas Cendekia Abditama, Indonesia
[2] Department of Anesthesiology Nursing, Universitas An Nasher, Indonesia

Corresponding Author Email: desmon_wirawati@uca.ac.id

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ABSTRACT

The nutritional status of toddlers serves as a primary indicator of public health and optimal child development. This study analyzed the relationships between maternal knowledge, parenting styles, and family support regarding toddler nutritional status in a suburban Indonesian health center. A descriptive correlational research design with a cross-sectional approach was employed, involving 242 families with toddlers aged 1–5 years selected through simple random sampling. Data were collected using a structured questionnaire and analyzed via Chi-square tests and Prevalence Odds Ratios (POR) with a 95% Confidence Interval (CI). Results revealed that 88% of toddlers had good nutritional status, despite 80.2% of mothers presenting poor knowledge levels. Bivariate analysis indicated no significant association between maternal knowledge and nutritional status (p = 0.604). However, significant relationships were identified for parenting styles (p = 0.027; POR = 2.89, 95% CI = 1.18 - 7.05) and family support (p = 0.000; POR = 8.54, 95% CI = 2.87 - 25.40). Toddlers raised with poor parenting practices or inadequate family support were significantly more likely to experience poor nutritional outcomes. This study concludes that public health interventions should prioritize strengthening family support systems and positive parenting practices over theoretical education alone. Enhancing these social determinants is crucial for optimizing early childhood growth and structural care.

Key Messages:

- Parenting styles and family support are stronger predictors of toddler nutritional status than maternal knowledge alone.
- Families with poor support systems face an 8.5 times higher risk of having malnourished toddlers.
- Nutritional interventions must move beyond education to include practical social and economic support for families

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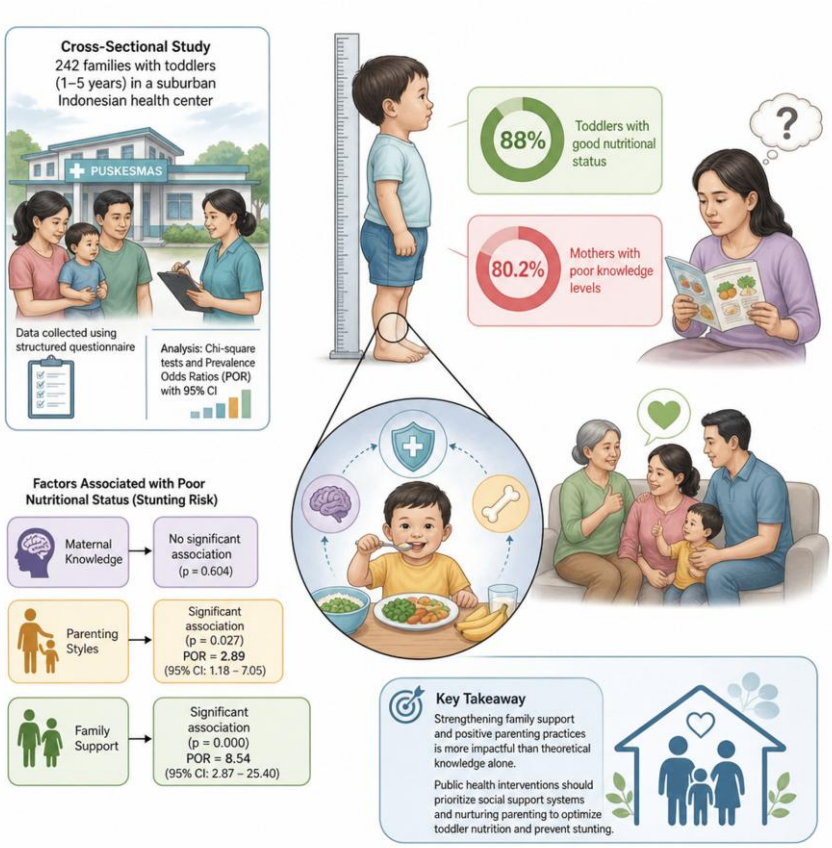
GRAPHICAL ABSTRACT



INTRODUCTION

Nutritional status during the toddler years is a vital metric for evaluating public health, as early childhood nutrition fundamentally determines long-term growth, physical health, and cognitive trajectories (1). Malnutrition during this critical developmental window is known to cause irreversible consequences, including stunting, impaired intellectual development, and a heightened vulnerability to chronic non-communicable diseases in adulthood (2). In contemporary developing nations like Indonesia, this challenge is increasingly characterized by the "double burden of malnutrition," where undernutrition and micronutrient deficiencies coexist alongside rising rates of childhood overweight and obesity within the same communities (3,4). In Indonesia, the prevalence of underweight and stunted growth remains a significant challenge, with national health surveys reporting stunting rates at 21.6% and wasting at 7.7% (5). At the provincial and local levels, Banten Province and Tangerang Regency reflect these national strains, with Tangerang Regency exhibiting a stunting prevalence of approximately 21.1% and substantial pockets of weight-based growth faltering across its peri-urban sub-districts (6). These figures underscore the urgency of addressing malnutrition as a primary investment in the country's future human capital and productivity.

To systematically analyze these dynamics, this study is grounded in the UNICEF Conceptual Framework of Malnutrition, which categorizes the determinants of child growth into immediate (dietary intake and health status), underlying (food security, caregiving practices, and health environment), and basic causes (socioeconomic and institutional structures) (7). Within this theoretical hierarchy, Current literature emphasizes that while macro-level factors such as food security and socioeconomic status are influential, micro-level behavioral determinants—specifically parenting styles and family support systems—play a decisive role in the actualization of nutrient intake (8). Positive parenting practices, particularly authoritative feeding behaviors, have been shown to be positively correlated with normal weight-for-age parameters and optimal child development (9). Furthermore, active family involvement serves as a critical protective factor, providing the emotional, informational, and financial resources necessary for caregivers to maintain optimal feeding habits under stressful conditions (10–12).

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However, the pathways through which these underlying causes operate are complex; for instance, the translation of structural resource availability into actualized care is heavily mediated by maternal literacy and social reinforcement. Despite the recognized importance of maternal health literacy, a research gap exists regarding the effectiveness of theoretical knowledge when isolated from the broader social and behavioral determinants outlined in the UNICEF framework (13). Evidence suggests that theoretical knowledge about nutrition often fails to translate into improved health outcomes in the absence of strong family support or favorable economic conditions, such as adequate household income (14). In many peri-urban areas of Indonesia, such as the Kelapa Dua District, families often face socio-economic constraints where earnings fall below the regional minimum wage (RMW / UMR), potentially mitigating the impact of formal education on child health (15). Therefore, investigating how these specific variables interact within a localized setting is essential for identifying the most impactful levers for nutritional improvement. Consequently, this study aims to analyze the relationships among maternal knowledge, family support, and parenting styles with toddlers' composite nutritional status (dichotomized into good and poor nutritional health) in the Bojong Nangka Health Center area, Kelapa Dua District, Tangerang.

METHODS

This research utilized a descriptive correlational design with a cross-sectional approach to investigate the determinants of nutritional status in early childhood. The study was conducted within the service area of the Bojong Nangka Health Center, Kelapa Dua District, Tangerang Regency. A total of 242 families with toddlers aged 1–5 years were recruited as respondents through simple random sampling. The sampling process involved identifying the total population of families with toddlers in the region, calculating the required sample size for statistical power, and selecting participants randomly to ensure representative data.

Data collection was performed using a structured questionnaire comprising 38 items, which was validated prior to administration. The instrument was categorized into three primary sections: 8 items on demographic characteristics, 20 items on family support, and 10 highly targeted items evaluating maternal knowledge and parenting patterns. The demographic variables analyzed included maternal age (categorized into early, middle, and late adulthood), ethnicity, number of children, and presence of domestic assistants. Socioeconomic status was measured through maternal education levels and family income, the latter of which was compared against the Regional Minimum Wage (UMR). Toddler-specific demographics included age and gender.

The independent variables in this study were maternal knowledge, parenting patterns, and family support, while the dependent variable was toddlers' nutritional status. Maternal knowledge was evaluated using factual items and classified into low, moderate, and good based on standard percentage scoring thresholds; for bivariate analysis, these scores were dichotomized to evaluate adequacy. Parenting patterns and family support were measured using Likert-scale questions and subsequently categorized into "inadequate" and "adequate" (or "moderate") to reflect the quality of care and social reinforcement received by the mother.

Nutritional status was determined using standard weight-based anthropometric indicators in accordance with the Indonesian Ministry of Health (Kemenkes) growth charts, which were dichotomized into "good" and "poor" nutritional health categories for statistical comparison.

Statistical analysis was conducted using univariate analysis to describe frequency distributions and bivariate analysis to test hypotheses. The Chi-Square test was employed with a significance threshold of α=0.05 to determine the relationship between the independent and dependent variables. To assess risk, the Prevalence Odds Ratio (POR) with a 95% Confidence Interval (CI) was calculated for parenting and family support variables.

CODE OF HEALTH ETHICS

This study adhered to strict ethical standards and received formal approval from the Universitas Cendekia Abditama Ethics Committee under certificate number 363.A/UCA-YIV/A.17/IV/2025.

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RESULTS

Table 1 presents the demographic profile and descriptive statistics of the respondents (n=242). The maternal cohorts were predominantly in the middle adulthood phase (26–35 years, 72.3%) and of Javanese ethnicity (75.2%). Regarding socioeconomic indicators, the majority having completed a senior high school education (62.0%) and reporting a family income below the regional minimum wage (RMW) (57.0%). The enrolled children in the study were primarily aged between 1 and 3 years, with the highest prevalence at 2 years (36.0%), and exhibited a relatively balanced gender distribution (52.9% male). Notably, regarding the key research variables, a substantial majority of mothers demonstrated poor knowledge (80.2%) and poor parenting styles (55.0%), whereas family support was reported as sufficient by slightly more than half of the participants (52.5%). The dependent variable, composite nutritional status, revealed that 12.0% (*n*=29) of the toddlers presented poor nutritional status based on national weight-for-age parameters, while 88.0% (*n*=213) exhibited good nutritional health.

Table 1. Descriptive Statistics (Demographics & Variables)

Variable	Category	n	%
Mother's Age	Early Adulthood (18-25 Years)	26	10.7
	Middle Adulthood (26-35 Years)	175	72.3
	Late Adulthood (36-60 Years)	41	16.9
Ethnicity	Javanese	182	75.2
	Others	60	24.8
Number of Children	1	95	39.3
	2	100	41.3
	3	33	13.6
	4	11	4.5
	5	3	1.2
Household Assistant	Yes	12	5.0
	No	230	95.0
Mother's education	Elementary	17	7.0
	Junior High	44	18.2
	Senior High	150	62.0
	College/University	31	12.8
Family Income	< Regional Minimum Wage (WMR)	138	57.0
	> Regional Minimum Wage (WMR)	104	43.0
Child's Age	1 Year	56	23.1
	2 Years	87	36.0
	3 Years	65	26.9
	4 Years	32	13.2
	5 Years	2	0.8
Child's Gender	Male	128	52.9
	Female	114	47.1
Maternal Knowledge	Poor	194	80.2
	Sufficient	9	3.7
	Good	39	16.1
Parenting Style	Poor	133	55.0
	Sufficient	109	45.0
Family Support	Poor	115	47.5
	Sufficient	127	52.5
Nutritional Status	Poor (Underweight/Growth Faltering)	29	12.0
	Good (Normal Weight)	213	88.0

The bivariate analysis highlights the associations between maternal factors and the nutritional status of children, revealing significant correlations for parenting style and family support. The results demonstrate that poor parenting style is a significant risk factor, as mothers with poor parenting practices

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were approximately 2.9 times more likely to have children with poor nutritional status compared to those with sufficient parenting (p = 0.027; POR = 2.888, 95% CI: 1.184–7.047). Similarly, family support emerged as a critical determinant; limited family support increased the likelihood of poor nutritional status by more than eightfold (p=0.000; POR=8.542, 95% CI: 2.872–25.403). Conversely, when evaluated across the complete clinical grading, the study found no statistically significant correlation between maternal knowledge levels and the child's nutritional status (p = 0.604).

Table 2. Bivariate Analysis (Relationship with Nutritional Status)

Variable	Category	Nutritional Status		POR (95% CI)	P Value
		Poor (*n* (%))	Good (*n* (%))		
Knowledge	Poor	23 (11.9)	171 (88.1)	-	0.604
	Sufficient	2 (22.2)	7 (77.8)		
	Good	4 (10.3)	35 (89.7)		
Parenting Style	Poor	22 (16.5)	111 (83.5)	2.888 (1.184-7.047)	0.027
	Sufficient	7 (6.4)	102 (93.6)		
Family Support	Poor	25 (21.7)	90 (78.3)	8.542 (2.872-25.403)	0.000
	Sufficient	4 (3.1)	123 (96.9)		

DISCUSSION

The findings of this study indicate that maternal knowledge does not significantly correlate with the nutritional status of toddlers (p=0.604) in the Bojong Nangka Health Center area. Despite the majority of mothers (80.2%) possessing low nutritional knowledge, 88% of toddlers were found to have good nutritional status. This outcome demonstrates a pattern of positive deviance within the study population, where the vast majority of children maintain normal growth trajectories despite the presence of multiple household risk factors, including low maternal education, poor parenting practices (55.0%), and low socioeconomic status, with 57.0% of families earning below the regional minimum wage (RMW).

This lack of statistical association can be explained by separating theoretical nutrition knowledge from functional health literacy. Theoretical knowledge refers to the passive retention of health facts, whereas functional health literacy involves the practical capacity to navigate local food markets, interpret available resources, and maximize a limited household budget (16,17). A mother may score poorly on structured questionnaires regarding abstract nutritional concepts, yet possess sufficient functional literacy to select affordable, nutrient-dense local foods (18). Conversely, theoretical knowledge of mothers and children alone is not enough to ensure optimal nutritional behavior in children without adequate social and economic support (19). Lower income is consistently associated with poorer diet quality (20). Nutritious foods (fresh fruits, vegetables, and lean proteins) are often more expensive and harder to source than energy-dense, highly processed foods (21). Furthermore, while maternal education is often a primary determinant, in resource-constrained environments, even mothers with higher education may struggle to implement health-literate practices if financial access is limited (22). This finding differs from traditional Indonesian studies, such as the work by Nasikhah and Margawati (2012), which reported that maternal knowledge directly correlates with child nutritional status (23). This discrepancy suggests that in peri-urban areas like Tangerang, financial barriers and the local food environment can suppress the expected protective benefits of maternal education (24).

In contrast, parenting styles demonstrated a significant relationship with nutritional outcomes (p=0.027), with inadequate parenting increasing the risk of poor nutrition by 2.89 times (POR = 2.89; 95% CI = 1.18–7.05). Parenting practices, particularly those involving feeding and healthcare, serve as a bridge between a family's resources and the child's actual intake. These findings are consistent with the research of Nadhila et al. (2023), which emphasizes that positive parenting supports the consistent provision of appropriate nutrients (25). Moreover, the results support the theory that authoritative parenting styles—characterized by responsiveness and clear health boundaries—improve healthy feeding practices and reduce feeding difficulties in early childhood (26).

Family support emerged as the most critical determinant in this study, showing a highly significant association with nutritional status (p=0.000) and a high Prevalence Odds Ratio (POR) of 8.54. Toddlers

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living in families with inadequate support systems are 8.5 times more likely to experience poor nutritional status compared to those with adequate support. This strong statistical relationship helps explain why so many children maintained good nutritional status despite low maternal knowledge and low income. In peri-urban Indonesian households, extended family networks frequently provide secondary caregiving, share financial burdens, and stabilize household food security, which directly reduces the burden on the primary caregiver (27).

Biologically, a highly supportive household environment protects child growth by minimizing chronic psychosocial stress. Inadequate family support and high caregiver strain can trigger prolonged activation of the child's hypothalamic-pituitary-adrenal (HPA) axis, leading to elevated systemic cortisol levels. Chronically elevated cortisol suppresses the secretion of growth hormone (GH) and insulin-like growth factor 1 (IGF-1), which impairs linear growth, alters metabolism, and increases susceptibility to subclinical childhood infections (28,29). Therefore, the substantial protective benefit of family support observed in this study serves as both a social cushion and a biological mechanism against stress-induced growth suppression.

Supporting research indicates that family-based interventions are critical for addressing malnutrition, particularly by fostering behavioral changes in nutritional intake and environmental sanitation. Proactive familial involvement in providing supplementary foods enriched with essential micronutrients—such as protein, iron, and vitamin A—has been established as an effective preventive measure against subtle wasting and micronutrient deficiencies, which can impair development even in children classified as having normal weight parameters (30,31). In the Bojong Nangka community, family support likely acts as a buffer against the economic pressures of earning below the minimum wage. Practical implications suggest the necessity of empowering families with skills to prepare complementary feeding using local resources and encouraging greater involvement of fathers in caregiving roles (32).

Compared with recent literature, such as Rahayuwati et al. (2025), this research confirms that family characteristics and childcare quality are stronger predictors of growth than formal education alone (33). However, a notable limitation of this study is its cross-sectional design, which allows for the identification of statistical associations but cannot establish definitive causal relationships between the variables. Additionally, the data collection relied on self-reported questionnaires, which may be subject to recall bias. Despite these limitations, the study provides robust empirical evidence that interventions for reducing stunting and malnutrition should move beyond basic health education and focus on strengthening social support networks and empowering positive parenting behaviors within the household.

CONCLUSION

This study concludes that while a significant majority (88%) of toddlers in the Bojong Nangka Health Center area maintain good nutritional status based on weight-for-age parameters, maternal knowledge alone does not serve as a statistically significant determinant of these health outcomes (p=0.604). The findings identify parenting styles (p=0.027) and family support (p=0.000) as the primary behavioral predictors, where toddlers in families with inadequate support systems face an 8.5 times higher risk of poor nutritional status (POR = 8.54, 95% CI = 2.87 - 25.40). These results demonstrate that within this specific peri-urban community, nutritional adequacy is heavily dependent on the operational quality of childcare practices and household social reinforcement.

Importantly, these data should not be interpreted to suggest that theoretical health education is redundant; rather, they demonstrate that health education requires robust domestic support systems and functional care structures to be effectively translated into optimal growth outcomes. Consequently, public health strategies in this localized context should prioritize integrated family-centered interventions that strengthen social support networks alongside parenting behavior changes. Future research in similar peri-urban settings should utilize longitudinal designs to establish definitive causal pathways and explore the specific dimensions of instrumental and emotional family support that most effectively mitigate the effects of low household income on child growth.

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DECLARATION OF THE USE OF AI

The authors declare that no artificial intelligence (AI), AI-assisted technologies, or large language models (LLMs) were used in the conception of the study, data analysis, or the drafting, writing, and editing of this manuscript. The only exception is the graphical abstract, which was created using the design platform Illustrae (https://illustrae.co/). The authors take full responsibility for the content and accuracy of the graphical abstract and the entire manuscript.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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