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The Relationship of Nutritional Knowledge, Mother's Attitude, and Macronutrient Intake with Nutritional Status of Children at SDN Gedangrowo Prambon Sidoarjo

Hubungan Pengetahuan Gizi, Sikap Ibu dan Asupan Zat Gizi Makro dengan Status Gizi Anak di SDN Gedangrowo Prambon Sidoarjo

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ABSTRACT

Background: A mother's nutritional knowledge, attitude, and children's macronutrient intake can affect the nutritional status of elementary school-age children.

Objectives: This research analyzes the relationship between a mother's nutritional knowledge, attitude, children's macronutrient intake, and children's nutritional status at SDN Gedangrowo Prambon Sidoarjo.

Methods: This research used a quantitative approach with a cross-sectional research design. It involved 110 students as research participants. The data were collected using multiple instruments. The research used the mother's nutritional knowledge test sheet to see the mother's nutritional knowledge knowledge. While an attitude questionnaire was distributed to investigate mothers' attitudes, the intake of macronutrients was measured using the Semi Quantitative Food Frequency Questionnaire (SQ-FFQ). These data were then analyzed using Logistic Regression Analysis.

Results: The results showed that mothers' nutritional knowledge (p=0.002), attitude (p=0.002), children's energy intake (p=0.001), protein intake (p=0.000) and carbohydrate intake (p=0.008) had a relationship with children's nutritional status. Nevertheless, no relationship was found between fat intake (P=0,067) and children's nutritional status. The nutritional status of children is divided into undernutrition, good nutrition, and overnutrition.

Conclusions: Mother nutritional knowledge, attitude, and children's energy, protein, and carbohydrate intake are related to children's nutritional status. There is no relationship between fat intake and children's nutritional status. Based on multivariate analysis, it is reported that protein intake has a strong relationship with children's nutritional status.

INTRODUCTION

Nutritional issues in school-age children have received wide attention from global and national communities. Globally, the prevalence of children suffering from wasting is 14.3 million, while those who are overweight are reported to be 38.3 million[1]. Many studies reveal that Southeast Asia is a group of countries with the highest wasting rate of 15.2%. Meanwhile, obesity among children in these countries has increased by 9.2%[2]. In Indonesia, such nutritional issues are not an exception. 10.2% are reported to have wasting, while 8% suffer from obesity[2]. If we look closer at the provincial level, the prevalence of wasting occurs at 7.2%, while obesity is 3.2%[3]. In Sidoarjo Regency, the rate of wasting prevalence almost reaches the national average by 9.6%. Further, the occurrence of overweight is 5.6%[3]. School age is a time of child development usually accomplished

by various activities such as playing and moving[4]. Unfortunately, some children experience nutritional issues during this time. These issues are generally affected by several factors, internal and external. Infectious diseases and dietary intake are commonly regarded as internal factors that affect children's nutritional status. On the other hand, socioeconomic conditions and mothers' nutritional knowledge are defined as external factors[5].

Among the above factors, mothers' knowledge of nutritious food is fundamental. It refers to the mothers' understanding of dietary materials and attitudes towards dietary selection behaviour[6]. According to a report, nutritional knowledge affects children's nutritional status because mothers with insufficient knowledge tend to have children experience wasting 7.7 times more than mothers with good knowledge[7]. This claim incorporates

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e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
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the earlier study arguing that nutritional knowledge influences children's nutritional status[8]. Nutritional knowledge is an understanding of how to process food correctly. A low knowledge about it will negatively affect the children's nutritional knowledge[8]. A recent study found a relationship between nutritional status and mothers' nutritional knowledge, reflected by their attitudes while feeding the children[9].

Mothers' attitudes are their responses towards day-to-day habits regarding the selection of food materials that will be consumed by children[10]. Attitudes are usually affected by social, psychological, and physiological factors. This attitude determines the dietary choice and the amount of food[11]. This aligns with previous research finding a significant relationship between mothers' attitudes and children's nutritional status[10]. The attitude is an application that comes from the mother's ability to choose the food the children consume so that their nutritional intake is fulfilled properly[10].

Nutritional intake is divided into macro and micronutrients. Macronutrient intake is the most important factor in meeting someone's nutritional needs. These intakes contain several nutrients: energy, protein, fat, and carbohydrate. The macronutrient intakes play an important role in generating energy for daily activities[12]. Nutrient intake influences children's nutritional status[13]. The selection of food materials that have balanced nutrients determines the growth and development of the children[14]. These macronutrient intakes are the internal factors affecting children's nutritional status[5].

Children's nutritional status is a physical condition that a dietary pattern can measure. It can be classified into undernutrition, good nutrition, and overnutrition[15]. The optimal nutritional status will be achieved with an adequate supply of nutrients for the body that is used efficiently and is expected to produce maximum physical development, work capability, and health outcomes[16]. A balance between food intake and nutritional needs can support children's development and affect their nutritional status[17].

One of the villages in Sidoarjo Regency included in the Prambon Sub-district areas is Gedangrowo village. The village has a public elementary school. SDN Gedangtowo. This research selected this school because Kabupaten Sidoarjo experiences increasing cases of wasting and being overweight. Recently, schools collaborated with Public Health Center to collect data about children's height and weight. The results indicated that some students suffered from wasting and being overweight. Data on students suffering from wasting is supported by the provision of PMT, which aims to improve the nutritional status of children. In addition, monitoring is carried out every month.
Mothers' nutritional knowledge and attitudes in determining children's diet affect the nutritional status because school-age students still heavily depend on their mothers. Thus, they must be provided food with balanced nutrients. Unfortunately, not all mother has good nutritional knowledge and attitude when choosing food for their children. Therefore, this research is motivated to examine mothers' nutritional knowledge, attitudes, and children's macronutrient intakes. This research analyzes the relationship between nutritional knowledge, attitudes, and macronutrient intakes with the nutritional status of children at the Public Elementary School (SDN) Gendangrowo Prambon Sidoarjo. The research is significant because it can serve as information resources and educational materials for those interested in knowing mothers' nutritional knowledge, attitudes, children's macronutrient intakes, and nutritional status.

METHODS

This research used a quantitative approach with a cross-sectional design. It was conducted from August to September 2022. The research was located at SDN Gedangrowo Prambon Sidoarjo. The research population was 131 students. They were sampled using the Probability Proportional to Size sampling technique. The sample was determined randomly using Simple Random Sampling by fitting the sample according to the criteria set in this research. There were two criteria: inclusion and exclusion criteria. The inclusion criteria for mothers were willing to participate in this research. In addition, they lived together with their children. Meanwhile, the exclusion criteria were those who did not want to participate and did not have income. For children, the inclusion criteria were that they must be present and willing to follow height and weight measurements. The exclusion criteria were sick students and absent during the measurement process. The sample consisted of 110 students. These samples were calculated using the Slovin formula.

Mothers' nutritional knowledge, attitudes, and macronutrient intakes were considered independent variables in this research. Meanwhile, the nutritional status was classified as a dependent variable. Nutritional knowledge is the mother's ability to choose food for children, which is measured using a knowledge test with the following criteria: "good" (>80), "adequate" (60-80), and "inadequate" (<60). Mothers' attitude refers to their action in selecting food. In this research, their attitudes were measured using a questionnaire, with the following criteria: "good" (31-40), "fair" (21-30), and "bad" (10-20). Macronutrient intakes are the composition of dietary materials and processed food used to fulfill children's nutritional needs (energy, protein, fat, and carbohydrate intakes). In this research, they were set with the following criteria: "low" (<80% RDA), "good" (80%-110% RDA), and "high" (>110% RDA). Nutritional status is a body condition that describes an interaction between food intake and nutrition usage for a long period. It is typically assessed using a digital scale, microtoise, and age scale. It aims to measure BMI/A with the following criteria: undernutrition (BMI/A -3SD to <-2SD), good nutrition (BMI/A -2SD to +1SD), overnutrition (BMI/A +1SD to +2SD).

The instruments used in this research went through validity and reliability tests. The validity test was conducted with logical and empirical validity. Further, the reliability test used Cronbach's Alpha to determine how far the results or measurement methods can be trusted. The techniques of data collection were divided into four parts: a test to collect mothers' knowledge about nutrition, a questionnaire to measure their attitudes, the Semi-Quantitative Food Frequency (SQ-FFQ) form to

gather nutritional intakes of the children, and the anthropometric measurements to obtain their nutritional status. The data underwent several stages: editing, coding, processing, and cleaning. They were analyzed using univariate, bivariate, and multivariate analysis. The technique of data analysis was called the logistic regression analysis. This research has been approved by The Ethics Committee for Health Research, Faculty of Health Sciences, Universitas Airlangga Number 370/HRECC.FODM/VI/2022.

RESULTS AND DISCUSSION

Data of sample characteristics in this research covers the distribution according to classes (grades), children's sex, age, mother's age, mother's education, mother's occupation, and parent income. These data were obtained from the general information the participants filled out in the survey. These characteristics are presented in Table 1 below.

Table 1. Participants Characteristics

Participants Characteristics	n	%
Grade/Level		
Grade 1	12	10.91
Grade 2	21	19.09
Grade 3	26	23.64
Grade 4	16	14.55
Grade 5	19	17.27
Grade 6	16	14.55
Children's Sex		
Male	61	55.45
Female	49	44.55
Children's Age		
6 years old	2	1.82
7 years old	15	13.64
8 years old	24	21.82
9 years old	23	20.91
10 years old	15	13.64
11 years old	22	20
12 years old	9	8.18
Mother's age		
20 – 25 years old	3	2.73
26 – 30 years old	23	20.91
31 – 35 years old	22	20
36 – 40 years old	39	35.45
41 – 45 years old	13	11.82
46 – 50 years old	7	6.36
51 – 55 years old	3	2.73
Mother's education		
Unschooled	1	0.91
SD	19	17.27
SMP	32	29.09
SMA	56	50.91
Diploma 3 (D3)	1	0.91
S1	1	0.91
Parent's Income		
< IDR 1.000.000	25	22.73
IDR 1.000.000 – Rp 3.000.000	30	27.27
>IDR 3.000.000	55	50
Mother's Occupation		
Housewife	66	60
Factory worker	1	0.91
Employee	23	20.91
Midwife	2	1.82
Merchant	17	15.45
Village Apparatus	1	0.91

Notes:
n   = Number of participants
%   = Number of participants' Percentage
>   = more than
SD   = Elementary School
SMP   = Junior High School

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p-ISSN: 2580-9776 (Print)
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SMP   = Senior High School
S1   = Strata-1 (Undergraduate)
Rp   = Rupiah

Participants' characteristics in this research describe the results of the participant frequency distribution based on the children's sex, age, mother's age, mother's education, mother's occupation, and parent's income. The results showed that most children were eight years old, 21.82%. Males' children dominated the sex characteristic by 55.45%. Further, the researchers reported that most mothers were 36 – 40 years old (35.45%). Senior High School graduates dominated the mothers' educational backgrounds by 50.91%. The research also found that more than half (60%) of the participants were housewives. Finally, their income was mostly >Rp 3.000.000. The frequency distribution of mothers' nutritional knowledge, attitudes, children's macronutrient intakes, and nutritional status are presented in Table 2.

Table 1. The Frequency Distribution of Mother's Nutritional Knowledge, Attitudes, Children's Macronutrient Intakes, and Nutritional Status

Participants Characteristics	n	%
Nutritional Knowledge		
Good	73	60
Adequate	36	30.00
Inadequate	1	0.91
Mother's Attitude		
Good	69	57.27
Fair	41	33.64
Bad	0	0
Energy Intake		
Low	14	11.82
Good	77	63.64
High	19	15.45
Protein Intake		
Low	6	4.55
Good	14	11.82
High	90	73.64
Fat Intake		
Low	16	14.55
Good	60	54.55
High	34	30.91
Carbohydrate Intake		
Low	24	20
Good	65	53.64
High	21	17.27
Child's nutritional status		
Undernutrition	17	13.64
Good	59	49.09
Overnutrition	34	28.18

Notes:

n   = Number of participants
%   = Number of participants' percentage

Table 2 illustrates the frequency distribution of the research variables: good nutritional knowledge (60%), good attitude (57.27%), good energy intake (63.64%), good protein intake (11.82%), good fat intake (54.55%), good carbohydrate intake (53.64%), and good nutritional status (49.04%). Based on the univariate analysis, the data were processed using the bivariate analysis. The analysis helps determine the relationship between independent and dependent variables. Meanwhile, the logistic regression analysis was the data analysis used in this research. The results of the analysis are provided in Table 3.

Table 2. Analysis of the Relationship between Mother's Nutritional Knowledge, Attitudes, Children's Macronutrient Intakes, and Nutritional Status

| Variables | Nutritional Status | | | | | | p-value |
| | Undernutrition | | Good | | Overnutrition | | |
	n	%	n	%	n	%	
Nutritional Knowledge							
Good	10	9.09	34	30.91	29	26.36	0.002
Adequate	7	6.36	25	22.73	4	3.64	
Inadequate	0	0	1	0.91	0	0	
Mother's Attitude							
Good	5	4.55	40	36.36	24	2.82	0.002
Fair	12	10.91	20	18.18	9	8.18	
Bad	0	0	0	0	0	0	
Energy Intake							
Low	1	0.91	5	4.55	8	7.27	0.001
Good	12	10.91	43	39.09	22	20	
High	4	3.64	12	10.91	3	2.73	
Protein Intake							
Low	0	0	0	0	6	5.45	0.000
Good	3	2.73	6	5.45	5	4.55	
High	14	12.73	54	49.09	22	20	
Fat Intake							
Low	2	1.82	9	8.18	5	4.55	0.067
Good	7	6.36	33	30	20	18.18	
High	8	7.27	18	16.36	8	7.27	
Carbohydrate Intake							
Low	3	2.73	12	10.91	9	8.18	0.008
Good	7	6.36	39	35.45	19	17.27	
High	7	6.36	9	8.18	5	4.55	

Notes:

n = Number of participants
% = Number of participants' percentage
p-value = Probability value

Nutritional knowledge covers selecting dietary ingredients and sources and how they are processed. Thus, nutritional knowledge indirectly has a relationship with children's nutritional status. Nutrition information plays an important role in the children's nutritional status[18]. In this research, the correlation between nutritional knowledge and nutritional status was shown by a p-value of 0.002. This value showed that Ha was accepted and Ho was rejected, which means children's nutritional status has a significant relationship with knowledge. Results of the research indicated that the mother's knowledge about nutrition tended to be good, although some had inadequate knowledge. An interesting finding of this research was that mothers with low nutritional knowledge had children with good nutritional status. In contrast, those with good knowledge had children who suffered from wasting and were overweight. This finding is in accordance with previous research stating that the nutritional status of children is significantly affected by the mother's nutritional knowledge[19]. This is a result of mothers' nutritional knowledge. Not all mothers with good nutritional information have children with good nutritional status. A mother's knowledge regarding choosing healthy food and using it properly so that

nutrients are not wasted has implications for children's health[20].

Another factor that affects children's nutritional status is a mother's attitude. Mothers' good attitudes are usually influenced by several factors, such as personal experiences, other people's influences, mass media (internet, newspaper, radio), educational institutions, and personal emotions. The present research found that the mother's attitude correlated with the children's nutritional knowledge with a p-value of 0.002. It could be assumed that Ha was accepted and Ho was rejected, which means that nutritional knowledge significantly correlates with the mother's attitudes. The results of the attitude questionnaires indicated that the participants had fair and good attitudes. No participant showed a bad attitude, but some students fell into the wasting and overweight categories. These findings corroborate earlier research explaining that mothers' attitudes have a significant relationship with nutritional status[21]. Mother's attitudes had a weak relationship with nutritional status. It is suspected that other factors have to do with nutritional status. A mother's attitude effectively influences children's dietary patterns. A mother's attitude and parenting style significantly affect the nutritional status of children, such as attention and attachment to the child's eating habits. Mothers who

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e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
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have negative attitudes usually do not pay attention to what their children consume. Consequently, the nutritional status of the children becomes abnormal. In contrast, positive attitudes towards food selection stem from the mother's concerns about growing their children well. This research revealed that they tended to have children with good nutritional status because environmental situations became a factor that directly affected the children.

This research also examined macronutrient intakes with four indicators: energy, protein, fat, and carbohydrate intake. The relationship between energy consumption and children's nutritional status was shown by a p-value of 0.001. This study also found that children's intake tended to be good. Energy intake comes from consuming foods containing macronutrients, namely carbohydrates, proteins, and fat, which provide energy[22]. Energy is used for growth, physical activity, and metabolism. Energy intake that is not balanced with human nutritional needs can cause nutritional problems[23].

Protein intake correlates with children's nutritional status, as shown by the p-value of 0.000. A striking finding was that this research found an excess consumption of protein. One of the possible causes is that children consume many types of food. Excessive protein intake risks increasing a child's weight because extra protein is stored as triglycerides. This can lead to obesity in children. Protein plays a major role in the child's growth phase. However, when too many protein sources are consumed, fat accumulates in the body[24].

Fat is the leading energy supplier, protects organs, dissolves vitamins, and regulates body temperature[25]. In this research, fat intakes showed a different result from the other three macronutrient intakes. The fat intake had a p-value of 0.067, showing that this intake did not have a significant relationship with children's nutritional status. The participants' fat intake in this research was classified as good (average) and high. Only some were categorized as low. This might be caused by the imbalance of fat consumption that affects their nutritional status. Fat metabolism in the body goes through 2 processes, namely exogenous and endogenous metabolisms. The process of fat metabolism takes a long time, so fat intake that enters the body is stored in the form of energy. Fat is used when energy from carbohydrates and proteins is insufficient. Low-fat intake, followed by lower energy use in the body, changes body tissues and prevents fat absorption.

Carbohydrate intake correlates with children's nutritional status by a p-value of 0.008. Strikingly, this research found that the carbohydrate intake among children in the research tended to be excessive. The research also reported that the children only consumed several types of carbohydrates, such as noodles and rice. Excess consumption of carbohydrates is converted into fat and stored in the body indefinitely. Conversely, when the body lacks energy, the body controls fat stores. Adequate carbohydrate consumption means the body does not have to store fat reserves[26].

After conducting bivariate analysis, this research continued analyzing the data using multivariate analysis, specifically the logistic regression analysis. This analysis examines the probability that independent variables can predict dependent variables. Multivariate analysis requires that the independent variable has a p-value <0.25 from the bivariate analysis results. The results of the logistic regression analysis are presented in Table 4.

Table 4. The results of Multivariate Analysis on Mothers' Nutritional Knowledge, Attitude, and Macronutrient Intakes with Nutritional Status

Variables	n	Multivariate	
		OR (95% CI)	p-Value
Nutritional Knowledge			
Good	73	18.28 (2.59 – 6.97)	0.000
Adequate	36	11 .01(1.47 – 5.73)	0.001
Inadequate	1	0.88 (-1.03 – 2.94)	0.347
Mother's Attitude			
Good	69	19.68 (2.84 – 7.33)	0.000
Fair	41	12.50 (1.75 – 6.11)	0.000
Bad	0	1.53 (-0.74 – 3.29)	0.216
Energy Intake			
Low	14	0.08 (-1.12 – 1.51)	0.772
Good	77	14.99 (1.39 – 4.25)	0.000
High	19	26.52 (2.49 – 5.54)	0.000
Protein Intake			
Low	6	0.03 (-1.03 – 0.86)	0.836
Good	14	24.98 (1.55 – 3.55)	0.000
High	90	40.34 (2.68 – 5.08)	0.000
Fat Intake			
Low	16	2.60 (-1.92 – 0.19)	0.107
Good	60	9.09 (0.59 – 2.77)	0.003

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e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
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Variables	n	Multivariate	
		OR (95% CI)	p-Value
High	34	21.78 (1.63 – 3.99)	0.000
Carbohydrate Intake			
Low	24	0.09 (-1.36 – 0.97)	0.758
Good	65	14.14 (1.17 – 3.71)	0.000
High	21	26.65 (2.23 – 4.97)	0.000

Notes:
Odds Ratio   = Probability Ratio
95% CI   = Confidence Interval 95%
p-value   = Probability value

Nutritional knowledge is a sort of knowledge about selecting food materials and how they are processed to ensure that the nutrients are not lost[27]. Results of the multivariate analysis indicated good knowledge (OR =18.28 95%CI = 2.59 – 6.97), adequate knowledge (OR = 11 .01 95%CI = 1.47 – 5.73), and inadequate knowledge (OR = 0.88 95%CI = -1.03 – 2.94). The highest OR value was obtained by nutritional knowledge with a good category of 18.28 and a p-value of 0.000. This analysis shows that mothers with good knowledge are 18.28 times more likely to have children with good nutritional status. This knowledge is important because it provides information regarding the role and sources of nutrients in food and how to process food properly so that no nutrients are lost[27]. On the other hand, a lack of nutritional knowledge will result in a lack of ability to select food materials and process them daily, resulting in nutritional problems[28].

Mothers' attitude toward feeding their children is another factor associated with children's nutritional status. Food that follows balanced nutrition will provide food intake following the child's Recommended Dietary Allowances (RDA)[29]. Based on the multivariate analysis, the researchers found several categories for the mother's attitude, such as good attitude (OR = 19.68 95%CI = 2.84 – 7.33), fair attitude (OR = 12.50 95%CI = 1.75 – 6.11), and bad attitude (OR = 1.53 95%CI = - 0.74 – 3.29). The highest OR value of the mothers was in the good attitude category by 19.85 with a p-value of 0.000. This finding can provide information that Mothers with a good attitude are 19.58 times more likely to have children with good nutritional status. The mother's attitude is important in determining the children's nutritional status. A good mother's attitude is related to the good nutritional status of children. It should be noted that not all children of mothers with good attitudes have good nutritional status. Malnutrition or excess nutrition may occur in some children[30].

The energy intake is obtained from macronutrient intakes such as protein, fat, and carbohydrate[25]. Results of the multivariate showed that the research found low energy intake (OR = 0.08 95%CI = -1.12 – 1.51), good energy intake (OR = 14.99 95%CI = 1.39 – 4.25), and high energy intake (OR = 26.52 95%CI = 2.49 – 5.54). The highest OR value for the energy intake was in the high energy intake by 26.52 with a p-value of 0.000. This finding shows that children with good energy intake are 14.99 times more likely to have good nutritional status. Energy intake illustrates someone's dietary habits, including attitude, trust, and food choices to satisfy physiological, psychological, and social-cultural needs[31]. Adequate energy intake according to needs and physical activity can provide benefits in preventing nutritional issues in children[32].

Following that, protein intake consumed by the body has the function of creating and repairing body tissues[33]. The results of the multivariate analysis indicated that protein intake was low (OR = 0.03 95% CI = -1.03 – 0.86), good or average (OR = 24.98 95%CI = 1.55 – 3.55), and high (OR = 40.34 95%CI = 2.68 – 5.08). The highest OR value of protein intake was in the high category, with a value of 40.34 and a p-value of 0.000. The results of an analysis of good protein intake can be used as a reference that children with good protein intake have a 24.98 times chance of having good nutritional status because their function for growth and maintenance of body tissues is good[34]. Protein consumed by children is recommended according to balanced dietary guidelines, as much as 50gr/KgBB[4]. Good consumption of food that contains protein can help children develop and maintain their muscles, blood, and body tissues[35]. Meanwhile, a low protein intake can lead to various health issues such as Calory Protein Malnutrition (CPM)[33].

Fat intake provides more energy than other macronutrients[36]. The results of the multivariate analysis revealed that the fat intake was low (OR=2.60 95%CI = -1.92 – 0.19), good or average (OR = 9.09 95%CI = 0.59 – 2.77), and high (OR = 21.78 95%CI = 1.63 – 3.99). The high category was noted as the highest OR value by 21.78 with a p-value of 0.000. Results of the analysis of fat intake can serve as a guide that children who have good fat intake are 9.09 times more likely to have good nutritional status. Fat intake is recommended following children's daily nutritional needs. Fat intake can prevent infectious and non-infectious diseases, especially nutritional problems, because fat is a substitute for energy sources, a tissue lubricant, a supplier of essential fatty acids, and an absorbent for fat-soluble vitamins. In addition, the intake protects internal organs and regulates body temperature[16].

Carbohydrate intake is a source of energy production. If the child's carbohydrate intake is fulfilled, it will affect their development. In contrast, the low carbohydrate intake might affect the children's nutritional status. As the primary energy source, carbohydrates will be converted to fat and stored in unlimited amounts. If the carbohydrate intake is low, the

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e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
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body will turn to fat reserves to gain energy[25]. Results of the multivariate analysis indicated that the carbohydrate intake was low (OR=0.09 95%CI = -1.36 – 0.97), good (OR = 14.14 95%CI = 1.17 – 3.71), and high (OR = 26.65 95%CI = 2.23 – 4.97). The highest OR value of the carbohydrate value was in the high category by 26.65 with a p-value of 0.000. The analysis of good carbohydrate intake can be used as a reference, as children with good carbohydrate intake are 14.14 times more likely to have good nutritional status. This intake also works as a provider of energy for the brain and nerves. It also serves as a regulator of fat metabolism, glycogen storage, and regulation of intestinal peristalsis[37].

CONCLUSIONS

Based on the above analysis, this research concludes that mothers' nutritional knowledge, attitudes, and macronutrient intakes are related to children's nutritional status. If we look closer, the research notes that fat intake is not associated with nutritional status. Meanwhile, protein intake has a stronger relationship than other variables. This research also encourages mothers to maintain their children's dietary patterns by providing healthy and balanced food. They are also encouraged to develop their knowledge by reading books or other sources of information about nutritional food for children.

ACKNOWLEDGMENTS

Conflict of Interest and Funding Disclosure

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