ORIGINAL ARTICLE

The Relationship Between Energy Intake and Fat Intake With Fine Motor Skill in Infants Aged 6-11 Months

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ABSTRACT

Introduction: Nutritional intake is the need of children who play a role in the process of growth and development, especially brain growth. One of the growth and development of children that is very influential with controlling body movements is the development of fine motor skills. Some of the nutrients that play a role in motor development are energy nutrients and fat nutrients. The purpose of this study was to determine the relationship between energy and fat intake and fine motor development in infants aged 6-11 months. **Methods:** This study used a cross-sectional design with a sample size of 284 infants aged 6-11 months. The research was conducted in Kulonprogo Regency. The data collection method for energy intake and fat intake was obtained through direct interviews using a 24-hour recall form, data on fine motor development based on the results of the pre-screening development questionnaire (PSDQ). Data were tested using the Chi-Square test. The level of significance used in this statistical test is 0.05. **Results:** There is a significant relationship between energy intake and fine motor development in infants aged 6-11 months (p value = 0.035). However, there was no association between fat intake and fine motor development in infants aged 6-11 months (p value = 0.844). **Conclusions:** There is a relationship between energy intake and fine motor development in infants aged 6-11 months, but there is no significant relationship with fat intake.

Keywords: Energy Intake, Fat Intake, Fine Motor Development

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INTRODUCTION

Pregnant women, nursing mothers, newborns and toddlers are the target groups for improving the quality of human life for the first 1000 days. At the age of 0-24 months is a period of growth and development that can take place naturally and cannot carry out activities independently. One of its developments is motor development (1). Motor development is the maturity development of elements that control body movements which are closely related to the development of motor centers in the brain and nerves and muscles. Every movement, no matter how simple it is, is the result of a complex pattern of relationships between the various parts of the system in the body controlled by the brain (2). Motor development consists of gross motor development and fine motor development. Gross motor skills are related to children's movement skills to use large muscles when running, jumping, kicking a ball, while fine motor skills are related to handwriting skills, the ability to draw lines, arrange cubes, make circles using fine muscles (3). There are 50% cases of delayed motor development in Asia, 30% in Africa, and 20% in children in Latin America. The results of research on motor development of children under five explain that motor development delays occur as much as 49% due to a lack of maternal knowledge and occur in developing countries (4). More than a third of children under five (70 million) out of 200 million children under five in developing countries are not well developed (5). Toddlers in Indonesia, 0.4 million (16%) have impaired fine motor development (6). The ability of children to be able to develop their motor nerve abilities through the provision of balanced nutritional intake. Provision

of nutritional intake which plays a very important role in the development of children starting from the fetus in the womb, toddlers, school age children, adolescents and even adults (7). Children who are malnourished will have an impact on growth limitations, susceptibility to infections, skin inflammation and in the end can hinder the development of children both cognitive, motoric, language, and skills compared to children who have good nutritional status (8). Various studies have shown that deficiencies of several nutrients have a negative impact on the process of brain growth. Children need energy and protein per kilogram of body weight more than adults, because children are still growing and developing (9). In addition, the nutrients consumed must be balanced. This means that the proportions of protein, hydrated charcoal, and fat are 10-20%, 50-60% and 20-30% of the calories needed, respectively. The completeness of nutrients in food is an absolute matter with an amount in accordance with the nutritional adequacy figure (10). In addition, Kartika's research results show that there are differences in motor growth rates in children who are given high energy and micro substance supplementation, it was found that 66.7% of children experienced slow gross motor skills due to insufficient energy intake, and 80% of children experienced insufficient intake. protein so that their gross motor skills are impaired. Therefore, good nutritional intake will support children's growth and development, because nutrients play an important role in children's development, especially children's gross motoric development (11). However, until now there has been no research on the relationship between energy intake and fat intake with fine motor development in infants aged 6-11 months. So from the above background, it is necessary to study the relationship between energy intake and fat intake with fine motor development in infants 6-11 months.

MATERIALS AND METHODS

This study has received approval from the Health Research Ethics Commission of Sebelas Maret University No.356 / UN27.06 / KEPK / EC / 2019. This type of research is observational with a cross sectional research design. The sampling method used was purposive sampling method which was conducted in November 2019 - January 2020. The population used was infants aged 6-11 months who were registered at Puskesmas Kulon Progo with a sample size of 284 babies and had agreed to take samples. approval that has been given. previous. The variables used in this study were energy and fat intake as independent variables and fine motor development as the dependent variable. How to determine normal or not fine motor development based on indicators. The indicator used is the PSDQ Form according to age, this form contains 2-4 questions about the developmental abilities that the child has achieved and the target for infants aged 6-11 months (9). The way to use PSDQ is to determine the age of the child by asking the date of the month and year of birth of the child, if the child's age is over 16 days then round it to 1 month. Furthermore, the mother gave the questions contained in the questionnaire and the mother gave orders to her child to do the movements contained in the questionnaire. Explain to parents not to hesitate to answer and make sure the mother understands the questions given. Ask the questions in order, and make sure the mother answers each question. The stages of fine motor development are according to age, namely 6-9 months of age; babies are able to move objects from one hand to another, pick up two objects, each hand holds one object at the same time, pick up pea-sized objects by spooning. The stages of fine motor development at 9-11 months of age are: inserting objects into the mouth and holding a pencil firmly. Data collection of energy and fat intake was carried out by in-depth interview technique using a 24-hour recall form which was carried out twice on non-consecutive days. Energy and fat intake data consumed daily were analyzed using Nutrisurvey software, expressed in grams, then compared with Recommended Dietary Allowances (RDA), and expressed as a percentage. The levels of energy intake and infant fat in this study were categorized into two groups; ie inadequate (<80%), and adequate (80-110%). Univariate analysis was performed to describe the frequency of each variable including energy intake, fat intake and fine motor development in infants 6-11 months. Energy and fat intake data with fine motor development will be processed using Ms. Excel 2010. After all data was collected then analyzed using SPSS version 23. All data will be analyzed using SPSS 23 with Chi-square test with significant p = 0.05.

RESULTS

Subject's Characteristic

Subject characteristics are shown in Table I. This study found that the largest gender was male as much as 50.7%. The majority of babies aged 8 months were 19.7%. The majority of the baby's energy intake is good and the baby's fat intake is good. Fine motor development in infants is 10.2% late.

Table II shows that out of 284 infants, 17 (7.8%) had good energy intake but experienced fine motor development in infants aged 6-11 months. Of the 284 infants, 12 (10.6%) experienced a decrease in fat intake and experienced impaired fine motor development in infants aged 6-11 months.

Table I : Subject's Characteristic

Subject's Characteristic	n (%)
Gender	
Male	144 (50.7)
Female	140 (49.3)
Age (Month)	
6	48 (16.9)
7	55 (19.4)
8	56 (19.7)
9	35 (12.3)
10	43 (15.1)
11	47 (16.5)
Energy Intake	
Inadequate	67 (23.6)
Adequate	217 (76.4
Fat Intake	
Inadequate	171 (60.2)
Adequate	113 (39.8)
Fine motor development	
Normal	299 (89.8)
Abnormal	29 (10.2)

children (2). The theory put forward by Prado et al states that energy plays a role in brain development, such as the formation and growth of axons and dendrites, the formation of synapses, and the overall phase of myelination. If the body lacks energy, the process of developing the central nervous system will be disrupted so that impulses or stimuli to perform motor movements will be problematic (12). The results of Susanty et al's research stated that energy can affect a chemical in the brain which is often called a neurotransmitter which is in charge of delivering impulses from one nerve to another, resulting in motor movement (13). The P value obtained exceeds the p value of 0.05, which is the P value amounting to 0.844, which means there is no significant relationship between fat intake and fine motor development in infants aged 6-11 months. In line with the research conducted by Hasyuti, the P value was 0.412 greater than the P value of 0.05 between fat intake and status. gross motor development. This is because at this age the adjustment is to adult food, so that food intake is often insufficient, then appetite tends to decrease so that many children do not get enough fat intake (14). Another possibility that occurs is because children are deficient fat will not always have delays due to motor development. The picture of children's fat intake does not describe in detail

Table II : The Relationship Of Energy Intake And Fat Intake With Fine Motor Skill In Infants Aged 6-11 Months

	Fine Motor Skill		Total	OR	CI95%	p
	Normal	Abnormal				
Energy intake						
- Adequate	200 (89.8%)	17 (7.8%)	100%	0.390	0.176-0.864	0.035
- Inadequate	55 (82.1%)	12 (17.9%)	100%			
Fat intake						
- Adequate	101 (89.4%)	12 (10.6%)	100%	1.076	0.493-2.349	0.844
- Inadequate	154 (90.1%)	17 (9.9%)	100%			

DISCUSSION

This study found a significant relationship between energy intake and fine motor development in infants, while fat intake was not significantly associated with fine motor development in infants. Children whose energy intake levels are less than their nutritional adequacy levels have a greater chance of experiencing abnormal motor development, both in fine motor development and gross motor development. The results of research regarding the significant relationship between energy intake and fine motor development in infants 6-11 months are supported by the results of other studies. Research conducted by Prastika shows that there is a relationship between the level of energy intake and the fine motor development of preschool

their intake and there are other factors that may have a greater influence, such as genetic factors, maternal behavior, culture and factors. However, parents are diligent in training their children's gross motor skills so that their gross motor skills are normal. The amount of time with children and paying attention to children can create self-confidence and foster children's interest in carrying out gross motor movements (15).

CONCLUSION

There is a relationship between energy intake and fine motor development in infants 6-11 months, while fat intake with fine motor development in infants 6-11 months has no relationship. There needs to be further research on several variables that affect

infant development, such as genetic factors, prenatal factors, and psychosocial environmental factors that can affect fine motor development.

ACKNOWLEDGEMENT

Thank you to the Kulon Progo District Health Office and the Puskesmas who have given permission for research as well as the Postgraduate Lecturer in Nutrition Science at Sebelas Maret University who has guided the author so that he can complete this article.

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