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The Relationship Between Infant and Child Feeding History and Stunting Prevention in Toddlers Aged 24–59 Months in The Work Area of Bukit Kerman Health Center, Kerinci District, Jambi Province

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ABSTRACT— Stunting is a problem of chronic malnutrition due to lack of nutritional intake from birth to the age of two. Of the 11 districts in Jambi, Kerinci Subdistrict is recorded with the second highest prevalence of stunting in toddlers aged 24-59 months, which is 26.7%. A very important factor in the incidence of stunting is the rate of exclusive breastfeeding and adequate nutrition. A case control study, with purposive sampling technique and obtained 184 samples (46 cases and 138 controls), based on sex matching. The independent variables were history of initiation of early breastfeeding, exclusive breastfeeding, and practice of giving complementary feeding (time, frequency, amount, type of basic ingredients, and variety of nutrients), while the dependent variable was the incidence of stunting. Data analysis was performed by Chi-Square and Enter logistic regression method. There was a significant relationship between the history of early initiation of breastfeeding and the practice of giving complementary feeding with the incidence of stunting. The factors that contributed the most were the type of basic ingredients (p=0.004; OR=22.545), the amount (p<0.001; OR=8.115), the variety of nutrients (p=0.006; OR=7.512), and the frequency of complementary feeding (p=0.017; OR=5.059). In preventing stunting it is important to pay attention to the type of basic ingredients used with attention to the nutrients contained. In addition, the frequency and amount are also important to note according to the age of the toddler.

KEYWORDS: complementary feeding, stunting, toddlers aged 24-59 months

1. INTRODUCTION

Stunting is a syndrome of failure to thrive in children (toddlers) due to chronic malnutrition and repeated infections, as well as inadequate psychosocial stimulation, especially at 1000 Days of Life so that children become short for their age [13]. Children who experience stunting start from the womb (foetus) and will be seen when the child is two years old with a below standard Z-Score (TB/A <-2 SD). Most stunting was found in the age range of 24-35 months with a prevalence of 42% and a 2.08 times greater chance of experiencing stunting than children aged 0-11 months (OR=2.08, 95%CI:1.12-3.86) [6], [9], [8]. Based on WHO, UNICEF, and the World Bank (2020) in [10] there is stunting data for a period of 29 years (1999-

2019), where the global prevalence of stunting in 2019 was 21.3%. Another statement was made by WHO, that in 2016 there were 158 million or 22.9% of children under the age of five were stunted and 56% were recorded in Asia [4]. According to the Global Nutrition Report, in 2018 there were 150.8 million or 22.2% of toddlers worldwide who were stunted.

In Indonesia, the stunting rate in 2013 according to Riskesdas results was 37.6%. The prevalence of very short toddlers in 2007, 2013 and 2018 was 18.8%, 18% and 11.5%, respectively. Meanwhile, the prevalence of short toddlers in 2007, 2013 and 2018 was 18%, 19.2% and 19.3%, respectively. That way, the prevalence of stunting in Indonesia was recorded in 2018 by the Indonesian Ministry of Health, where as many as 8.7 million or 30.7% of children under five years old (toddlers) experienced stunting [7]. Based on the Indonesian Nutritional Status Study (2022), the prevalence of children under five (toddlers) who experience stunting in Jambi Province is 22.4% in 2021. Out of 11 subdistricts in Jambi Province, Kerinci Subdistrict is recorded as the area with the second highest prevalence of toddlers aged 24-59 months with stunting, which is 26.7% or it can be estimated that around 1 in 4 toddlers in this district will experience stunting in 2021.

Efforts to reduce the incidence of stunting can be influenced by the important role of parents in monitoring the growth, especially the height and length of their children. [12] adds that several risk factors for stunting include two categories of factors. The first category covers social factors, such as political economy, health status and health services, level of education, social and cultural, agricultural and food systems, as well as water availability, environment, and sanitation. Then, the second category includes family factors and breastfeeding and complementary feeding factors, and infectious factors. However, the factors that are very important to note are the level of exclusive breastfeeding and adequate nutrition.

The Global Strategy on Infant and Child Feeding explains that the best feeding pattern for infants and children is one way to overcome stunting. This pattern of breastfeeding is carried out from birth to 24 months of age with the following pattern: (1) Immediate breastfeeding within the first one to two hours after the baby is born (Early Breastfeeding Initiation/IMD), (2) Exclusive breastfeeding from birth until the baby is 6 months, (3) Start giving good and correct complementary foods since the baby is 6 months old; and (4) continue to provide breastfeeding until the child is 24 months or older (Ministry of Health RI, 2018). The purpose of this study was to determine the relationship between the history of infant and child feeding with the incidence of stunting in toddlers aged 24–59 months in the working area of the Bukit Kerman Health Center, Kerinci Regency, Jambi Province.

2. MATERIALS AND METHODS

The study was approved by the Ethical Committee (ref: 2136/UN4.14.1/TP.01.02/2023). All the participants already sign to informed consent before join this study. This type of research was a case control study. The target population referred to the Nutrition Status Study (2022) regarding the prevalence of stunting in Kerinci Subdistrict of 24.2%. Sampling of stunting cases and controls in the age group 24-59 months in Kerinci Subdistrict was obtained using the Lameshow formula and purposive sampling technique. In this case the ratio used to determine the number of case and control samples is 1:3. Based on the results of the calculation of case and control samples, the minimum was 46 case samples so that the number of control samples with a ratio of 1:3 was 138 samples. In this case, the total sample size was 184 (46 cases and 138 controls). Sampling was carried out based on matching sex, 25 males and 21 females for the case sample, and 75 males and 63 females for the control sample.

The independent variables in the study were history of early initiation of breastfeeding, history of exclusive

breastfeeding, history of time of giving complementary feeding, history of giving the frequency of complementary feeding, history of giving the amount of complementary feeding, history of giving the texture of complementary feeding, history of the types of basic ingredients of complementary feeding, and history of variety of nutrients of complementary feeding. In this case, the measurement of the independent variables was carried out by interviewing the mother/caregiver with the help of a questionnaire. Meanwhile, the dependent variable was the incidence of stunting in toddlers aged 24-59 months, where the measurement referred to the Z-Score (stunting: -2 SD – +3 SD or <+3 SD and normal: <-3 SD or -3 SD – <-2SD). The collected data were analyzed using IBM Statistical Package for Social Sciences Statistics (IBM SPSS Statistics) for Windows, Version 26.0. Armonk, New York: IBM Corp. Data analysis was performed by Chi-Square and Enter logistic regression method.

3. RESULTS

3.1 Nutritional Status Based on Gender

Based on the results obtained, the respondents in this study were dominated by male toddlers, namely 100 (54%), while female toddlers were 84 (46%). Then, to see the frequency of toddlers who are short or not short according to sex can be seen in Table 1. Toddlers aged 24-59 months who experience more stunting are toddler boys as many as 25 (13.6%), while 21 (11.4%) female toddlers. Likewise, toddlers who are not short are dominated by 75 (40.8%) male toddlers, while 63 (34.2%) female toddlers.

3.2 Nutritional Status Based on History of Early Breastfeeding Initiation

Early Breastfeeding Initiation is the first breastfeeding at the beginning of a newborn's life. Table 2 shows that 27 toddlers (14.7%) experienced stunting because they did not have a history of Early Breastfeeding Initiation at the start of their lives, on the other hand as many as 103 toddlers (55%) did not experience stunting because they had a history of IMD in their early life. These results indicate that there is a significant relationship between the history of Early Breastfeeding Initiation and the incidence of stunting with a $p<0.001$.

3.3 Nutritional Status Based on a History of Exclusive Breastfeeding

History of exclusive breastfeeding is a condition in which a child is given exclusive breastfeeding only up to 6 months of age without replacing it with or adding other foods and drinks. Table 2 shows that 11 toddlers (6%) experienced stunting because they did not have a history of exclusive breastfeeding for six months, whereas 115 toddlers (62.5%) did not experience stunting because they had a history of exclusive breastfeeding for six months. However, these results indicated that there was no significant relationship between a history of exclusive breastfeeding and the incidence of stunting, where the $p=0.273$.

3.4 Nutritional Status Based on Time History of Giving Complementary Feeding for the First Time

Giving solid food for the first time is giving solid foods for the first time when toddlers are exactly six months old. Based on Table 2 it shows that 32 toddlers (17.4%) experienced stunting because they did not have a history of appropriate complementary feeding time, on the other hand as many as 104 toddlers (56.5%) did not experience stunting because they had a history of appropriate complementary feeding time. These results indicate that there is a significant relationship between the time history of complementary feeding and the incidence of stunting with a $p<0.001$.

3.5 Nutritional Status Based on History of Giving the Frequency of Complementary Feeding

The frequency of complementary feeding must be appropriate and appropriate for each age group. Table 2 shows that 41 toddlers (22.3%) experienced stunting because they did not have a history of giving the

appropriate complementary feeding frequency, on the other hand as many as 72 toddlers (39.1%) did not experience stunting because they had a history of giving the appropriate complementary feeding frequency. These results are indicated by a significant relationship between the history of the frequency of giving complementary feeding and the incidence of stunting, which is evidenced by the $p<0.001$.

3.6 Nutritional Status Based on History of Giving the Amount of Complementary Feeding

The amount of MPASI must be appropriate and suitable for each age group. Table 2 shows that 35 toddlers (19%) experienced stunting because they did not have a history of giving the appropriate number of complementary feeding, whereas 108 toddlers (58.7%) did not experience stunting because they had a history of providing the appropriate number of complementary feeding. These results are indicated by a significant relationship between the history of the number of complementary feeding given to the incidence of stunting with a $p<0.001$.

3.7 Nutritional Status Based on History of Giving the Texture of Complementary Feeding

The texture of solids should be appropriate and appropriate for each age group. Table 2 shows that 19 toddlers (10.3%) experienced stunting because they did not have a history of giving appropriate complementary feeding textures, whereas 114 toddlers (62%) did not experience stunting because they had a history of giving appropriate complementary feeding textures. These results are indicated by a significant relationship between the texture history of giving complementary feeding and the incidence of stunting, which is evidenced by the $p=0.001$.

3.8 Nutritional Status Based on History of Giving the Basic Ingresients Types of Complementary Feeding

The number of types of solid food ingredients must be precise and appropriate for each age group. Table 2 shows that 45 toddlers (24.5%) experienced stunting because they did not have a history of giving the appropriate types of complementary feeding, whereas 74 toddlers (40.2%) did not experience stunting because they had a history of providing the appropriate types of complementary feeding. These results are indicated by a significant relationship between the history of the number of types of basic ingredients for giving complementary feeding and the incidence of stunting, which is evidenced by a $p<0.001$.

3.9 Nutritional Status Based on the History of Giving the Variety of Nutrients of Complementary Feeding

Provision of various complementary feeding nutrients must be appropriate and appropriate so that they are fulfilled, namely by obtaining from food at least 4 types of groups in one child's menu. Table 2 shows 43 toddlers (23.4%) experienced stunting because they did not have a history of providing a variety of appropriate complementary feeding nutrients, on the other hand as many as 72 toddlers (39.1%) did not experience stunting because they had a history of providing a variety of appropriate complementary feeding nutrients. These results are indicated by a significant relationship between the history of the number of variations of nutrients given complementary feeding and the incidence of stunting, which is evidenced by the $p<0.001$.

3.10 Multivariate Analysis

After seeing the relationship between each independent variable in this study, then the analysis was carried out in a multivariate manner using the Enter logistic regression model. Table 3 shows that there are only four risk factors that have a significant effect on the incidence of stunting in toddlers aged 24-59 months. This is evidenced by the p of each variable, namely the frequency of complementary feeding ($p=0.017$; OR=5.059), the number of complementary feeding ($p<0.001$; OR=8.115), the type of complementary

feeding used (p=0.004; OR=22.545), and the variety of complementary feeding (p=0.006; OR=7.512). In this case, the frequency of complementary feeding has a 5 times greater risk of stunting, while the number of MPASI has a eight times greater risk of stunting. Then, the variety of MPASI nutrients has a 7 times greater risk of stunting. However, the largest OR is found in the type of complementary feeding basic ingredients, which is 23 times more at risk of stunting.

4. DISCUSSION

A history of giving complementary feeding frequency is one of the practices of giving complementary feeding that needs attention, including the proportion of children who receive it with complementary feeding fulfill their nutritional adequacy. This is evidenced by the OR value in the history of giving MPASI frequency of 5.059. This means that there is a 5 times greater risk of stunting with a history of giving the frequency of complementary feeding. [5] explained that the frequency of complementary feeding plays an important role in the practice of giving complementary feeding because without a frequency of eating that is appropriate for the child's age there is a risk of experiencing nutritional deficiencies resulting in stunting. [11] added that children who get the frequency of complementary feeding not according to their age will tend to be more at risk of experiencing stunting compared to toddlers who get the right frequency of complementary feeding. The frequency of MPASI for toddlers needs to be done as often as possible according to their age because children can consume food little by little because their needs for calorie intake and other nutrients must be met.

The statement above regarding the history of giving the frequency of complementary foods is like the history of giving the number of complementary feeding. The frequency and amount of complementary feeding to toddlers can affect the incidence of stunting. If the frequency and number of complementary feeding is less than required according to the age of the toddler, it can cause nutritional deficiencies and impaired growth. Conversely, if the frequency and number of complementary feeding exceeds the standard for toddlers, it can result in infectious diseases and the process of bone growth can be disrupted [1]. In this study, the history factor of giving the number of complementary feeding contributed greatly to the incidence of stunting with an OR value of 8.115. That is, obtained 8 times greater risk of stunting in the history of giving the number of complementary feeding.

The frequency and amount of complementary feeding is related to the type of basic ingredients used. Without a wide variety of foodstuffs, stunting can occur. In this case, there was a 22 times greater risk of stunting with a history of giving complementary feeding. The history of giving the basic ingredients of MP-ASI is like the history of giving a variety of MP-ASI nutrients. This similarity is found in the types or groups of food used as complementary feeding, which determine the variety of nutrients that can meet the nutritional adequacy of toddlers. [2] added that a good and appropriate variety of basic complementary feeding ingredients is food that contains vitamins A and Fe (eggs, liver, meat and other food sources). This is caused by the plant-based food group alone not meeting nutritional needs. The diversity of types of solid food ingredients must include macro and micro substances obtained not only from plants but from animals, fruits, and vegetables, with a minimum or at least 4 food groups in one menu. Of course, the provision of a variety of complementary feeding ingredients is adjusted to the texture of complementary feeding based on the age of the child.

5. CONCLUSION

In conclusion, our study has shown that there was a significant relationship between the history of Early Breastfeeding Initiation and the practice of giving complementary feeding (time, frequency, amount, type of basic ingredients, and variety of nutrients) with the incidence of stunting in toddlers aged 24-59 months at

the Bukit Kerman Public Health Center, Kerinci Subdistrict, Jambi. The order of the magnitude of the risk of stunting in the working area of the Bukit Kerman Public Health Center, Kerinci Subdistrict, Jambi was the basic ingredients type of complementary feeding, the amount of complementary feeding, the variety of complementary feeding nutrients, and the frequency of complementary feeding. The four factors that contribute to the incidence of stunting in toddlers caused by the importance of the quality of complementary feeding by paying attention to the type of basic ingredients used regarding the nutrients contained. In addition, in terms of quantity (frequency and amount) it is important to pay attention to the age of the toddler.

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Conflict of interest
The authors declare that there is no conflict of interest.

Authors' contributions
Irwan IN conceptualised and designed the study, conducted the study, data analysis and interpretation, and prepared the draft of the manuscript. Thaha AR, Indriasari R conceptualized the study, advised on the data analysis and interpretation and reviewed the manuscript. Hidayanty H advised on the interpretation and reviewed the manuscript. Mallongi A advised on the interpretation and reviewed the manuscript. Russeng SS advised on the interpretation and reviewed the manuscript. All authors read and approved the final manuscript.

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Table 1. Nutritional status based on gender

Gender	Nutritional Status				Total	
	Stunting		Normal			
	n	%	n	%	n	%
Male	25	13.6	75	40.8	100	54.3
Female	21	11.4	63	34.2	84	45.7
Total	**46**	**25.0**	**138**	**75.0**	**184**	**100.0**

Table 2. The correlation between independent variables and the incidence of stunting

Variable	Nutritional Status				Total		*p*
	Stunting		Normal				
	n	%	n	%	n	%	
History of early breastfeeding initiation							
No	27	14.7	35	19.0	62	33.7	<0.001
Yes	19	10.3	103	55.0	122	66.3	
History of exclusive breastfeeding							
No	11	6.0	23	12.5	34	18.5	0.273
Yes	35	19.0	115	62.5	150	81.5	
History of giving complementary feeding for the first time							
Not appropiate	32	17.4	34	18.5	66	35.9	<0.001
Appropiate	14	7.6	104	56.5	118	64.1	
History of giving the frequency of complementary feeding							
Not appropiate	41	22.3	66	35.9	107	58.2	<0.001
Appropiate	5	2.7	72	39.1	77	41.8	
History of giving the amount of complementary feeding							
Not appropiate	35	19.0	30	16.3	65	35.3	<0.001
Appropiate	11	6.0	108	58.7	119	64.7	
History of giving the texture of complementary feeding							

Not appropiate	19	10.3	24	13.0	43	23.4	0.001
Appropiate	27	14.7	114	62.0	141	76.6	
History of giving the basic ingresients types of complementary feeding							
Not appropiate	45	24.5	64	34.8	109	59.2	<0.001
Appropiate	1	0.5	74	40.2	75	40.8	
History of giving the variety of nutrients of complementary feeding							
Not appropiate	43	23.4	66	35.9	109	59.2	<0.001
Appropiate	3	1.6	72	39.1	75	40.8	

Table 3. Multivariate analysis results

No.	Factors	*p*	OR	95%CI	
				Lower	*Upper*
1.	Early breastfeeding initiation	0.106	2.470	0.826	7.380
2.	Complementary feeding giving time	0.431	1.565	0.514	4.766
3.	Frequency of complementary feeding	0.017	5.059	1.333	19.194
4.	Amount of complementary feeding	<0.001	8.115	2.753	23.926
5.	Texture of complementary feeding	0.182	2.127	0.702	6.443
6.	Basic ingredient types of complementary feeding	0.004	22.545	2.698	188.364
7.	Variety of complementary feeding nutrients	0.006	7.512	1.765	31.963