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Original Research

The Relationship between Type and Frequency of Complementary Feeding and Nutritional Status among Infants Aged 7–12 Months

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Abstract

Background: Nutritional status refers to the level of a person's nutritional condition which is categorized based on its type and severity, such as overweight, good nutrition, undernutrition, and malnutrition.
Objective: This study aims to determine the relationship between the type and frequency of complementary feeding of BREAST MILK (MP-ASI) and the nutritional status of infants aged 7–12 months in the working area of the Mangasa Health Center.
Methods: The research design used was observational with a cross-sectional approach.
Results: The results showed a significant relationship between the type of MP-ASI and the nutritional status of the baby (ρ = 0.037). Most of the babies given commercial MP-ASI had normal nutritional status (61.5%), while babies given locally made MP-ASI mostly showed abnormal nutritional status (78.6%).
Conclusion: It is recommended that health workers continue to improve education and counseling to mothers under five about the importance of providing proper MP-ASI, both in terms of type, frequency, and nutritional content. For mothers and families, it is expected to be more selective and active in choosing and preparing MP-ASI, by prioritizing aspects of nutritional adequacy and food safety. Local MP-ASI can still be a good choice if prepared with nutritious, clean, and suitable ingredients for the baby's needs.

Keywords: Frequency of complementary feeding for breastfeeding; nutritional status of babies; types of complementary foods for breastfeeding

Introduction

A baby's growth and development occur very rapidly during the first year of life, including the growth of brain tissue. Breast milk is the most ideal food for infants because it contains complete nutrients and immune protection. However, as babies grow older and their nutritional needs increase, breast milk alone is no longer sufficient. Therefore, infants require additional complementary foods (MP-ASI) to meet their increasing energy and nutrient requirements (Pujiastuti, 2013). Malnutrition among infants is often caused by inappropriate complementary feeding practices. Mothers' lack of knowledge about how to properly feed babies and young children, coupled with harmful cultural feeding traditions, contributes directly or indirectly to high rates of malnutrition, especially among children under two years of age (Ratna, 2011).

Malnutrition and stunting remain serious challenges in global public health, particularly among children under five years old. Based on global data in 2024, approximately 150.2 million children are stunted (23.2%), 42.8 million are wasted (6.6%), and 35.5 million are overweight. The regional distribution shows that 51% of all stunting cases occur in Asia, reflecting that the greatest burden is concentrated in this region (WHO, 2024). In South Asia, the joint report by UNICEF, WHO, and the World Bank (2023) showed that the prevalence of stunting declined from 48.1% in 2000 to 30.5% in 2022, although the rate remains high. The prevalence of wasting in the region was 14.3%. Some countries, such as India (31–32% stunting, 20% wasting), Pakistan (40.2% stunting, 17.7% wasting), and Afghanistan and Bangladesh, still have stunting rates above 30%. In Southeast Asia, the prevalence of stunting in 2022 was 26.4%, a decrease from 29% in 2015, while the prevalence of wasting remained 7.8%. Countries with the highest stunting prevalence in this region include Indonesia (45.1%), the Philippines (31%), and Timor-Leste (28.8%). At the national level, Indonesia continues to face a significant stunting problem. According to SSGI data, the national prevalence of stunting was 21.5% in 2023, which decreased to

19.8% in 2024. Although this trend indicates improvement, the prevalence remains above the WHO maximum threshold of 20%.

Specifically in South Sulawesi, SSGI (2023) reported a stunting prevalence of 27.4%, placing it among the ten provinces with the highest rates in Indonesia. The provincial government has implemented several interventions, including the First 1,000 Days of Life program, provision of supplementary foods, and community-based nutrition education. At the city level, Makassar recorded a stunting rate of 25.6% in 2023, an increase from 18.04% in the previous year. However, monitoring from August 2023 to February 2024 showed a decline to 18.0%, with 17 villages achieving zero stunting status. This fluctuation indicates that local interventions have produced positive impacts but still require strengthened strategies, particularly in monitoring child growth and development, providing nutrition counseling, and improving the quality of primary health services at the community level.

Given these data, addressing stunting and malnutrition, especially in South Sulawesi and Makassar City, remains crucial. Sustained, evidence-based, and community-targeted interventions are needed to further reduce stunting prevalence and enhance the overall quality of child growth and development.

Methods

Study Design

This study employed an observational research method with a cross-sectional design. The purpose of this design was to identify the relationship between independent variables (type and frequency of complementary feeding) and the dependent variable (nutritional status) at a single point in time. This approach allows simultaneous analysis of variables and facilitates the identification of associations between feeding practices and infant nutritional outcomes.

Samples

The study population consisted of 40 infants aged 7–12 months, and the total sample included 40 respondents selected using a purposive sampling technique. The inclusion criteria were infants aged 7–12 months who had received complementary feeding (MP-ASI) and whose mothers were willing to participate and provide informed consent. Exclusion criteria included infants with congenital disorders or chronic illnesses that could affect growth and nutritional status.

Instruments

The research instrument used was a structured questionnaire specifically designed to collect data on the type and frequency of complementary feeding (MP-ASI) and the nutritional status of infants aged 7–12 months. The questionnaire contained several parts, including respondent demographic data, type of MP-ASI provided, feeding frequency, and indicators of infant nutritional status based on standard growth criteria. The questionnaire was tested for validity and reliability prior to data collection to ensure that all items accurately measured the intended variables and that the data obtained were both valid and reliable.

Data Collection

Data collection was conducted using an observational method with a cross-sectional approach. The population consisted of all infants aged 7–12 months receiving MP-ASI in the working area of the Mangasa Health Center. A total of 40 respondents were selected through purposive sampling. Primary data were collected through direct interviews with the infants' mothers using the validated questionnaire. To ensure data accuracy, trained enumerators conducted interviews and recorded responses under supervision.

Data Analysis

After the data is collected, the analysis is carried out using the Statistical Product and Service Solutions (SPSS) program. After data collection, analysis was carried out using the SPSS program. Data were presented in frequency distribution tables to illustrate the relationship between the type and frequency of complementary feeding and the nutritional status of infants. Univariate analysis was used to describe respondent characteristics, while bivariate analysis using the Chi-Square test was employed to examine the relationship between independent and dependent variables. A significance level of $p < 0.05$ was used to determine statistical significance.

Ethical Considerations

In this study, ethical considerations are highly upheld. Prior to data collection, written permission was obtained from the local health authorities. All participants received clear explanations regarding the study objectives and procedures, and written informed consent was obtained from each mother. The principles of confidentiality, voluntariness, and respect for participants' rights were strictly upheld throughout the study.

Results

Table 1 shows that of the 40 babies who were given Commercial Type MP-Breastfeeding, 26 people (61.5%) and 16 people with normal nutritional status, and 10 people with abnormal nutritional status, (38.5%), while of the 40 babies who received locally made MP-ASI as many as 14 people, and those with normal nutritional status 3 people (21.4%) and those with abnormal nutritional status as many as 11 people (78.6%).

The results of the Chi Square Test analysis were obtained ρ (0.037) < α (0.05), then it was concluded that the Zero (Ho) Hypothesis was rejected and the Alternative Hypothesis (Ha) was accepted, namely that there is a relationship between the type of MP-ASI given and the nutritional status of the baby.

Table 1 The Relationship Between MP-Breast Milk Feeding and Saatatus
Infant nutrition in the Mangasa Health Center Working Area of Makassar City

Type of MP-ASI	Nutritional Status of Babies				Sum		α = 0,05
	Usual		Abnormal				
	n	%	n	%	n	%	
Commercial (Industrial/Commercial products)	16	61,5%	10	38,5%	26	100,0	ρ= 0,037
Local (Household Produced)	3	21,4%	11	78,6%	14	100,0	
sum	19	47,5%	21	52,5%	40	100,0	

Source: Primary Data 2025

Table 2 shows that of the 40 babies who were given MP-ASI with the appropriate frequency, 23 people and 15 people with normal nutritional status (65.2%), and 8 people with abnormal nutritional status (34.8%). Meanwhile, of the 40 babies who were given MP-ASI with inappropriate frequency, 17 people were given the wrong frequency, and 4 people with normal nutritional status (23.5%), and 13 people (76.5%) had abnormal nutritional status.

The results of the Chi Square Tests analysis were obtained ρ (0.022) < α (0.05), then it was concluded that the Zero (Ho) Hypothesis was rejected and the Alternative Hypothesis (Ha) was accepted, namely that there was a relationship between the frequency of MP-Breast Milk administration and the nutritional status of the baby.

Table 2 The Relationship Between the Frequency of MP-ASI Feeding and Status
infant nutrition in the Mangasa Health Center Working Area, Makassar City

Frequency of MP-ASI Feeding	Nutritional Status of Babies				Sum		α = 0,05
	Usual		Abnormal				
	n	%	n	%	n	%	
Appropriate	15	65,2%	8	34,8%	23	100,0%	ρ= 0,022
Inappropriate	4	23,5%	13	76,5%	17	100,0%	
sum	19	47,5%	21	52,5%	40	100,0%	

Source: Primary Data 2025

Discussion

Complementary foods for Breast Milk (MP-ASI) are foods for babies/children aged 7-24 months to meet nutritional needs in addition to breast milk. The quality and amount of food consumed by children during the period of MP-ASI administration have an important meaning to meet the nutritional needs of children who continue to increase which will greatly determine the level of health and nutritional status of the child in the future. Based on the results of the interview, it is known that the parents of babies in the Mangasa Health Center Work Area generally work as daily hunters. As is known that farmers' income is highly dependent on daily income, so this can affect the fulfillment of family needs, including in meeting the nutritional needs of their children. However, this problem has been solved by distributing free MP-ASI to every baby and toddler who has a low body weight. Complementary Breastfeeding (MP-ASI) is a crucial stage in meeting the nutritional needs of babies aged 6-12 months. WHO recommends appropriate feeding of MP-breastfeeding starting at 6 months of age, with a frequency of 2-3 times per day at the age of 6-8 months, increasing to 3-4 times per day at 9-11 months, and 4-5 times per day plus 1-2 interludes at 12-24 months along with breastfeeding that is continued for up to two years to support optimal growth.

In general, MP-ASI is divided into commercial MP-ASI (industrial/commercial products) and local MP-ASI (household products). The WHO study states that the quality of commercial MP-Breast Milk varies, and when it replaces breast milk with foods of low nutritional quality, it can interfere with the nutritional intake of babies. On the other hand, local processing (household products) is often fresher and in accordance with cultural preferences, but can be deficient in micronutrients such as iron, zinc, and calcium if not fortified. Research in Malawi (2021) shows that proper feeding of MP-breastfeeding, especially local nutritious foods with diversity and frequency according to standards, is significantly correlated with a reduction in stunting rates (OR = 0.7; 95% CI: 0.4–0.95) and shows a trend of decreasing wasting and underweight. A study in Indonesia (Semarang) also noted that babies who received the recommended variation and frequency of MP-breastfeeding had a lower risk of malnutrition

Locally, a study in Cilowong (Banten, 2023) found a strong relationship between the type of MP-ASI (timely introduction, texture, portion, frequency, and type of MP-ASI) and the incidence of stunting ($p < 0.001$). This emphasizes that the processing and presentation of MP-ASI, both commercial and local, that meets nutrition, diversity, and frequency standards, is an important key in efforts to prevent stunting and wasting at an early age. The Relationship between MP-ASI Types and Nutritional Status. The results showed that of the 26 babies who were given MP-ASI in instant form, as many as 16 babies (61.5%) had normal nutritional status, while 10 babies (38.5%) had abnormal nutritional status. Meanwhile, of the 14 babies who were given MP-ASI in the form of household preparation, only 3 babies (21.4%) had normal nutritional status, and 11 babies (78.6%) had abnormal nutritional status. Based on the results of the Chi-Square test, a significance value of $\rho = 0.037$ was obtained, which is smaller than $\alpha = 0.05$. Thus, it can be concluded that there is a significant relationship between the type of MP-ASI given and the nutritional status of infants aged 7–12 months. The results showed that out of a total of 40 baby respondents, as many as 26 babies received MP-ASI in commercial form (industrial/commercial products) and 14 babies received local MP-ASI (household products). Of the 26 infants who consumed commercial MP-ASI, 16 infants (61.5%) had normal nutritional status, while 10 infants (38.5%) had abnormal nutritional status. Meanwhile, of the 14 babies given by local MP-ASI, only 3 babies (21.4%) had normal nutritional status, and 11 babies (78.6%) showed abnormal nutritional status. Statistical tests using Chi-Square showed a significance value (ρ) of 0.037, which is smaller than the significance level (α) of 0.05. These results show that there is a significant relationship between the type of MP-ASI given and the nutritional status of infants aged 7–12 months in the working area of the Mangasa Health Center. Theoretically, commercial MP-Breast Milk on the market has been fortified and has nutritional content designed in accordance with international nutritional adequacy standards, as set by the Codex Alimentarius (FAO/WHO). The adequate content of nutrients such as energy, protein, iron, zinc, and vitamin A in commercial MP-ASI allows babies to achieve better nutritional status, especially if consumed regularly and in accordance with the dosage (Pujiadi, 1996; WHO, 2021).

In addition, in the work area of the Mangasa Health Center, many commercial MP-ASI are given free of charge to low-weight babies through government programs. This also supports the improvement of nutritional status in the infant group. These findings are consistent with the results of Heniwahyuni (2002) research in Rappojawa Village which showed that the majority of children who consume commercial MP-ASI have normal nutritional status. On the other hand, local MP-ASI made at the household level tends to have lower nutritional quality if not made with sufficient knowledge and skills. Several national studies show that local MP-ASI in Indonesia is still low in nutrient content, especially micronutrients, and often does not meet the principles of diversity and energy density (Thaha et al., 1998; UNICEF Indonesia, 2023). This problem is further exacerbated by the high incidence of infectious diseases such as ISPA and diarrhea which worsens the nutritional status of children. Nevertheless, local MP-ASI has advantages in terms of social and empowerment, such as improving maternal cooking skills, strengthening the role of Posyandu and PKK, and encouraging family participation in fulfilling child nutrition (Ministry of Health of the Republic of Indonesia, 2022). Therefore, the effectiveness of local MP-ASI feeding is highly dependent on the mother's knowledge, cooking skills, and access to information on the composition of balanced nutritious foods.

Theoretically, the frequency of MP-breastfeeding is an important aspect in determining the baby's daily energy and nutritional adequacy. WHO (2021) recommends that infants aged 6–8 months be given MP-ASI 2–3 times a day, and increase to 3–4 times at 9–11 months of age, plus 1–2 intermittent meals if possible. Frequency mismatches can lead to energy and nutrient deficits, thus impacting children's growth and development, including an increased risk of stunting and wasting (WHO, 2021).

Based on the results of this study and previous findings, it can be concluded that the more in accordance with the frequency of MP-ASI administration with nutritional recommendations, the better the likelihood of the child having a normal nutritional status. Therefore, education to mothers under five about the schedule and amount of MP-ASI is very important in efforts to prevent malnutrition in babies.

Conclusion

There was a significant relationship between the type of MP-ASI and the nutritional status of the infant (ρ = 0.037). Most of the babies given commercial MP-ASI had normal nutritional status (61.5%), while babies given locally made MP-ASI mostly showed abnormal nutritional status (78.6%). This can be caused by the nutritional content of packaged MP-ASI that has been fortified and adjusted to international standards, and is more controlled in its nutritional content than local MP-ASI whose nutritional quality is highly dependent on the mother's skills and knowledge. For future researchers, it is hoped that they can further research other factors that can affect the nutritional status of infants, such as parenting, environmental sanitation, and the incidence of infectious diseases that contribute to the nutritional status of early childhood.

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