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IDENTIFICATION OF FOOD DIVERSITY FACTORS TO OVERCOME STUNTING IN TODDLERS ON THE MUSI RIVER SUBURBS, PALEMBANG SOUTH SUMATRA, INDONESIA

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ABSTRACT

A diverse and balanced diet is one way to overcome stunting in toddlers. Without adequate food intake, toddlers will lack the nutrients to grow and develop properly. The purpose of this study was to identify the factors of various food choices in stunting toddlers on the outskirts of the Musi River, Palembang. This research is an observational study with a cross-sectional method conducted in two health centers representing the Musi River suburbs, namely Gandus Health Center and 11 Ilir Health Center. The subjects of this study were toddlers aged 6 months to 59 months, totaling 170 children under five who were calculated using the two-proportion hypothesis test for χ^2 and sampling through the purposive sampling technique. Data collection was carried out directly by interviews using a questionnaire. Chi-square test was used to analyze bivariate and multiple logistic regression test predictive model for multivariate analysis. Based on the results of the study, data obtained that there was a relationship between the mother's education ($p = 0.000$), number of family members ($p = 0.017$), food availability ($p = 0.000$), and eating patterns ($p = 0.005$) with various foods. The results of multivariate analysis showed that maternal education and food availability had a significant relationship with food diversity. Mother's education has the greatest influence or is the most dominant risk factor for food diversity to overcome stunting in toddlers on the Musi River suburbs, Palembang. Mothers of toddlers should increase their knowledge about food diversity and provide food at home that does not have to be expensive but remains diverse and nutritionally balanced, in order to meet nutritional needs so that toddlers avoid stunting.

Key words: diverse food, stunting, musu river

ABSTRAK

Pola makan yang beragam dan seimbang merupakan salah satu cara untuk mengatasi stunting pada balita. Tanpa asupan makanan yang cukup, balita akan kekurangan zat gizi untuk tumbuh dan berkembang dengan baik. Tujuan penelitian ini adalah untuk mengidentifikasi faktor-faktor pemilihan makanan yang beragam pada balita stunting di pinggiran Sungai Musi Palembang. Penelitian ini merupakan penelitian observasional dengan metode cross sectional yang dilakukan di dua puskesmas yang mewakili wilayah pinggiran Sungai Musi, yaitu Puskesmas Gandus dan Puskesmas 11 Ilir. Subyek penelitian ini adalah balita usia 6 bulan sampai dengan 59 bulan yang berjumlah 170 balita yang dihitung menggunakan rumus uji hipotesis dua proporsi dan penentuan sampel melalui teknik purposive sampling. Pengambilan data dilakukan secara langsung dengan wawancara menggunakan kuesioner. Uji Chi-square digunakan untuk menganalisis bivariat dan uji regresi logistik ganda model prediktif untuk analisis multivariat. Berdasarkan hasil penelitian didapat data bahwa ada hubungan antara pendidikan ibu ($p=0,000$), jumlah anggota keluarga ($p=0,017$), ketersediaan pangan ($p=0,000$), dan pola makan ($p=0,005$) dengan makanan beragam. Hasil analisis multivariat didapat hasil bahwa pendidikan ibu dan ketersediaan pangan memiliki hubungan yang signifikan dengan keragaman pangan. Pendidikan ibu memiliki pengaruh paling besar atau merupakan faktor risiko yang paling dominan terhadap keragaman pangan untuk mengatasi stunting pada balita di pinggiran Sungai Musi Palembang.

Kata Kunci : makanan beragam, stunting, Sungai Musi

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Introduction

According to WHO median standard, the failure of linear growth during a critical period in children aged 0-59 months is stunting, where height for age is below minus 2 Standard Deviations (<-2SD).¹ In 2019, there were around 144 million children under five (21.3%) in the world experiencing stunting.² Data from the World Health Organization (WHO) shows that Indonesia is the third country with the highest prevalence in the South-East Asia Regional (SEAR).³ From 2005-2017 the average prevalence of stunting under five in Indonesia was 36.4%⁴ and tends to be static from year to year. Nationally, the prevalence of stunting in 2013 was 37.2 percent, an increase compared to 2010 (35.6%) and 2007 (36.8%).⁵ Based on Nutrition Status Monitoring (PSG) data for the last three years (2015 - 2017), the highest prevalence is short when compared to undernourished, underweight, and obese.⁶

Stunting is closely related to low cognitive and motor development that is not optimal.^{7,8,9} Stunting children fail to achieve linear growth potential, suffer from irreparable physical damage and stunted growth so that they are at risk of decreasing productivity and will have an impact on the quality of human resources, economic growth and poverty.^{9,10,11} Many factors cause stunting such as sub-optimal health conditions and inadequate care,^{10,12} socioeconomic conditions, maternal nutrition during pregnancy, and lack of nutritional intake in infants,⁴ dietary habit¹² and food diversity.^{13,14} Food diversity affects the nutritional quality of the food consumed,¹⁵ with a variety of foods, the nutritional status of children is getting better.¹⁶ There is a positive relationship between the characteristics of toddlers and families with food diversity, namely income,¹⁷ family, child age¹⁸ and mother's education.¹⁹ In addition, the diversity of toddler food is also influenced by food availability^{20,21} which can be obtained from the ownership of livestock and food crops in the household. Another household characteristic related to food diversity is access to mass media,^{20,22} dietary habit,^{12,21} and food decision makers.

Palembang City is one of the cities where the focus of implementing integrated stunting reduction interventions is 2020-2022. Based on the 2018 Riskesdas data in Palembang, the prevalence of very short is 10.37% and short is 15.52%.¹⁰ Gandus Public Health Center and 11 Ilir Health Center are one of the areas on the outskirts of the Musi River in Palembang City with a fairly high incidence of stunting at 6.6% and 20.2%.²³ If seen from the consumption of Diverse Foods in toddlers aged 6-23 months only reached 44.1%.¹⁰ Children under five need attention in order to prevent stunting. One of the efforts to reduce cases of malnutrition in toddlers is to pay attention to nutritious, diverse and balanced food consumption patterns.²⁴ There is no research that focuses on food diversity to reduce stunting on the banks of the Musi River. Therefore, it is necessary to conduct research on the identification of diverse food choices to reduce stunting in

toddlers on the outskirts of the Musi River, Palembang. The purpose of this study was to identify the characteristics of toddlers, families and households in choosing diverse foods for toddlers.

Method

This research is an observational study with a cross sectional method conducted in two health centers representing the Musi River suburbs, Palembang City, namely Gandus Health Center and 11 Ilir Health Center from September to October 2021. The subjects of this study were toddlers aged 6 months to 59 months totaling 170 children under five were calculated using the two-proportion hypothesis test formula and sampling through purposive sampling technique. Data collection was carried out directly by interview using a questionnaire and anthropometric measurements. The data obtained by direct interviews are the characteristics of toddlers, families, households and diverse foods. Meanwhile, nutritional status data was obtained by measuring the weight and height of children under five. All respondents were informed and signed a consent form.

The dependent variable in this study is food diversity and the independent variables are the characteristics of children under five and their families and household characteristics. The data on the characteristics of children under five and families are gender, age, parental education, parents' occupations, family income, and number of family members. Family income of 3,270,093 Rupiah (IDR) is the minimum wage for Palembang City per month.²⁵ The number of family members living at home is categorized as large if it is more than 4 people. Meanwhile, household characteristics such as livestock ownership, ownership of food crops, access to mass media (affordable if access to mass media such as newspapers, television, and the internet is easy to obtain), food decision making (people who are responsible for cooking at home), diet (good if score 76%), food availability, and food diversity. Food availability data were selected from the Household Food Security Questionnaire to see anxiety or perceptions that the availability of food in the household is not sufficient and the perception that the food consumed by adults and children in the household is of poor quality. The family food availability score category is guaranteed if the score 2.²⁶

To assess the diversity of food used the diversity of food consumption (DDS). The Dietary Diversity Score (DDS) can be used to measure the nutritional adequacy of children in developing countries.^{13,27} The results of the data are said to be diverse if the food groups consumed are 4 and not diverse if the food groups consumed are <4²¹. Data analysis includes univariate, bivariate and multivariate. Bivariate analysis used the Chi-square test to see the relationship between the dependent variable and the independent variable, while the multivariate analysis used a predictive multiple logistic regression test. Data is presented in tabulated and narrated form. The Research

Ethics Committee of the Faculty of Public Health, Sriwijaya University has approved this research based on the approval decree number 261/UN9.FKM/TU.KKE/2021.

Results

The Musi River divides the city of Palembang into two, namely across the ulu and across the ilir. The Gandus Health Center and the 11 Ilir Health Center are located on the opposite side of the Musi River. The area of Gandus is larger than the area of 11 Ilir but has a denser population. The Gandus area has easy access to the nearest health facility and easy access to the nearest education facility.²⁸ Region 11 Ilir has easy access to the nearest health facility and very easy to reach the nearest education facility.²⁹

Based on the frequency distribution of the characteristics of children under five and families in the Musi River suburbs, Palembang City, which became the research sample (Table 1), it was found that most of the toddlers were aged 25-59 months and had a history of non-exclusive breastfeeding. For data on family characteristics, the majority of the last education of fathers and mothers is high school level with low income levels and the number of large family members.

Table 1. Frequency Distribution of Toddler and Family Characteristics

Variable	Total (n)	Percentage (%)
Toddler age		
7 – 12 Months	1	0,6
13 – 24 Months	47	27,6
25 – 59 Months	122	71,8
Breastfeeding		
Not Exclusive Breastfeeding	77	45,3
Exclusive Breastfeeding	93	54,7
Father's Education		
Elementary School	37	21,8
Junior High School	41	24,1
Senior High School	83	48,8
University	9	5,3
Mother's Education		
Elementary School	31	18,2
Junior High School	36	21,2
Senior High School	89	52,4
University	14	8,2
Family's Income		
Low	111	65,3
High	59	34,7
Number of Family		
Big	99	58,2
Small	71	41,8

The following table describes the frequency distribution of household characteristics (Table 2), namely that most of the respondent's families are not guaranteed food availability and do not have livestock or food crops. Some respondents have access to mass media and the decision

making regarding food is mostly done by mothers. Most of the toddlers' eating patterns are not good, but the variety of food is good.

Table 2. Frequency Distribution of Household Characteristics

Variable	Total (n)	Percentage (%)
Food availability		
Not Guaranteed	103	60,6
Guaranteed	67	39,4
Livestock Ownership		
No	155	91,2
Yes	15	8,8
Food Crop Ownership		
No	144	84,7
Yes	26	15,3
Mass Media Access		
Unreachable	9	5,3
Reachable	161	94,7
Food Decision Making		
Father	7	4,1
Mother	140	82,4
Family	23	13,5
Dietary habit		
Not good	143	84,1
Good	27	15,9
Food Diversity		
Not Diverse	77	45,3
Diverse	93	54,7

The results of the bivariate analysis (Table 3) show that there is a relationship between mother's education and the number of family members with diverse diets for toddlers in the Musi Riverside area of Palembang City. While exclusive breastfeeding, father's education and family income are not related to food diversity.

Tabel 3. Results of Bivariate Analysis of Toddler & Family Characteristics

Variable	Food Diversity				p-value	PR (95% CI)
	Not diverse		Diverse			
	n	%	n	%		
Breastfeeding						
Not Exclusive Breastfeeding	52	45,2	63	54,8	1,000	0,990 (0,519 – 1,889)
Exclusive Breastfeeding	25	45,5	30	54,5		
Father's Education						
Low	38	48,7	40	51,3	0,502	1,291 (0,704 – 2,368)
High	39	42,4	53	57,6		
Mother's Education						
Low	46	68,7	21	31,3	0,000	5,088 (2,613 – 9,904)
High	31	30,1	72	69,9		
Family's Income						
Low	54	48,6	57	51,4	0,297	1,483 (0,780 – 2,818)
High	23	39,0	36	61,0		
Number of Family						
Big	53	53,5	46	46,5	0,017	2,256 (1,201 – 4,240)
Small	24	33,8	47	66,2		

The results of the bivariate analysis (Table 4) show that there is a relationship between food availability and diet with food diversity in children under five in the Musi Riverside area of

Palembang City. While the variables that do not have a relationship with food diversity in children under five are livestock ownership, food crop ownership, access to mass media and food decision making.

Table 4. Results of Bivariate Analysis of Household Characteristics with Food Diversity

Variable	Food Diversity				p-value	PR (95% CI)
	Not Diverse		Diverse			
	n	%	n	%		
Food availability						
Not Guaranteed	60	58,3	43	41,7	0,000	4,104 (2,089 – 8,064)
Guaranteed	17	25,4	50	74,6		
Livestock Ownership						
No	72	46,5	83	53,5	0,482	1,735 (0,567 – 5,312)
Yes	5	33,3	10	66,7		
Food Crop Ownership						
No	64	44,4	80	55,6	0,757	0,800 (0,347 – 1,846)
Yes	13	50,0	13	50,0		
Mass Media Access						
Unreachable	5	55,6	4	44,4	0,771	1,545 (0,400 – 5,966)
Reachable	72	44,7	89	55,3		
Food Decision Making						
Father	3	42,9	4	57,1	1,000	0,975 (0,177 – 5,385)
Mother	64	45,7	76	54,3		
Family	10	43,5	13	56,5		
Dietary habit						
Not good	72	50,3	71	49,7	0,005	4,462 (1,601 – 12,434)
Good	5	18,5	22	81,5		

While the results of multivariate analysis (Table 5), it is known that maternal education and food availability have a significant relationship with food diversity. Mother's education has the greatest influence or is the most dominant risk factor for food diversity in children under five in the Musi River suburbs, Palembang City.

Table 5. Multivariate Analysis Modeling of Food Diversity Selection Factors for Toddlers on the Musi Riverside, Palembang City

Variable	p-value	PR	95% CI	
			Lower	Upper
Mother's Education	0,000	5,072	2,438	10,552
Number of Family	0,087	1,901	0,910	3,971
Family's Income	0,450	0,739	0,337	1,619
Food availability	0,002	3,415	1,595	7,310
Dietary Habit	0,091	2,737	0,852	8,799

Discussion

The results of this study indicate that most toddlers have consumed a variety of foods. Food diversity is an important factor that must be considered as a determinant of the quality of the food consumed by toddlers, the more diverse the food consumption, the better the nutritional status.¹⁶ Several studies have shown that there is a significant relationship between food diversity and stunting in children under five.³⁰⁻³² The World Health Organization (WHO) uses multiple dietary indicators as a key to assessing children's eating practices.³³ Child feeding is an important contributor to child nutrition and child development globally.³⁴

Many factors are associated with dietary diversity, such as the results in this study which stated that there was a relationship between diverse foods with maternal education and number of family members. Based on the results of multivariate analysis that mother's education has the greatest influence or is the most dominant risk factor for food diversity that can prevent stunting in toddlers. Dietary diversity was significantly higher in mothers with higher education. This is because with a sufficient level of education, mothers will understand the importance of balanced nutrition for children.³⁵ Mothers with higher education levels have a positive attitude towards family nutrition and can receive information about nutrition and child health well.³⁶ Mothers with higher education also have better knowledge and practice of nutritious food habits.³⁷ In addition, the mother's education and occupation are related to better diet and food quality and adequate nutrition.³⁸⁻⁴¹ Higher education provides job opportunities and better income, thereby increasing purchasing power and better nutrition knowledge, low household income causes low purchasing power so that it does not meet the diversity of food consumption for families.^{39,37} Meanwhile, the number of family members will reflect variations in the availability of food for family consumption⁴². Larger family size is negatively related to dietary diversity.⁴³

Other factors related to dietary diversity are dietary patterns and food availability, as the results of this study suggest. Diverse food is a proxy for the quality of diet and nutritional adequacy.²¹ Availability of food can be obtained from livestock and food plants that are raised by the family to meet the nutritional needs of the family, based on the WHO recommendation, children over 6 months of age should be given a complete diet to meet the needs of macro and micro nutrients for their growth and development.⁴⁴ However, in this study, most of the families did not have livestock and food crops and were not related to the diversity of food. The results of this study differ from research by Taruvunga that there is a significant positive relationship between households that have small livestock and ownership of gardens in their yards with food diversity. Small farm animals are easy to care for, easy to trade and contain several food groups (eggs, meat and goat's milk) that can provide micronutrient and macronutrient benefits.⁴⁵ While the home yard can provide a variety of horticultural crops that are rich in micronutrients such as vegetables, fruits and tubers. One of the efforts that can be done by families to increase the diversity of food consumption is by optimizing the yard to meet the food needs of the family.⁴⁶

Access to mass media in this study was not related to diverse foods, this could be due to mothers accessing mass media but not accessing information related to diet and food diversity that can prevent stunting. In fact, several studies state that mothers who are exposed to mass media are positively related to an increase in children's dietary diversity⁴⁷⁻⁴⁹ and it can impact to the case of stunting.^{50,51} The mass media can provide information about optimal child feeding practices through increased awareness and good nutrition practices from mothers. Through newspapers and magazines or access to radio and television, it is more likely for mothers to get education about the

practice of PMBA. The mass media provide information that can increase the knowledge and behavior of mothers regarding feeding practices and child health.⁵²⁻⁵⁴ Mothers who live in urban areas have greater access to information related to nutrition obtained through various mass media so that this information allows urban mothers to properly feed their children compared to mothers in rural areas.¹⁴ Likewise, mothers who are respondents in this study who live in urban areas, most of them have affordability to mass media, access to education and access to health services.

Conclusion

Based on the results of multivariate analysis, it was found that maternal education and food availability had a significant relationship with food diversity. Mother's education has the greatest influence or is the most dominant risk factor for food diversity in infants on the outskirts of the Musi River, Palembang. Mothers of toddlers should increase knowledge about food diversity which can be done through social media. Food provided at home does not have to be expensive, mothers can buy cheap but varied food, to meet nutritional needs so as to overcome stunting in toddlers.

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Conflict of Interest

There is no conflict of interest in this study.

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