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The Relationship Between Maternal Age, Nutritional Knowledge, and Complementary Feeding (Mp-Asi) Parenting Practices with the Incidence of Undernutrition in Toddlers

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Abstract

The assessment of undernutrition status in toddlers was conducted using the weight-for-length or weight-for-height index (WLH or WHH), with a range of -3 to < -2 standard deviations (SD). This study aims to analyze the relationship between maternal age at pregnancy, mothers' nutritional knowledge, and parenting practices in complementary feeding (MP-ASI) with the incidence of undernutrition in toddlers aged 6-23 months. This research employed a cross-sectional design with a population of toddlers aged 6-23 months. A total of 98 toddlers were selected as samples through a cluster random sampling technique. Data collection was conducted through anthropometric measurements, including the weight and length/height of the toddlers, along with questionnaires to assess mothers' knowledge levels and MP-ASI parenting practices. The collected data were analyzed using the chi-square test. The results of the analysis showed that maternal age at pregnancy did not have a significant relationship with the incidence of undernutrition in toddlers aged 6-23 months, with a p-value of 0.152 (p > 0.1). However, mothers' nutritional knowledge and MP-ASI parenting practices showed a significant relationship with the incidence of undernutrition in toddlers, with a p-value of 0.000 (p < 0.1). In conclusion, low levels of maternal nutritional knowledge and inadequate MP-ASI parenting practices are associated with undernutrition in toddlers aged 6-23 months. In contrast, maternal age at pregnancy, whether below 20 or above 35, does not show a significant relationship with toddler nutrition status in this study.

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INTRODUCTION

Toddlers are children under five years old who undergo rapid physical growth and social development, particularly during the first two years of life according Supardi et al (2023). This period is a critical phase because child growth and development begin in the prenatal stage. Proper nutrition during this phase plays a crucial role in ensuring optimal growth and development. Conversely, nutritional deficiencies can hinder growth and impair organ and system development, leading to long-term consequences for a child's quality of life (1).

Undernutrition in toddlers is a condition where a child has an anthropometric index that is not within the ideal range. According to the Ministry of Health standards, undernutrition is defined by a weight-for-length or weight-for-height index (WLH or WHH) between -3 and < -2 standard deviations for children aged 0-60 months. For children aged 6-59 months, undernutrition can also be assessed using mid-upper arm circumference (MUAC), ranging between 11.5-12.5 cm (2).

The 2022 Indonesia Nutrition Status Survey (SSGI) reported that the prevalence of undernutrition among toddlers in Indonesia reached 7.7%. The prevalence was higher in Central Sulawesi (11.3%) and Donggala Regency (12.6%) (Ministry of Health, 2023). In the working area of Ita Seseibi Sabang Community Health Center, Dampelas District, Donggala Regency, the prevalence of undernutrition among toddlers was recorded at 7.1%, or approximately 175 toddlers, as of June 2023 (3).

Interviews with 10 mothers of undernourished toddlers revealed that these mothers were between 18-28 years old. The majority had low levels of nutritional knowledge; they did not fully understand the concept of undernutrition or balanced nutrition for toddlers. Additionally, their complementary feeding (MP-ASI) practices were considered inadequate. These mothers tended to provide meals with limited dietary diversity, typically following a "three-star" meal pattern (carbohydrates, protein, and vegetables) and often on an irregular schedule. Most children received only one or two main meals per day and were more frequently given snacks rather than balanced main meals.

Several factors may influence the incidence of undernutrition in toddlers, including maternal age at pregnancy, maternal nutritional knowledge, and MP-ASI parenting practices. Young mothers who lack child-rearing experience are at a higher risk of having undernourished children compared to older, more experienced mothers. Mothers of an ideal reproductive age with greater experience are more likely to understand the nutritional needs of children at different developmental stages (4).

Maternal knowledge of nutrition is another crucial factor. Limited maternal knowledge about nutrition affects the accuracy of feeding practices, potentially leading to undernutrition (5). Additionally, improper parenting practices can impact a child's nutritional status, as parenting involves understanding the appropriate nutritional requirements, food choices, feeding management, environmental hygiene, and instilling healthy lifestyle values in children (6).

This study contributes to the understanding of factors influencing undernutrition in toddlers by highlighting the relationships between maternal age at pregnancy, maternal nutritional knowledge, and MP-ASI parenting practices. Unlike previous studies that generally focused on the relationship between parenting or maternal knowledge and child nutrition status, this research integrates three key factors—maternal age, nutritional knowledge, and MP-ASI parenting practices—to comprehensively examine their impact on toddler nutritional status within the 6-23 months age range.

METHODS

This study adopted a cross-sectional design with an analytical observational approach. The study population consisted of all mothers with toddlers aged 6-23 months in the Ita Seseibi Sabang Community Health Center's working area, located in Dampelas District, Donggala Regency, with a total of 732 mother-toddler pairs. From this population, 98 mother-toddler pairs were selected as the study sample for further analysis. The inclusion criteria for this study were mothers who could read and write, were willing to participate as respondents, and resided in villages accessible to the researchers. The exclusion criteria included mothers who were not permanent residents of Dampelas District and toddlers who were overweight or obese, to maintain focus on factors related to undernutrition. This study examined several variables. The independent variables included maternal age at pregnancy, maternal nutritional knowledge, and MP-ASI parenting practices. The dependent variable was the incidence of undernutrition in toddlers aged 6-23 months within the Ita Seseibi Sabang Community Health Center's working area.

This research was conducted in August 2023. Data collection utilized several instruments, including a questionnaire to gather information on maternal age, maternal nutritional knowledge, and MP-ASI parenting practices.

Additionally, microtoise/baby length boards and digital baby scales were used to measure toddler weight and height/length to determine nutritional status.

For data analysis, both univariate and bivariate analyses were performed. Bivariate analysis was conducted using the chi-square test with a significance level of $p < 0.1$, considering a maximum tolerable sampling error of 10%. This test aimed to determine the relationship between variables such as maternal age at pregnancy, maternal nutritional knowledge, and MP-ASI parenting practices with the incidence of undernutrition in toddlers aged 6-23 months.

RESULTS AND DISCUSSION

Univariate Analysis

a. Respondent Characteristics

Table 1. Respondent Characteristics

Respondent Characteristics	Frequency (f) (n=98)	Percentage (%)
Toddler Age		
6-8 months	19	19.4
9-11 months	27	27.6
12-23 months	52	53
Gender		
Female	51	52
Male	47	48
Birth Order		
First	37	38
Second	22	22
Third	25	26
Fourth	11	11
Fifth	1	1
Sixth	2	2
Maternal Age		
15-20 years	2	2
21-25 years	37	37.8
26-30 years	30	30.6
31-35 years	18	18.4
36-40 years	9	9.2
41-45 years	2	2
Education		
Elementary School (SD)	34	34.7
Junior High School (SMP)	21	21.4
Senior High School (SMA/SMK)	37	37.8
Diploma	2	2

Bachelor's Degree	4	4.1
Occupation		
Housewife	94	95.9
Private Employee	1	1
Entrepreneur	3	3.1

According to Table 1, most toddlers in this study were aged 12-23 months (52 children, 53%). The number of female toddlers was slightly higher (51 children, 52%) compared to male toddlers (47 children, 48%). The majority of toddlers were first-born children (38%), followed by third-born (26%) and second-born (22%).

Regarding maternal characteristics, most mothers were within the ideal reproductive age of 21-25 years (37.8%) and 26-30 years (30.6%). In terms of education, 37.8% of mothers had completed high school (SMA/SMK), while 34.7% had only completed elementary school (SD). Nearly all mothers in this study were housewives (95.9%), with only 1% working as private employees and 3.1% as entrepreneurs.

b. Study Variables

Table 2. Frequency Distribution of Study Variables

Variable	Frequency (f) (n=98)	Persentage (%)
Maternal Age at Pregnancy		
Age <20 years and >35 years	14	14.3
Age 20-35 years	84	85.7
Nutritional Knowledge		
High	54	55.1
Low	44	44.9
MP-ASI Parenting Practices		
Good	56	57.1
Poor	42	42.9
Nutritional Status		
Undernutrition	10	10.2
Good Nutrition	88	89.8

According to Table 2, most mothers (85.7%) were within the ideal reproductive age range (20-35 years). 55.1% of mothers had a high level of nutritional knowledge, whereas 44.9% had a low level. Additionally, 57.1% of mothers practiced good complementary feeding (MP-ASI) parenting, while 42.9% demonstrated poor MP-ASI practices. The majority of toddlers in this study had good nutritional status (89.8%), with only 10.2% classified as undernourished.

Bivariate Analysis

a. Maternal Age at Pregnancy

Table 3. Relationship between Maternal Age at Pregnancy and Incidence of Undernutrition in Toddlers

Maternal Age at Pregnancy	Nutritional Status						*P-value*
	Undernutrition		Good Nutrition		Total		
	F	%	*F*	%	*F*	%	
Age <20 years and >35 years	3	21.4%	11	78.6	14	100	0.152
Age 20-35 years	7	8.3	77	91.7	84	100	

The results in Table 3 indicate that among 14 mothers aged below 20 years or above 35 years, 3 toddlers (21.4%) were undernourished, while 11 toddlers (78.6%) had good nutritional status. Among 84 mothers within the ideal reproductive age range (20-35 years), 7 toddlers (8.3%) experienced undernutrition, whereas the majority, 77 toddlers (91.7%), had good nutritional status. The p-value of 0.152 suggests that the relationship between maternal age at pregnancy and toddler nutritional status is not statistically significant at a conventional significance level ($\alpha = 0.1$). Therefore, maternal age at pregnancy within the analyzed categories does not show a strong or significant association with toddler nutritional status.

b. Nutritional Knowledge

Table 4. Relationship between Maternal Nutritional Knowledge and Incidence of Undernutrition in Toddlers

Nutritional Knowledge	Nutritional Status						*P-value*
	Undernutrition		Good Nutrition		Total		
	F	%	*F*	%	*F*	%	
High	0	0	54	100	54	100	0.000
Low	10	22.7	34	77.3	44	100	

As shown in Table 4, all 54 mothers (100%) with high nutritional knowledge had toddlers with good nutritional status. There were no cases of undernutrition among toddlers whose mothers had a high level of nutritional knowledge. Conversely, among the 44 mothers with low nutritional knowledge, 10 toddlers (22.7%) experienced undernutrition, while 34 toddlers (77.3%) had good nutritional status. A p-value of 0.000 indicates a statistically significant relationship between maternal nutritional knowledge and toddler nutritional status. High maternal knowledge is associated with good nutritional outcomes in toddlers, while low maternal knowledge increases the risk of undernutrition.

c. MP-ASI Parenting Practices

Table 5. Relationship between MP-ASI Parenting Practices and Incidence of Undernutrition in Toddlers

MP-ASI Parenting Practices	Nutritional Status						*P-value*
	Undernutrition		Good Nutrition		Total		
	F	%	*F*	%	*F*	%	
Good	0	0	56	100	56	100	0.000
Poor	10	23.8	32	76.2	42	100	

The results in Table 5 indicate that all 56 mothers (100%) who implemented good MP-ASI parenting practices had toddlers with good nutritional status, and there were no cases of undernutrition in this group. In contrast, among the 42 mothers with poor MP-ASI parenting practices, 10 toddlers (23.8%) were undernourished, while 32 toddlers (76.2%) had good nutritional status. A p-value of 0.000 confirms that this relationship is statistically significant. In other words, there is a strong association between MP-ASI parenting practices and toddler nutritional status. Good parenting practices tend to correlate with good toddler nutritional status, while poor parenting practices are more frequently associated with undernutrition.

1. Relationship Between Maternal Age at Pregnancy and Incidence of Undernutrition in Toddlers

This study found that there was no significant relationship between maternal age at pregnancy and the incidence of undernutrition in toddlers aged 6-23 months in the working area of the Ita Seseibi Sabang Community Health Center. However, the study also identified some mothers aged 20-35 years who had undernourished toddlers. This may be due to a lack of experience among first-time mothers, as well as limited nutritional knowledge, which prevents them from fully understanding which foods are appropriate for infants and toddlers at different ages.

These findings are consistent with the study by Ersanya (2022) which found no significant relationship between maternal age and undernutrition in children. Maternal age during pregnancy can directly influence maternal reproductive health, which is important for achieving optimal genetic potential, particularly during the prenatal and postnatal periods. Although the ideal maternal age for pregnancy is 20-35 years, there are also mothers younger than 20 years who have toddlers with good nutritional status. This may be due to social support from family or the surrounding environment, which helps younger mothers in child care. Furthermore, maternal dedication to child-rearing, combined with adequate nutritional knowledge, is another key factor. Proper knowledge of nutrition allows mothers to provide appropriate nutritional intake and implement healthy feeding practices, which positively affect toddler nutritional status (7).

A similar study by Mutyofi (2021) also found no significant relationship between maternal age and the nutritional status of toddlers aged 12-24 months in Rejosopinggir Village. These results suggest that maternal attentiveness in caring for, nurturing, and raising children plays a more crucial role than maternal age alone. In addition, maternal attitudes and sufficient nutritional knowledge are essential in shaping toddler eating habits, which ultimately influence their nutritional status (8).

2. Relationship Between Nutritional Knowledge and Incidence of Undernutrition in Toddlers

This study identified a significant relationship between maternal nutritional knowledge and the incidence of undernutrition among toddlers aged 6-23 months in the Ita Seseibi Sabang Community Health Center area. These findings align with research by Yolanda (2021) which reported a significant relationship between maternal nutritional knowledge and toddler nutritional status in the Taba Lagan Health Center area, Semidan Lagan District, Central Bengkulu Regency. Yolanda emphasized that low maternal knowledge of nutrition is often due to limited participation in health education activities at community health centers (Puskesmas) or integrated health service posts (Posyandu). Programs such as complementary feeding (MP-ASI) education and nutrition counseling play a crucial role in helping mothers understand the importance of nutrition, food management, and essential nutrients such as carbohydrates, protein, vitamins, and minerals appropriate for their child's age. Higher levels of maternal education improve access to additional information through digital media, which can support increased nutritional knowledge. In many cases, housewives (IRT) are more engaged in child care, allowing them to focus on improving their child's nutrition (9).

A similar study by Suseno (2021) (10) also confirmed that maternal knowledge significantly influences toddler nutritional status. However, some mothers with low nutritional knowledge still had toddlers with good nutritional status. According to Glewwe (1999) (11), this may be due to prior parenting experience, where mothers rely on practical knowledge and social support from family members to ensure adequate nutrition for their children .

However, the study also revealed that some mothers with low levels of nutritional knowledge had toddlers with good nutritional status. This finding suggests that a toddler’s nutritional status is not solely influenced by maternal knowledge of nutrition but is also affected by various other factors, such as exclusive breastfeeding and maternal employment status. According Iqbal dan Suharmanto (2020), exclusive breastfeeding for the first six months of life can prevent both undernutrition and overnutrition, as breast milk provides essential nutrients required by infants. Mothers who are housewives generally have more time at home, allowing them to provide exclusive breastfeeding more freely to their children. Additionally, low levels of formal education, such as completing only elementary (SD) or junior high school (SMP), are associated with limited nutritional knowledge, which in turn affects the nutritional status of toddlers (12).

3. Relationship Between MP-ASI Parenting Practices and Incidence of Undernutrition in Toddlers

This study found a significant relationship between MP-ASI parenting practices and toddler undernutrition in the Ita Seseibi Sabang Community Health Center area. These findings are consistent with research by Apriani (2023) (13) which identified a significant relationship between maternal parenting practices and toddler nutritional status in Tegaljadi Village, Marga II Health Center, Tabanan. Additionally, a study by Casando (2022), demonstrated a relationship between parenting practices and the nutritional status of children aged 12-59 months at Paal Merah II Health Center, Jambi City (14).

Parental caregiving, particularly in complementary feeding (MP-ASI), plays a crucial role in supporting toddler nutritional status. Parenting involves responsibilities such as protecting, nurturing, educating, and providing appropriate food that meets the child's nutritional needs. Mothers play a central role in selecting, preparing, and serving food, ensuring that children receive nutritious and age-appropriate meals. Good parenting practices in MP-ASI include careful selection of nutritious foods, adjusting food textures according to a child's developmental stage, and maintaining hygiene during food preparation and serving (15).

Mothers who actively prepare meals and accompany their children during mealtime tend to support optimal nutritional fulfillment in their children. A mother's presence during meals allows for better supervision of the child's intake

and encourages the child to finish their food. When a child refuses to eat, the mother can persuade them or provide nutritious alternative foods to ensure that their nutritional needs are met (16). However, time constraints faced by mothers, especially those working outside the home, may reduce direct support in shaping the child's eating habits. Limited time can affect both the frequency and quality of meal provision, particularly if caregiving is delegated to other caregivers who may lack a deep understanding of the child's nutritional needs.

A study by Lubis (2024) also highlights that mothers with better nutritional knowledge tend to apply more structured and appropriate MP-ASI feeding practices. This knowledge enables them to understand the child's nutritional needs based on age and condition, thereby influencing the selection of appropriate food ingredients. Thus, even if overall parenting practices are categorized as poor, mothers with a basic understanding of child nutrition can still support good nutritional outcomes in their children through simple practices such as consistent mealtime monitoring and the provision of high-quality food (17).

Additionally, the study revealed that some mothers with poor MP-ASI parenting practices still had toddlers with good nutritional status. This may be due to the mother's greater attention to the child’s food intake, such as ensuring that meals are consumed completely. Some mothers also adopt feeding practices based on the child's needs or follow a structured meal schedule (morning, noon, and evening), which contributes to adequate nutritional fulfillment in their children.

CONCLUSION

The findings of this study indicate that low maternal nutritional knowledge and inadequate MP-ASI (complementary feeding) parenting practices are significantly associated with the incidence of undernutrition in toddlers aged 6-23 months. However, maternal age at pregnancy (below 20 years or above 35 years) was not significantly related to toddler undernutrition.

It is recommended that health practitioners at community health centers (Puskesmas) and integrated health service posts (Posyandu) enhance the intensity of education for mothers regarding appropriate MP-ASI parenting practices and the importance of adequate nutritional knowledge. Educational programs should include detailed information on age-appropriate complementary feeding, covering aspects such as portion size, food type, feeding frequency, and the importance of hygiene in food preparation. Additionally, health practitioners should provide practical guidance for mothers on identifying and overcoming daily feeding challenges, such as dealing with children who are reluctant to eat.

Future research should consider using a more detailed and specific questionnaire on MP-ASI parenting practices, covering aspects such as the appropriateness of complementary feeding based on the child’s age, portion sizes, total intake, and feeding frequency. Further studies are also encouraged to explore other relevant variables, including infectious diseases, dietary intake, exclusive breastfeeding, family income, and maternal education level, to provide a more comprehensive understanding of the factors influencing toddler nutritional status.

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