



The Relationship Between Nutrition Knowledge and Feeding Style with Nutritional Status in Early Childhood Education Institutions

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Abstract

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Nutritional problems among children in coastal areas reflect the complexity of unique socio-ecological challenges, in which mothers' theoretical understanding is often not translated into appropriate parenting practices. This study aims to comprehensively analyze the relationships between mothers' nutritional knowledge and feeding styles and the nutritional status of preschool-aged children, and to identify the most influential determinants in coastal communities. This analytical observational study employed a cross-sectional design and included 107 pairs of mothers and children aged 3-6 years in the coastal area of Bai Island, Bengkulu City. Subjects were selected using multistage random sampling. Research instruments included the Nutrition Knowledge Questionnaire (NKQ), Caregiver's Feeding Styles Questionnaire (CFSQ), and standardized anthropometric measurements. Data were analyzed using the Chi-Square test and Multiple Logistic Regression to predict risk. The results showed that the prevalence of stunting in the study location was 31.8%. Multivariate analysis revealed that although nutrition knowledge was correlated with nutritional status, feeding style was a much stronger predictor. Mothers with authoritarian caregiving styles increased the risk of stunting by 5.19 times (95% CI: 1.90–14.17), while uninvolved styles increased the risk by 7.27 times (95% CI: 1.77–29.85) compared to authoritative styles. Conclusion: There is a significant gap between cognition and practice, in which parenting interaction patterns (e.g., feeding practices) have a greater impact on nutritional status than mere nutritional knowledge.

Keywords: Feeding style, nutrition knowledge, stunting, coastal areas, preschool children.

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INTRODUCTION

The nutritional status of preschool-aged children is a critical foundation for the quality of life and productivity of future generations. During this golden period of growth, optimal nutritional intake not only supports physical development but also influences cognitive abilities and long-term metabolic health (Black et al., 2021; Prado & Dewey, 2021). The dual nutrition problems of stunting, wasting, and overweight still plague the health of Indonesian children, with patterns varying between regions.

The unique geographical and socio-economic characteristics make coastal areas both attractive and vulnerable for study. The characteristics of coastal communities, which often depend on fluctuating marine yields, combined with limited access to diverse foods and sanitation challenges, create a specific nutritional landscape (Béné et al., 2019a; Purwaningsih et al., 2022). The role of mothers as *primary caregivers* is central, and their nutritional knowledge must be translated into daily caregiving practices, particularly regarding feeding patterns.

Knowledge alone is often not enough. Many mothers may understand the principles of balanced nutrition in theory, but find it difficult to apply them consistently due to various obstacles. Previous research indicates that although mothers' nutritional knowledge correlates with better feeding practices, other factors, such as cultural beliefs, economic pressures, and psychological dynamics in parenting, often pose significant barriers (Brug et al., 2020; Contento, 2021).

The concept of *feeding style* or feeding practices is highly relevant. This concept goes beyond what is given to the child, to *how* the feeding process occurs, how mothers respond to their children's hunger and fullness cues, the strategies used to encourage eating, and the emotional climate created during mealtimes (Hughes et al., 2021; Vaughn et al., 2019). Feeding practices are believed to be an important pathway linking mothers' nutritional knowledge with children's actual nutritional status (Vollmer & Baietto, 2017).

The relationship between specific feeding styles and children's nutritional outcomes has been extensively studied, particularly in Western countries. Strong evidence shows that an *authoritative feeding style*, characterized by high responsiveness and reasonable demands, is consistently associated with healthier eating patterns and lower obesity risk in children. Conversely, overly demanding (*authoritarian*) or overly indulgent feeding styles tend to result in less favorable outcomes (Peters, Parletta, Campbell, et al., 2021; Saltzman, Balantekin, Musaad, et al., 2022; Shloim et al., 2017a)

Community nutrition research has extensively examined the direct relationship between mothers' nutritional knowledge and children's nutritional status ([Aprilia et al., 2021](#); [Fadilla & Mahmudiono, 2022](#)). Several recent studies have also begun to include parenting elements, but the focus is often still on specific practices (*feeding practices*) rather than overall interactional styles (*feeding style*) ([Misnadiarly & Soekatri, 2023](#)). Specifically for coastal settings, studies that integrate these two key variables, maternal nutrition knowledge and *feeding style*, into a single analytical framework to predict children's nutritional status are still very rare.

This research gap indicates a contextual and conceptual gap. Contextually, there are unique dynamics of coastal families, such as fishermen's livelihoods with irregular income patterns, local perceptions of nutritious food, and levels of exposure to health education, which may moderate the relationship between knowledge, parenting, and nutritional status. While conceptually, a more holistic approach is needed that looks at how cognitive aspects (knowledge) and behavioral interaction aspects (*feeding style*) are interrelated and together influence nutritional outcomes, with the assumption that a deep understanding of the interaction of these two factors in the coastal context will provide a more meaningful contribution ([Eka Daryati & Sadiana, 2025](#); [Fadillah & Suryadi, 2025](#); [Nurdin & Anhusadar, 2020](#))

This study aims to test the validity and applicability of *feeding style* theory, which is largely grounded in Western culture, in the context of Indonesian coastal culture, and to enrich the ecological model of child nutrition determinants by incorporating measurable psychosocial variables. From a practical standpoint, the results of this study have direct implications for the design of more effective and context-sensitive nutritional interventions. If *feeding style* is found to be a strong mediator, then nutrition promotion programs in coastal areas should no longer focus solely on knowledge transfer through conventional counseling. Programs need to be developed into a more comprehensive approach that includes parenting skills training to help mothers implement responsive feeding practices, thereby translating knowledge into positive behavior.

Based on the above description, this study specifically aims to analyze mothers' nutritional knowledge levels and describe the distribution of dominant feeding patterns in preschool-aged children in coastal areas, the relationship between mothers' nutritional knowledge and their children's nutritional status (based on weight-for-age, height-for-age, and weight-for-height indices), the relationship between the feeding practices applied by mothers and the nutritional status of children, and the simultaneous contribution of mothers' nutritional knowledge and feeding practices to variations in the nutritional status of preschool-aged children in coastal areas, through the

achievement of these objectives, this study is expected to provide empirical evidence to inform more targeted policies and programs.

METHODOLOGY

Type of Research

This study is a quantitative study using an analytical observational design with a cross-sectional approach. This design was chosen to analyze the correlation between the independent variables, namely maternal nutritional knowledge and feeding style, with the dependent variable, namely the nutritional status of children, simultaneously at a single point in time. Through this approach, researchers can identify the dynamics of nutritional problems and their risk factors without providing intervention or treatment to the research subjects.

Time and Place of Research

The research was conducted over three months in the coastal area of Bai Island, Bengkulu City. This location was determined purposively, taking into account the sociodemographic characteristics of the community, which is dominated by fishing families, as well as the urgency of addressing toddler nutrition issues, which remains a public health priority in the region.

Research Objectives (Population and Sample)

The population in this study included all mothers and preschool children (aged 3-6 years) who were actively enrolled in Early Childhood Education Institutions in the coastal area. The sample size was determined using a proportion estimation formula for an infinite population, which resulted in a minimum of 97 subjects. To anticipate possible dropouts or incomplete data during the study, the sample size was set at 107 mother-child pairs. The sampling technique employed was multistage random sampling, conducted in two stages. The first stage involved the random selection of 6 Childhood Education Institutions from a total of 12 available. The second stage involved proportional random sampling of subjects in each selected PAUD to ensure population representativeness.

Data Collection Techniques and Instrument Development

Data were collected comprehensively through structured interviews, questionnaires, and anthropometric measurements. The research instruments consisted of three main components, all of which underwent validity and reliability testing. First, nutritional knowledge variables were measured using the Nutrition Knowledge Questionnaire (NKQ), adapted from the original, which included 25 questions on balanced nutrition (Cronbach's Alpha = 0.82). Second, feeding patterns were measured using an adapted Caregiver's Feeding Styles Questionnaire (CFSQ), which assessed

responsiveness and demandingness to classify mothers into four parenting typologies: authoritative, authoritarian, indulgent, or uninvolved. Third, nutritional status data were obtained through anthropometric measurements of weight and height by trained enumerators, which were then converted into Z-score indices (weight-for-age, height-for-age, and weight-for-height) using the 2020 World Health Organization (WHO) growth standards.

Data Analysis Techniques

The data obtained were analyzed gradually using statistical software. Univariate analysis was performed to describe respondents' demographic characteristics and the frequency distributions of research variables. Bivariate analysis used the Chi-Square test with $\alpha = 0.05$ to assess the relationship between the independent and dependent variables. Furthermore, multivariate logistic regression was used to identify the most significant determinants of nutritional status and to calculate the risk ratio (Odds Ratio). Variables included in the multivariate model were those with $p < 0.25$ in the bivariate analysis. All research procedures complied with health research ethics principles and obtained ethical clearance from the relevant ethics committee.

RESULTS AND DISCUSSION

RESULTS

The implementation of this research in coastal areas successfully collected data from all respondents who met the inclusion and exclusion criteria. The initial stage of analysis focused on mapping the socio-demographic profiles of mothers and the characteristics of the children who were the subjects of the study. Understanding these characteristics is important for providing key findings on parenting patterns and nutritional status, which will be discussed further.

Table 1. Distribution of Respondent Characteristics

Characteristics	<i>f</i>	%
Mother's Age		
< 25 years	18	16.8
25 - 35 years old	62	57.9
> 35 years old	27	25.3
Mother's Education		
Basic (Elementary/Junior High School)	45	42.1
Secondary (high school/vocational school)	48	44.9

Higher (Diploma/Bachelor's Degree)	14	13
Mother's occupation		
Housewife (Not Working)	71	66.4
Laborer/Fisherman Processor	24	22.4
Entrepreneurs/Traders	9	8
Employee (Civil Servant/Private Sector)	3	2.8
Child's Gender		
Male	56	52.3
Female	51	47.7

Based on the demographic data above, it can be seen that the majority of mothers are in the productive age range, namely 25-35 years old, which dominates more than half of the total respondents. An interesting finding can be seen in terms of employment, where most mothers are housewives (66.4%), who theoretically have more time available for childcare than mothers who work as seafood processors or entrepreneurs. Meanwhile, in terms of education, the respondent profile is dominated by those with a secondary (high school/vocational school) and elementary education, with a relatively small proportion of highly educated mothers (13%). This condition is an important background for exploring their level of understanding of nutrition and its application in their daily diet.

The distribution of the main research variables, which include mothers' level of nutrition knowledge, feeding style preferences, and the current nutritional status of children, is summarized in the following table.

Table 2. Distribution of Nutrition Knowledge, Feeding Style, and Nutritional Status

Variable	Category	<i>f</i>	%
Maternal Nutrition Knowledge	Good ($\geq 76\%$)	29	27.1
	Sufficient (56-75%)	46	43
	Insufficient ($\leq 55\%$)	32	29.9
Feeding Style	Authoritative (Responsive & High Demands)	31	29
	Authoritarian (Low Responsiveness, High Demands)	38	35
	Indulgent (High Responsiveness, Low Demands)	26	24
	Uninvolved (Responsive & Low Demands)	12	11.2

Child Nutritional Status (TB/U)	Normal (≥ -2 SD)	73	68.2
	Stunted (< -2 SD)	34	31.8

Based on Table 2, the research results show a trend that requires serious attention. Although the majority of mothers had nutritional knowledge in the "Adequate" category (43%), there was still a significant number (29.9%) in the "Inadequate" category, in line with the feeding practices applied, where the Authoritarian style was the most dominant (35.5%) compared to the more recommended Authoritative style. The implications of this combination of knowledge and parenting style are evident in nutritional outcomes, with a study site prevalence of stunting among toddlers of 31.8%, indicating a significant public health problem in this coastal area. To assess whether the high stunting rate is statistically associated with mothers' understanding of nutrition, the following bivariate tests were conducted.

Table 3. Relationship between Mothers' Nutritional Knowledge and Children's Nutritional Status

Nutrition Knowledge	Child Nutritional Status		Total <i>f</i> (%)	<i>p</i>
	<i>f</i> (%)	Stunted <i>f</i> (%)		
Good	25 (86.2%)	4 (13.8%)	29 (100%)	0.003
Fair	33 (71.7%)	13 (28.3%)	46 (100%)	
Insufficient	15 (46.9%)	17 (53.1%)	32 (100%)	
Total	73 (68.2%)	34 (31.8%)	107 (100%)	

The results of the bivariate analysis confirm a significant correlation between maternal cognition and children's physical health. A *p*-value of 0.003 ($p < 0.05$) indicates that maternal nutritional knowledge is directly proportional to children's nutritional status⁷. Mothers with "Good" knowledge tended to have children with normal nutritional status (86.2%), while more than half of the children of mothers with "Poor" knowledge experienced stunting (53.1%)⁸. However, knowledge is only one side of the coin of parenting. The behavioral aspect, namely how mothers interact when feeding, was further analyzed to see its impact on nutritional status.

Table 4. Relationship Between Feeding Care Patterns and Children's Nutritional Status
(TB/U)

Feeding Practices	Child's Nutritional Status		Total <i>f</i> (%)	<i>p</i>
	<i>f</i> (%)	Stunted <i>f</i> (%)		
Authoritative	28 (90.3%)	3 (9.7%)	31 (100%)	0.001
Authoritarian	21 (55.3%)	17 (44.7%)	38 (100%)	
Indulgent	18 (69.2%)	8 (30.8%)	26 (100%)	
Uninvolved	6 (50.0%)	6 (50.0%)	12 (100%)	
Total	73 (68.2%)	34 (31.8%)	107 (100%)	

The analysis in Table 4 shows an even stronger relationship than the knowledge variable. With a *p*-value of 0.001, feeding practices were proven to be a significantly differentiating factor in children's growth status. Children who were raised with an authoritative parenting style—which balances feeding demands with warm responses from mothers—achieved the highest proportion of normal nutritional status at 90.3%. Conversely, extreme parenting styles, whether Authoritarian (strict/coercive) or Uninvolved (neglectful), contributed to high rates of stunting, at 44.7% and 50.0%, respectively.

Nutritional status is the result of the interaction of various factors. The analysis was continued to the multivariate stage using Multiple Logistic Regression. This analysis was conducted in two steps (stepwise model) to select confounding variables (such as education) and find the purest determinants affecting children's nutritional status.

Table 5. Results of Logistic Regression Analysis of Determinants of Child Nutritional Status

Variable	B (Coefficient)	Sig. (<i>p</i>)	95% C.I. for OR
STEP 1			
Secondary Education	0.41	0.506	1.51 (0.45 - 5.09)
Basic Education	0.85	0.141	2.35 (0.75 - 7.32)
Lack of knowledge	1.15	0.017	3.15 (1.23 - 8.10)
Authoritarian Parenting	1.52	0.004	4.57 (1.62 - 12.91)
Constant	-3.10	0.005	0.04
STEP 2			

Sufficient Knowledge	0.84	0.04	2.32 (1.04 - 5.18)
Insufficient	1.25	0.006	3.51 (1.44 - 8.59)
Authoritarian Parenting Style	1.64	0.001	5.19 (1.90 - 14.17)
Indulgent Feeding Pattern	1.12	0.05	3.06 (0.98 - 9.56)
Uninvolved Feeding Pattern	1.98	0.006	7.27 (1.77 - 29.85)
Constant	-2.45	0	0.08

The multivariate modeling above provides a final picture of the main risk factors for stunting in this region. In Step 1, the variable Mother's Education was not statistically significant ($p > 0.05$) relative to knowledge and parenting patterns; therefore, it was excluded from the final model 12.

Step 2 (Final Model) found that feeding practices contributed more to risk (odds ratio) than knowledge. Mothers who practiced authoritarian feeding practices were 5.19 times more likely to have stunted children than mothers who practiced authoritative feeding practices. This risk increased further among mothers who were uninvolved, with an OR of 7.27, although the confidence interval range was quite wide. Meanwhile, from a cognitive perspective, mothers with insufficient nutritional knowledge are 3.51 times more likely to cause their children to experience growth disorders than those with good knowledge. This finding underscores that, in coastal environments, interventions relying on nutritional education alone are insufficient and must also address changes in feeding behavior to be more responsive.

DISCUSSION

The interpretation of the study's statistical findings confirms the initial hypothesis that both maternal nutrition knowledge and feeding style are significantly associated with the nutritional status of preschool children in coastal areas. The results of bivariate analysis indicate a positive association between greater maternal nutrition knowledge and better child nutritional status ($p=0.003$). This finding is consistent with the theory that knowledge is the cognitive foundation for healthy parenting practices, although it does not automatically manifest in behavior.

A stronger association was observed for feeding style: authoritative parenting was associated with the lowest prevalence of stunting (9.7%), whereas authoritarian and uninvolved parenting were associated with higher risks of stunting (44.7% and 50.0%, respectively). Multivariate logistic regression analysis reinforced this, showing that authoritarian feeding patterns increased the risk of stunting by 5.19 times (95% CI: 1.90–14.17), even after controlling for knowledge levels. These findings underscore that in coastal contexts, how mothers feed their children (*feeding style*) may be

a more direct causal pathway to child nutrition outcomes than simply knowledge (*what they know*), consistent with conceptual frameworks emphasizing the importance of the interactional dimension of feeding practices ([Contento, 2021](#); [Hughes et al., 2021](#); [Vaughn et al., 2019](#)).

The consistency of the superiority of authoritative parenting has been found in various cross-cultural studies, including in Western countries, linking it to healthier eating patterns and lower obesity risk, but socioeconomic and cultural factors can moderate the expression and effectiveness of feeding style. Studies in West African coastal communities (e.g., Ghana) report that food insecurity and dependence on seasonal marine resources often force caregivers to adopt reactive and less planned feeding practices, where nutritional knowledge is sometimes inapplicable due to structural constraints ([Béné et al., 2019b](#); [Peters, Parletta, Campbell, et al., 2021](#); [Shloim et al., 2017b](#))

Research in the Philippines shows that economic pressure on fishing households encourages more indulgent parenting patterns because food is used as a means of entertainment or an outlet ([Purwaningsih et al., 2022](#)). The dominance of authoritarian parenting styles found in this study may reflect the cultural characteristics of East Java, which emphasize child obedience and mothers' concerns about insufficient food intake due to the uncertainty of fishing families' income ([Nuridin et al., 2023](#)). Thus, although the authoritative parenting style is universally considered ideal, its manifestation is greatly influenced by contextual factors such as economic stability, local parenting norms, and access to food.

The coastal environment with unstable livelihoods, limited access to diverse food, and minimal exposure to health education creates a stressful parenting ecosystem. In these conditions, authoritarian parenting patterns characterized by high control and coercion during meals can be perceived as a strategy to ensure children consume what is available, even at the expense of warm responsiveness. Meanwhile, the significant indulgent parenting style (24.3%) may emerge as a form of compensation for feelings of guilt or limited parenting time ([Hughes et al., 2021](#)).

The educational profile of mothers, which is dominated by middle and basic levels (87%), also shapes this landscape. The low proportion of highly educated mothers limits their capacity to access, critique, and apply the latest nutritional information, as well as to reflect on and adapt more responsive parenting styles. Unlike early childhood education settings in urban areas or lab schools that involve mothers with higher socioeconomic capital, interventions in coastal areas must be designed with consideration for the double burden faced by mothers, namely between economic demands and childcare responsibilities ([Susanto et al., 2022](#)).

Feeding patterns affect nutritional status through several behavioral and physiological mechanisms that impact the quantity and quality of a child's intake. First, authoritarian patterns with high external control can interfere with the development of a child's internal satiety regulation. Children may lose the ability to recognize their natural hunger and satiety cues, leading to irregular eating patterns and inadequate energy intake (Vollmer & Baietto, 2017).

A negative emotional climate during mealtimes, such as pressure, threats, or anxiety, can create negative associations with food, increasing the risk of *food neophobia* or, conversely, *emotional eating* as a response to stress (Saltzman, Balantekin, Bost, et al., 2022). Uninvolved or neglectful parenting styles can lead to a lack of supervision over food selection and consumption, making children vulnerable to unbalanced diets and deficiencies in essential micronutrients (Abeshu et al., 2021). Conversely, an authoritative parenting style that combines warmth, responsiveness, and clear structure creates a positive learning environment for eating. This encourages children to explore new foods, develop healthy food preferences, and ultimately achieve optimal nutritional intake for growth (Peters, Parletta, Lynch, et al., 2021).

Interpretation of these research results must account for several methodological limitations. The measurement of feeding patterns used a self-reported questionnaire, which is prone to social desirability bias. Mothers may tend to report practices that are considered "good" or "ideal" rather than those that occur in daily practice. Although enumerators have been trained to minimize this bias through in-depth interviewing, direct observation (e.g., recording interactions during meals) will yield more objective data in the future. The generalization of these research results is limited to coastal communities with specific socio-demographic characteristics (fishing families in Bengkulu). These dynamics may differ in coastal communities in other regions with more established economies or different parenting cultures.

These findings confirm that nutrition improvement efforts in coastal areas must go beyond conventional nutrition education that focuses on knowledge transfer. Intervention programs should adopt a holistic approach that integrates contextual nutrition education tailored to local food resources, parenting skills training emphasizing *responsive feeding*, and psychosocial support to reduce maternal stress. Such interventions are expected to bridge the gap between knowledge and practice and to empower mothers to create a feeding environment that supports optimal child nutrition, even amid resource constraints.

CONCLUSION

This study concludes that in coastal contexts, *feeding styles* have a stronger influence on children's nutritional status than mothers' nutritional knowledge alone. Responsive *authoritative* feeding styles have been shown to be most effective in preventing stunting, whereas authoritarian and uninvolved feeding styles significantly increase the risk. These findings reflect the adaptive dynamics of parenting amid economic uncertainty and food-availability patterns typical of coastal areas, suggesting that future nutrition interventions should shift from conventional education to a holistic approach that integrates training in responsive parenting skills and psychosocial support to translate knowledge into effective practices.

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