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Article

The Relationship Between Early Introduction of Complementary Feeding and Nutritional Status in Children Aged 6-24 Months

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ABSTRACT

To ensure optimal growth and development in children, the provision of complementary feeding (MP-ASI) needs to consider several important factors such as nutritional content, appropriate timing, frequency, portion size, and method of delivery. This is crucial because the first two years of life are a period of rapid growth and development in children, requiring adequate nutritional intake. This study aim to examine the relationship between early introduction of MP-ASI and nutritional status among children aged 6-24 months in Banyuraden Subdistrict. This study using an observational analytical method with a Cross-Sectional approach. This study employed a purposive sampling technique to select participants, resulting in a sample of 125 children aged 6-24 months. The inclusion criteria were: (1) children whose mothers were willing to participate as respondents in the study, (2) children aged 6–24 months, (3) children who were given early complementary feeding (MP-ASI) and those who were not, and (4) children whose mothers were literate. The exclusion criteria included: (1) children with congenital Hirschsprung's disease, (2) children with congenital duodenal atresia, and (3) children with congenital achalasia. The research findings revealed that the majority of respondents (61.6%) did not introduce early complementary feeding (MP-ASI) to their children. Additionally, 60% of respondents demonstrated good nutritional status. Statistical analysis using SPSS 26 with chi-square testing indicated a significant relationship between early introduction of MP-ASI and nutritional status, with a p-value of 0.001 ($p < 0.05$). These results suggest that the timing of MP-ASI introduction is associated with the nutritional status of children.

Keywords: Todler; Complementary Feeding; Nutritional Status

INTRODUCTION

A major change will be initiated by the children of this era, in the times to come. Children have a characteristic of growing and developing from the time of conception until the end of adolescence. The term 'Golden Age' is commonly used to describe the phase where a child's growth will rapidly increase during the first two years of life[1]. During this period, adequate nutrition is necessary to optimize a child's growth and development. According to the Ministry of Health Regulation No. 41 of 2014 on Balanced Nutrition Guidelines, it is stated that infants under 6

months receive sufficient nutrition solely from breastfeeding (breast milk). After the child reaches 6 months of age, complementary feeding (MP-ASI) can begin, as breast milk alone is no longer enough to meet their nutritional needs. Therefore, complementary feeding (MP-ASI) with nutritional value is needed as a supplement to breast milk. Providing MP-ASI means offering food and beverages containing essential nutrients to meet the child's nutritional needs from 6 to 24 months. By providing MP-ASI, a child's nutritional needs can be optimally fulfilled[2].

According to the World Health Organization (WHO), malnutrition is linked to 45% of child deaths[3]. In Indonesia, the nutritional status rate has not significantly improved, and millions of children are still at risk from high rates of stunting, wasting, and malnutrition issues[4]. There are several guidelines for good MP-ASI, they are containing complete nutrition, the right timing for feeding, the frequency of feeding, portion size, and proper methods of feeding. The MP-ASI menu should be varied, starting from liquid porridge to thicker porridge, fruit juice, fresh fruit, soft food, and finally solid food[5].

MP-ASI should also be given at the appropriate time when the child turns 6 months old. If MP-ASI is introduced too early, before 6 months, it can replace breast milk, making it difficult to meet the child's nutritional needs, reducing the protective factors obtained from breast milk, and increasing the risk of allergies[6]. Additionally, at this age, the baby's digestive system is not fully mature, and the digestive enzymes in the baby's body are not complete. Therefore, giving MP-ASI can be difficult for babies to digest, potentially causing digestive problems and other reactions[5].

According to a study by WHO in 2017, only 44% of infants under 6 months received exclusive breastfeeding between 2015 and 2020. This indicates that 56% of infants received something other than breast milk before 6 months[7]. A study by the Indonesian Demographic and Health Survey (SDKI) in 2017 also showed that 29% of Indonesian children received food other than breast milk on the third day after birth[2].

From 6 months onwards, many babies experience malnutrition due to the transition from exclusive breastfeeding to MP-ASI. It is important for fathers and mothers to have a better understanding and a more active role in understanding the types of food, ingredients used, and food preparation methods to be given during this transition period[5]. In a study by Melawati[5], a Mann Whitney test resulted in a P value of 0.0003, indicating a significant difference between the nutritional status of babies who were given early MP-ASI and those who were given delayed MP-ASI.

The prevalence of poor nutritional status in 2018, based on weight-for-age (BB/U), in Indonesia for children aged 0-23 months was 3.8%, while undernutrition was 11.4%[8]. In the

Special Region of Yogyakarta (DIY), the prevalence of children with energy protein deficiency (malnutrition and undernutrition) in 2018 was 7.94%, which increased to 8.35% in 2019. Nearly all areas in DIY experienced an increase in the prevalence of energy protein deficiency, including Sleman, which rose from 7.84% in 2018 to 8.17% in 2019[9]. Furthermore, Preliminary study's data of the Gamping II Health Center stated that the prevalence of poor nutritional status also increased from 7.42% in 2020 to 8.08% in 2021.

METHODS

This study employed a quantitative, observational, analytical design with a cross-sectional approach. The study population consisted of mothers with children aged 6-24 months residing in Banyuraden Village, Gamping District, Sleman. Sampling was conducted using the purposive sampling technique, which is based on the researcher's considerations regarding characteristics or attributes of the population that were previously identified resulting in a final sample of 125 subjects. The inclusion criteria were: (1) children whose mothers were willing to participate as respondents in the study, (2) children aged 6–24 months, (3) children who were given early complementary feeding (MP-ASI) and those who were not, and (4) children whose mothers were literate. The exclusion criteria included: (1) children with congenital Hirschsprung's disease, (2) children with congenital duodenal atresia, and (3) children with congenital achalasia.

The primary variables in this study were the timing of complementary feeding (MP-ASI) as the independent variable, and the nutritional status of children aged 6-24 months as the dependent variable. Data were collected using a structured questionnaire that included informed consent, respondent identification, demographic characteristics, and a question regarding whether the respondent introduced MP-ASI before the child reached 6 months of age, with response options of (yes) or (no). The measurement instruments used in this study were a weighing scale and an infantometer used to measure the length of a baby or infant to assess the children's nutritional status.

RESULTS

Of 125 children aged 6-24 months who became research respondents, 38.4% were given early complementary foods. In table 1, it is known that the age of most respondents includes early adulthood (26-35 years) with a sample of 83 respondents (66.4%). Most of the mothers of the respondents of this study had a college education level as many as 61 people (48.8%). The majority of mothers in this study were housewives, with a total of 89 (71.2%). Based on table 1, it can be seen that most mothers gave birth vaginally as many as 84 mothers, two of them (1.6%) were born

with LBW (low birth weight). Whereas for mothers who were born with sectio caesarea (SC) as many as 41 mothers, most of them were born prematurely as many as 1 child (0.8%) and born with LBW as many as 1 child (0.8%).

***Table 1**. Characteristics of Respondents*

Characteristics of Respondents	***Frequency (F)***	***Presentage (%)***
Complemetary feeding <6 Months		
Yes	48	38.4
No	77	61.6
Mother's Age		
17-25 Years	26	20.8
26-35 Years	83	66.4
36-45 Years	15	12
46-55 Years	1	0.8
Education Level		
SD	5	4.0
SMP	7	5.6
HIGH SCHOOL	36	28.8
SMK	16	12.8
Higher Education	61	48.8
Mother's Job		
Work	36	28.8
Housewife	89	71.2
Birth History		
Vaginal	82	65.6
Vaginal & LBW	2	1.6
Sectio Caesarea	39	32.8
Sectio Caesarea & Premature	1	0.8
Sectio Caesarea & LBW	1	0.8
Nutrition Status		
Good Nutrition	75	60
Malnutrition	1	0.8
Undernourished	18	14.4
Risk of Overnutrition	24	19.2
More Nutrition	3	2.4
Obesity	4	3.2

***Table 2.** Cross-tabulation between early complementary feeding and nutritional status of children aged 6-24 months in Banyuraden Village, Sleman Regency.*

No	***Early complementary feeding***	***Nutrition Status***				***Total***		***P value***
		Not good		***Good***				
		f	***%***	***f***	***%***	***f***	***%***	
1	Yes	28	22.4	20	16	48	38.4	0.001
2	No	22	17.6	55	44	77	61.6	
Total	50	40	75	60	125	100		

Table 2 shows that, among the 48 children who received early complementary feeding, 28 children (22.4%) had poor nutritional status, while 20 children (16.0%) had good nutritional

status. Conversely, among the 77 children who did not receive early complementary feeding, 22 children (17.6%) had poor nutritional status, whereas 55 children (44.0%) had good nutritional status. Overall, 50 children (40.0%) were categorized as having poor nutritional status and 75 children (60.0%) as having good nutritional status. Statistical analysis demonstrated a significant association between early complementary feeding and nutritional status ($p < 0.05$).

DISCUSSION

Complementary feeding (MP-ASI) is additional food provided to infants besides breast milk when breast milk alone is no longer sufficient to meet their nutritional needs. The purpose of MP-ASI is to fulfill the infant's nutritional and dietary requirements while also training their ability to chew, swallow, and adapt to various tastes and textures of food[10].

The early introduction of MP-ASI can be influenced by several factors, including maternal age, knowledge, occupation, and education. Based on Table 1, the age range with the highest occurrence is 26-35 years, which falls within early adulthood. According to Scheibe at al, emotions, thought processes, and behavior are influenced by age, with older individuals demonstrating greater emotional stability compared to younger ones. Mothers of older age tend to be more prudent in deciding what is best for their children, especially in feeding practices [11].

Table 1 shows that most mothers in this study have a higher education level, with 61 participants (48.8%) having completed tertiary education. A study by Wulandari (2018), Aini, and Sari found that mothers with higher education levels are less likely to introduce early MP-ASI compared to those with lower education levels [12]. According to Notoatmodjo (2010), education plays an essential role in enhancing cognitive abilities. Consequently, individuals with higher education levels tend to make better, more rational decisions and are generally more open to new information and changes compared to individuals with lower education levels [13].

Table 1 reveals that the majority of mothers in this study are housewives, totaling 89 participants (71.2%). According to Heryanto (2017), fewer housewives introduce early MP-ASI compared to working mothers [1]. Nugraheni (2016) found that maternal occupation can reduce the likelihood of exclusive breastfeeding [14]. However, Oktova (2017) stated that both working and non-working mothers have an influence on the early introduction of MP-ASI. Housewives, who tend to spend most of their time at home, may have limited access to external health information, while working mothers are more likely to introduce MP-ASI during maternity leave. These mothers may also give formula milk to familiarize their infants with it, making the transition smoother when they return to work [15].

Table 1 also shows that most mothers gave birth vaginally, with 84 participants recorded, and 2 of them (1.6%) having infants with low birth weight (LBW). Meanwhile, 41 mothers gave birth via cesarean section (CS), with a small number of premature births (1 child, 0.8%) and LBW (1 child, 0.8%). Mothers who opted for cesarean delivery had various reasons, including premature rupture of membranes, obstructed labor, a history of prior cesarean deliveries, multiple pregnancies, preeclampsia, weak fetal heart rate, and large fetal size. According to Aprina (2016), factors such as severe preeclampsia, placenta previa, obstructed labor, and abnormal fetal position influence the decision to deliver via cesarean section [16].

Nutritional status is the result of a balance between the body's nutritional needs for metabolism and the nutrients consumed[17]. Food consumption and nutrient utilization in the body directly impact a child's nutritional status. Additionally, factors such as supplementary feeding programs, income levels, healthcare, and parenting styles also influence nutritional status[18]. Table 2 shows that out of 77 children given MP-ASI, most (55 children or 44%) have good nutritional status. Conversely, children introduced to MP-ASI early mostly have poor nutritional status (28 children or 22.4%). This finding aligns with Paramashanti (2020) who found that children not introduced to early MP-ASI have better nutritional status compared to those given MP-ASI before six months of age [19].

This study found that most respondents had children with good nutritional status, and the majority of them did not introduce early MP-ASI. Chi-square analysis yielded a p-value of 0.001, which is less than the significance level of 0.05 ($\alpha = 0.05$). Therefore, there is a significant relationship between the timing of MP-ASI introduction and nutritional status. Early introduction of complementary feeding, defined as providing foods other than breastmilk or formula before six months of age, is associated with various nutritional disorders. The mechanisms include the immaturity of the infant's digestive system, leading to inadequate digestion and absorption of nutrients. Early feeding can displace breastfeeding, reducing the intake of essential nutrients and protective antibodies provided by breastmilk. It may also cause nutritional imbalances, such as insufficient caloric and micronutrient intake or excessive consumption of energy-dense but nutrient-poor foods, increasing the risk of malnutrition, obesity, or micronutrient deficiencies[10,20].

Additionally, premature exposure to complementary foods heightens the risk of food allergies and disrupts the gut microbiome. Poor hygiene practices associated with early feeding can introduce pathogens, resulting in infections and gastrointestinal diseases that exacerbate malnutrition. These factors can have long-term consequences, including stunting, obesity, and developmental delays. Exclusive breastfeeding for the first six months remains essential to ensure

optimal growth and development while mitigating these risks[21].

These findings are consistent with previous research on the relationship between complementary feeding and the nutritional status of children aged 6-24 months in the Telaga Biru Health Center area, which also concluded a significant relationship between early MP-ASI introduction and nutritional status[22]. Therefore, this study highlights the importance of introducing MP-ASI at the appropriate time, according to the infant's readiness, to ensure optimal growth and good nutritional status.

CONCLUSION

Out of a total sample of 155 children, 77 children (61.6%) received complementary feeding (MP-ASI) at an early age, while 48 infants (38.4%) did not. Furthermore, 75 children (60%) were found to have good nutritional status, while 50 children (40%) had poor nutritional status. The analysis results of this study indicate a significant relationship between early introduction of complementary feeding and the nutritional status of infants aged 6-24 months in Banyuraden Village, Sleman Regency.

ETHICAL APPROVAL

The study obtained ethical approval with approval number 012302016 from Research Ethics Committee, Universitas Ahmad Dahlan

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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