Determining the Relationship Between Feeding Patterns and Stunting Incidence in Children: A Cross-Sectional Study in Magetan, Indonesia

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ABSTRACT Stunting has the potential to slow brain development and increase the risk of chronic disease. Panekan District is an area with the highest prevalence of stunting in Magetan Regency. This study aims to determine the effect of feeding patterns on the incidence of stunting in children aged 1-5 years. This research is a cross-sectional analytic observational study. Samples were taken using proportional random sampling technique so that a total of 217 mothers with stunted children aged 1-5 years were obtained. Primary data collection used the Child Feeding Questionnaire and secondary data used the EPPGBM application. The results of the Chi-square test can be concluded that the significant value is 0.000 <0.05, the significant value of frequency is 0.027 <0.05, the significant value of the number of meals is 0.016 <0.05. Based on the description above, it can be concluded that there is an influence on the pattern of feeding on the incidence of stunting, so it is recommended that parents use KIA's books to increase knowledge and observe about the growth and development of their children and always apply the right feeding pattern for their children from birth to adulthood because nutritional intake is one of the important factors to create a healthy and quality life. Urgency of research Increasing mothers' knowledge in early detection and preventing their toddlers from experiencing stunting.

INDEX TERMS feeding patterns, incidence of stunting.

I. INTRODUCTION

One of the physical growth disorders in toddlers is stunting, which is a condition where the length or height of a toddler is less than his age. Stunting (dwarfism) is a chronic nutritional problem in toddlers which is characterized by a shorter height compared to children at their age [1]. Stunting is one of the indicators of chronic malnutrition failure that describes the lack of the best nutrition in children [2] in the long term and has a long-term impact, namely physical, mental, intellectual and cognitive disorders [3]. Panekan District is one of the sub-districts in Magetan Regency that has the highest stunting prevalence compared to other sub-districts. One of the villages in Panekan District with a high prevalence of stunting children is Ngiliran Village, where out of 182 children there are 30 children aged 1-5 years or 16.5% who are stunted.

Data shows that out of 30 stunted children, there are 9 (nine) children or 30% have koch pulmonum, 2 (two) children or 6.7% have ascariasis and the remaining 19 children or 63.3% due to unhealthy food consumption patterns. This condition makes Nturn Village in 2023 designated as a stunting locus. An initial study of 10 (ten) mothers in Nturn Village who had a stunted child aged 1-5 years, there were 2 (two) children (20%) who preferred to eat snacks, 3 (three) children (30%) showed that if they did not want to be fed, mothers let them go and there were 5 (five) children (50%) who liked to choose food, which preferred flavored or spiced foods rather than vegetables or other nutritionally fulfilling foods. The data shows that the

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incidence of stunting in children is not only caused by lack of nutritional needs, but also due to the feeding patterns of children carried out by mothers.

The incidence of stunting in Indonesia in 2021 is high, which is 24.4%, still above the limit set by WHO of 20% and still far from the 2020-2024 RPJMN target of 14%. East Java is one of the provinces that has a stunting prevalence in toddlers with a medium to high level of 23.5% or around 2.7 million stunted children [4]. Magetan Regency is one of the districts that has decreased stunting prevalence. If in 2019 it was 21.54%, then in 2021 it fell to 17.2%. Despite the decline, the percentage is still above the set target, which is 14%. The area with the highest stunting prevalence rate in Magetan Regency during 2021 is Panekan District, there are 421 children or 19.7% of all stunted children in Magetan Regency.

Stunting has the potential to slow brain development [5]. According to Kurniawan, et al., with long-term impacts in the form of mental retardation, low learning ability, and the risk of chronic diseases such as diabetes, hypertension, and obesity [6]. Children who are stunted will experience obstacles in their cognitive and motor development, which will affect their productivity as adults [7]. Stunting is also associated with increased morbidity and mortality due to infection, especially pneumonia and diarrhea, but also sepsis, meningitis, tuberculosis and hepatitis [8].

The incidence of stunting can be avoided by meeting the nutritional needs of children through habituation to good feeding patterns and carried out regularly repeatedly, gradually according to children's growth and development, sustainable and integrated with various approaches [9]. Anthropometric index assessment is the most frequently used way to see the nutritional status of children under five [10]. The nutritional status of toddlers is one of the indicators that describe the level of public welfare. One way of assessing the nutritional status of toddlers is by anthropometry using an age-based Weight Index (BB/U). The categories used were overweight (Z-score > +2 SD); Good nutrition (z-score-2 SD to +2 SD); Malnutrition (z-score < -2 SD to -3 SD); Malnutrition (z-score <-3 SD) [11].

One of the possible approaches to prevent stunting is parenting patterns, which covers various aspects, such as feeding, hygiene and sanitation, health care, and psychosocial stimulation [12]. The early nutritional status of the children is related to their feeding pattern [13]. Efforts to handle and prevent stunting can also be done through proper feeding patterns for children. Feeding pattern is a way or effort in regulating the amount and type of food with certain purposes, such as maintaining health, nutritional status, preventing and helping cure diseases [14] [15]. The feeding pattern in children has three components consisting of type of food, frequency of eating and number of feedings [9]. Good feeding practices or patterns in children will prevent

stunting. Feeding patterns will affect stunting rates in children caused by infrequent feeding, uncertainty in the nutritional quality of food provided, whole food offerings, and inappropriate feeding practices [16]. Low feeding practices result in low intake of energy and nutrients that can affect linear growth in children [17]. In addition, children do not get a balanced supply of energy and nutrients, thus disrupting their growth. The diet should contain sufficient energy and complete nutrients such as carbohydrates, proteins, fats, vitamins and minerals that are appropriate for the age of the child [18] [19].

Prevention and handling of stunting incidents in toddlers in Magetan Regency has been carried out through various activities, namely the implementation of the Action to Prevent Stunting (ACS) program by donating eggs, UHT milk and PKMK/PKGK milk which are distributed gradually, providing counseling to mothers who have children with malnutrition cases, mentoring malnourished toddlers, increasing PMT counseling at Posyandu, and optimizing the role of posyandu in providing counseling on Infant and Child Feeding (PMBA).

Ludong and Lubis Research. (2021), the focus of research at the age of 25-59 months, as well as Marantika and Sarwinanti's research. (2021). Research on the age range of 24-59 months. This study highlights the importance of feeding patterns in preventing stunting, focusing on the age range of 12-60 months, because the period of growth and development in children aged 12-23 months is a critical stage in the formation of a long-term health baseline. During this period, children experience rapid physical growth, rapid brain development, and important immune system development. Therefore, adequate nutrient intake is essential to support optimal growth and development.

From the background description provided, the aim is to investigate the influence of feeding patterns on the occurrence of stunting in children aged 1-5 years. The findings of this research can serve as a basis for refining and improving existing interventions and programs in Magetan so that they can prevent and reduce stunting in toddlers.

II. METHODS

The general objective of this study was to determine the effect of feeding patterns on the incidence of stunting in children aged 1-5 years in Panekan District, Magetan Regency. The specific objectives were to identify the characteristics of mothers who have stunted children in terms of age, education, and number of children and family characteristics in terms of income and number of family members, identify the characteristics of children aged 1-5 years with stunting in terms of age, gender, and order of children in the family, identify stunting categories in children

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aged 1-5 years, Identify feeding patterns based on feeding type, identify feeding patterns based on meal frequency, identify feeding patterns based on the number of meals/portions of food and analyze the effect of feeding patterns on the incidence of stunting.

The type of research carried out is an analytical observational study which is usually intended with variables that seek to relate a variable to other variables [20]. This study analyzed the effect of feeding patterns on the incidence of stunting in children aged 1-5 years in Panekan District, Magetan Regency. This study uses a cross-sectional design, is an approach that observes and measures research variables at one point in time. The subject is taken at a fixed point or at a short period (snapshot). All participating subjects were examined, observed and questioned about their disease status, current or past exposure, and other relevant variables [20]. This study examines the effect of diet on the incidence of stunting, namely feeding patterns as independent variables and stunting events as dependent variables.

Population is the overall object of study studied [20]. The population in this study is all mothers of stunted children aged 1-5 years in Panekan District, Magetan Regency, totaling 471 people. The sample is the object studied and is considered representative of the entire population studied [18]. The sample was obtained from the study population that met the inclusion criteria: stunted children aged 12 months to 60 months, mothers who had stunted children aged 12 months to 60 months, and had complete nutritional status measurement data based on height according to age (TB/U) and length according to age (PB/U) and exclusion criteria covering children in February 2023 aged less than 12 months or more than 60 months, low birth weight (BBLR), children born prematurely, children experiencing chronic diseases, such as tuberculosis or heart disease and children experiencing congenital abnormalities or physical defects. Determining the number of samples in this study was determined using the Slovin formula [18]. Based on the results of these calculations, the large sample in this study was mothers who had stunted children aged 1-5 years as many as 217 people. In this study, the sampling technique used is proportional random sampling so that populations that meet the inclusion and exclusion criteria have equal opportunities and are free to be selected as sample members. Proportional random sampling in this study was carried out by lottery.

The data collection techniques used in this study were questionnaires and documentation. Questionnaires or questionnaires are data collection techniques carried out by giving a set of written questions/statements to respondents to answer [18]. Feeding patterns can be measured using Child Feeding Questioner (CFQ), which is a questionnaire that measures aspects of children's feeding perceptions, attitudes, practices, and their relationship with the development of children's food acceptance patterns and food intake [21]. CFQ describes parenting in children that can be used at the age of 2-12 years. The documentation used in this study includes data on the incidence of stunting in children aged 1-5 years in Panekan District, Magetan Regency. Data was collected from the Electronic Community-Based Nutrition Recording and Reporting (EPPGBM) application documentation.

The instruments used for data collection in this study were questionnaires and chekclist sheets or observations. The questionnaire uses Child Feeding Questioner (CFQ) as an instrument to collect data on feeding patterns, while the checklist or observation sheet is used to collect data from EPPGBM documentation.

The feeding pattern questionnaire used in this study was compiled by researchers. Therefore, it is necessary to test the validity and reliability of the questionnaire. Researchers started by conducting a validity test by testing water questionnaires to 30 respondents outside the sample and there were 2 invalid questions, because the calculated value < rtable (0.361). Invalid questionnaire statement items are discarded, namely no. 10 and 19, so that only 20 statement items are valid or have a calculated value of > rtable (0.361). Furthermore, from 20 valid questionnaire items, reliability tests were carried out using Cronbach's alpha. The 20 valid questionnaire items were tested for reliability using Cronbach's alpha. A construct or variable is said to be reliable if it gives a Cronbach alpha (α) value of > 0.70. The results of the reliability test show that valid feeding pattern questionnaire items have a cronbach alpha value of 0.932 or > 0.70 so that it can be stated that the questionnaire is reliable. A valid and reliable questionnaire means that it is feasible and legitimate to use to collect feeding pattern data. Furthermore, the collected data is processed through the stages of editing, coding, scoring, entry, cleaning and tabulating.

After data processing is complete, then the data analysis process is carried out so that it can be used as decision-making material in overcoming problems. The results of the data analysis can later be used to conclude the results in determining alternative solutions to the problem carried out. The data analysis process is carried out using computer assistance which includes: (1) Univariate analysis, aims to explain or describe the characteristics of each research variable, both independent and dependent variables. This analysis produces a frequency and percentage distribution of each variable. In addition, univariate analysis was also used to determine the characteristics of research respondents, namely mothers who have stunted children in terms of age, education, and number of children and family characteristics in terms of income and number of family members; (2) Bivariate analysis is carried out with the aim of determining the significance of the relationship between the independent

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variable and the dependent variable. Bivariate analysis was performed using the Chi-square test with a confidence degree of 95%. Decision making: (a) if Sig. $\chi^2 > 0,05$ then Ho is accepted, (b) if *Sig*. $\chi^2 < 0,05$ then Ho is rejected [18].

III. RESULT

A. CHARACTERISTICS OF RESPONDENTS IN TERMS OF AGE, EDUCATION AND NUMBER OF CHILDREN AND FAMILY CHARACTERISTICS IN TERMS OF INCOME AND NUMBER OF FAMILY MEMBERS

Data on the characteristics of age, education and number of children as well as family characteristics in terms of income and number of family members are shown in the following table:

TABLE 1
Frequency Distribution of Characteristics of Mothers Who Have Stunting Children in Panekan District in terms of Age, Education, Number of Children and Family Characteristics in terms of Income and Number of Family Members

Maternal and Family Characteristics	Frequency (f)	Percentage (%)
Age (year)		
15 – 19	15	6,9
20 – 24	66	30,4
25 – 29	26	12,0
30 – 34	40	18,4
35 – 39	58	26,7
40 – 44	10	4,9
45 – 49	2	9,0
Total	217	100
Education		
No School	2	0,9
Elementary school/equivalent	4	1,8
Junior high school/equivalent	53	24,4
Senior high school/equivalent	109	50,2
Bachelor Degree/College	49	22,6
Total	217	100
Number of Children		
1-2 children	157	72,4
3-4 children	46	21,2
>4 children	14	6,5
Total	217	100
Income		
≤ Rp 2.153.062	137	63,1
> Rp 2.153.062	80	36,9
Total	217	100
Number of Family Members		
≤ 3	157	72,4
> 3	60	27,6
Total	217	100

From TABLE 1 above, it can be seen that the most respondents from this study were respondents aged 20-24 years, which was 66 people (30.4%), in terms of education, the most respondents in this study were mothers with high school education/equivalent, which was 109 people (50.2%). Judging from the highest number of respondent children in

this study was the number of children 1-2 children, which was 157 people (72.4%). Judging from income, families who have stunted children in Panekan District, Magetan Regency as the most respondents in this study are those who have income less than the same as MSEs in Magetan Regency or ≤ Rp 2,153062 per month, which is 137 people (63.1%). Judging from the number of family members, the highest respondents in the study were with 3 family members ≤, which was 157 people (72.4%).

B. CHARACTERISTICS OF STUNTING CHILDREN AGED 1-5 YEARS IN TERMS OF AGE, GENDER, AND ORDER IN THE FAMILY

Data on the characteristics of children aged 1-5 years with stunting in terms of age, gender and order in the family are shown in the following table:

TABLE 2
Frequency Distribution of Characteristics of Children Aged 1-5 Years with Stunting in Panekan District in terms of Age, Gender, and Order in the Family

Characteristics of Children Aged 1-5 Years with Stunting	Frequency (f)	Percentage (%)
Age (month)		
≥ 12-24	26	12,0
> 24-36	30	13,8
> 36-48	103	47,5
> 48-60	58	26,7
Total	217	100
Sex		
Male	118	54,4
Female	99	45,6
Total	217	100
Order in the Family		
First	141	65
Second and so on	76	35
Total	217	100

From TABLE 2, it is known that the most respondents from this study were children aged 1-5 years with stunting aged > 36-48 months, which was 103 children (47.5%). In terms of gender, the most respondents from this study were men, namely as many as 118 children (54.4). Judging from the order of children in the family, the most respondents from this study were children aged 1-5 years with stunting as the 1st child or the first child in the family, which was 141 children (65%).

C. STUNTING CATEGORY IN CHILDREN AGED 1-5 YEARS

Data on the stunting category of children aged 1-5 years are shown in the following table. Data on the stunting category in children aged 1-5 years in Panekan Sub-district who were selected as research samples were collected from documentation data for the Electronic Recording and Reporting of Community-Based Nutrition (EPPGBM)

application for December 2022. From TABLE 3 below is known that the most respondents from this study were stunted children with a short category, which was 173 children (79.5%). Meanwhile, stunting children with very short categories amounted to 44 children (20.3%). The number of stunted children aged 1-5 years with the short category is more than stunted children with the very short category.

TABLE 3
Frequency Distribution of Stunting Category in Children Aged 1-5 Years

Stunting Category	Frequency (f)	Percentage (%)
Very short	44	20,3
Short	173	79,7
Total	217	100

D. FEEDING PATTERNS BY TYPE OF FEEDING

Data on feeding patterns by feeding type are shown in the following table:

TABLE 4
Frequency Distribution of Feeding Patterns by Type of Feeding

Type of Feeding	Frequency (f)	Percentage (%)
Not right	60	27,6
Right	157	72,4
Total	217	100

From TABLE 4 above, there were 157 mothers (72.4%) who were right in applying the right feeding pattern and 60 mothers (27.6%) applying the wrong feeding pattern.

E. FEEDING PATTERNS BASED ON FEEDING FREQUENCY

Data on feeding patterns based on feeding frequency are shown in the following table.

TABLE 5
Frequency Distribution of Feeding Patterns by Feeding Frequency

Feeding Frequency	Frequency (f)	Percentage (%)
Not right	4	1,8
Right	213	98,2
Total	217	100

From TABLE 5 above, there were 213 mothers (98.2%) who had applied the right feeding pattern, while those who were not right in applying a diet based on the frequency of eating were 4 people (1.8%).

F. FEEDING PATTERNS BASED ON NUMBER OF FEEDING

Data on feeding patterns based on the number of feedings are shown in the following table. From TABLE 6 above, there were 211 mothers (97.2%) who had applied the right

feeding pattern, while 6 people (2.8%) were not right in applying the feeding pattern.

TABLE 6
Frequency Distribution of Feeding Patterns by Number of Feeding

Number of Feeding	Frequency (f)	Percentage (%)
Not right	6	2,8
Right	211	97,2
Total	217	100

G. THE EFFECT OF FEEDING PATTERNS ON THE INCIDENCE OF STUNTING

In relation to the influence of feeding patterns on the incidence of stunting, cross-tabulation was carried out. Cross-tabulated data on the effect of feeding patterns based on type, frequency and number of feedings on the incidence of stunting are shown in the following table:

TABLE 7
Cross-tabulation of the Effect of Feeding Patterns Based on Type, Frequency and Number of Meals on the Incidence of Stunting

Feeding Patterns	Stunting Incidence				Total	
	Very Short		Short			
	f	%	f	%	f	%
Type of feeding						
Not right	39	18,0	21	9,7	60	27,6
Right	5	2,3	152	70,0	157	72,4
Total	**44**	**20,3**	**173**	**79,7**	217	**100**
Feeding frequency						
Not right	3	1,4	1	0,4	4	1,8
Right	41	18,9	172	79,3	213	98,2
Total	**44**	**20,3**	**173**	**79,7**	217	**100**
Number of feeding						
Not right	4	1,9	2	0,9	6	2,8
Right	40	18,4	171	78,8	211	97,2
Total	**44**	**20,3**	**173**	**79,7**	**217**	**100**

From TABLE 7 above, it is known that the results of cross-tabulation showed that there were feeding patterns based on the type of feeding with the stunting category, showing that there were 39 children (18%) who received feeding patterns based on improper feeding types who were stunted in the very short category, while 152 children (70%) who received feeding patterns based on the right type of feeding were stunted in the short category. In children who received feeding patterns based on eating frequency, there were 3 children (1.4%) with feeding patterns based on improper feeding frequency who were stunted in the very short category and 172 children (79.3%) who received feeding patterns based on the right feeding frequency were stunted in the short category. In children who received a feeding pattern based on the number of meals, there were 4 children (1.9%) with feeding patterns based on improper feeding rates stunted in the very short category and 171 children (78.8%) who received feeding patterns based on the right amount of food, stunted in the short category.

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H. STATISTICAL ANALYSIS

This study aims to determine the effect of feeding patterns according to type, frequency and amount of feeding on the incidence of stunting in children aged 1-5 years in Panekan District, Magetan Regency. Data on the effect of feeding patterns based on the type of feeding on the incidence of stunting are shown in the following table:

TABLE 8
Test Results of the Effect of Feeding Patterns Based on Types of Feeding to the Incidence of Stunting

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	102,613[a]	1	0,000
Continuity Correction[b]	98,825	1	0,000
Likelihood Ratio	96,827	1	0,000
Linear-by-Linear Association	102,140	1	0,000
N of Valid Cases	217		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.17.
b. Computed only for a 2x2 table

From TABLE 8 above, it is known that the results of the test of the effect of feeding patterns based on the type of feeding on the incidence of stunting in children aged 1-5 years using the Chi-square Test, obtained a significance value (Sig.) of 0.000. Based on this, the significance (Sig.) (0.000) < 0.05 or indicates that the hypothesis is accepted. That is, there is an influence of feeding patterns based on the type of feeding on the incidence of stunting in children aged 1-5 years.

Data on the effect of feeding patterns based on the feeding frequency on the incidence of stunting are shown in the following TABLE 9 below, it is known that the results of the test of the effect of feeding patterns based on feeding frequency on the incidence of stunting in children aged 1-5 years using the Chi-square Test, found that there were 2 cells (50%) that had an expected frequency or expected count of less than 5 so that they did not meet the requirements of the Chi-square test. Therefore, the test is carried out using the Fisher Exact test (Fisher's Exact test). The results of the Fisher Exact test obtained a significance value (Sig.) of 0.027. Based on this, the significance (Sig.) (0.027) < 0.05 or indicates that the hypothesis is accepted. That is, there is an influence of feeding patterns based on the frequency of eating on the incidence of stunting in children aged 1-5 years.

TABLE 9
Test Results of the Effect of Feeding Patterns Based on the Feeding Frequency to the Incidence of Stunting

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7,549[a]	1	0,006		
Continuity Correction[b]	4,494	1	0,034		
Likelihood Ratio	5,670	1	0,017		
Fisher's Exact Test				0,027	0,027
Linear-by-Linear Association	7,515	1	0,006		
N of Valid Cases	217				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .81.
b. Computed only for a 2x2 table

Data on the effect of feeding patterns based on the amount of feeding on the incidence of stunting are shown in the following table:

TABLE 10
Test Results of the Effect of Feeding Patterns Based on the Amount of Feeding to the Incidence of Stunting

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8,215[a]	1	0,004		
Continuity Correction[b]	5,529	1	0,019		
Likelihood Ratio	6,265	1	0,012		
Fisher's Exact Test				0,016	0,016
Linear-by-Linear Association	8,177	1	0,004		
N of Valid Cases	217				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.22.
b. Computed only for a 2x2 table

From TABLE 10 above, it is known that the results of the test of the effect of feeding patterns based on the amount of food on the incidence of stunting in children aged 1-5 years using the Chi-square Test, found that there were 2 cells (50%) that had an expected frequency or expected count of less than 5 so that they did not meet the requirements of the Chi-Square test. Therefore, the test is carried out using the Fisher Exact test (Fisher's Exact test). The results of the Fisher Exact test obtained a significance value (Sig.) of 0.016. Based on this, the significance (Sig.) (0.016) < 0.05 or indicates that the hypothesis is accepted. That is, there is an influence of feeding patterns based on the amount of food on the incidence of stunting in children aged 1-5 years. That is, there is an influence of feeding patterns based on the amount of food on the incidence of stunting in children aged 1-5 years.

IV. DISCUSSION

Mothers who have children aged 1-5 years with stunting are generally included in the early adult age group. Legally, a person can be said to be an early adult when he reaches the age of 21 years to the age of 21 years. Early adulthood is a term that is now used to designate the transition from adolescence to adulthood. This is supported by theory of Notoatmodjo that this age range ranges from 18 years to 25 years, this period is marked by experimental and exploratory activities The age of parents/mothers affects the process of learning to adjust, as a person gets older, the more experience

will be gained from the environment in shaping his behavior [22]. As you get older, mothers will have more experience from their environment in parenting, especially in feeding behavior for children. Here, parents/mothers who lack a role in implementing the right feeding pattern can have an impact on the fulfillment of nutrition in children who are lacking, resulting in stunting in children.

Education, mothers who have children aged 1-5 years with stunting generally have high school education/equivalent. The mother's education in fulfilling nutrition will determine the nutritional status of her child. This can affect the selection of food ingredients and meeting nutritional needs. A high level of education in a person will tend to choose and balance the nutritional needs of his child. A low level of education in a person, will assume that the most important thing in nutritional needs is filling. The education obtained will provide knowledge about nutrition and risk factors that can affect nutritional problems in children. When related to the education of parents/mothers in Panekan District, Magetan Regency who have stunted children, it is known that parents/mothers in Panekan District who have stunted children have an average high school education or secondary education. Father's education is related to family income, the higher the income, the food that can be bought and consumed by the family is also good. In mothers, the higher the mother's education, the better the parenting style applied to the child. This is because it is easier for mothers to absorb information where these things will then affect the child's food intake.

According to the number of children, mothers who have children aged 1-5 years with stunting mostly have stunted children with 1-2 children. If it is related to parents or mothers in Panekan sub-district who only have 1-2 children, lack experience in fulfilling the implementation of proper feeding patterns and nutritional needs of their children. Unlike parents who have 3 or more children, they are usually experienced in applying the right feeding pattern and meeting the nutritional needs of children. The increasing number of children and not balanced with increasing income will cause the distribution of food consumption to children more unevenly, so the risk of stunting in children.

Income, families who have stunted children generally earn ≤ Rp 2,153062 per month. One of the factors that can affect diet in children is socioeconomic factors. Family economy can indirectly affect family food availability. There is a relationship between family socioeconomics and the nutritional status of toddlers. If food access at the household level is disrupted, especially due to poverty, malnutrition will inevitably arise. Poverty or low family income greatly affects the nutritional adequacy of the family. Food availability in the family affects consumption patterns that can affect family nutritional intake. If it is related to the income level of mothers' families in Panekan sub-district, on average less

than MSEs, this causes low economic status to affect food consumption patterns. The socioeconomic status of the family will affect the quality of food consumption.

The number of family members who have stunted children in general with the number of families ≤ 3 people. Regarding the number of family members, the number of family members has a positive and significant effect on the amount of household consumption. The more the number of family members, the higher the consumption expenditure. If it is associated with the number of maternal family members who have stunted children, the average is ≤ 3, which causes stunting factors accompanied by low income, family members, especially children, have the opportunity not to get better intake to meet their body needs.

Based on the age of children, the highest incidence of stunting in Panekan District, Magetan Regency from this study is children aged >36-48 months. Children aged > 36-48 months have a greater risk of stunting than the age before and after. Age is one of the factors that determine a person's nutritional needs, the higher the age the decreased one's ability to carry out activities so that it requires greater energy. If it is related to the condition of stunting children in Panekan, children are very active in their daily activities. In addition, the toddler age group is also very easy to experience changes in nutritional conditions, because children aged 3-4 years are passive consumers where everything they consume still depends on what is given and provided by their parents.

The incidence of stunting of children aged 1-5 years in Panekan District, Magetan Regency is the most with male gender. According to Suryawan, Ningtyias and Hidayati boys are known to be at greater risk of stunting [23]. When it comes to the condition of boys in Panekan, their behavior is very active compared to girls. In boys, the risk is greater for stunting than girls because boys do more physical activities outside the home that require a lot of energy, causing energy reserves for growth to be limited because a lot is spent on activities. The order of children in the family, from this study is children aged 1-5 years with stunting as the 1st child or the first child in the family. Regarding the order of children in the family, according to Kusumawati, Marina and Wuryaningsih the first child is more stunted than the order of children in the family is the third child or more [24]. The order of children in the family (birth order) can be a predictor of the incidence of stunting in children under the age of 5 (five) years, where the first child is more stunted than the order of children in the family is the third child or more. This is because in the first child, parental experience in parenting tends to be still lacking.

Based on the results of data analysis, it is known that stunting children aged 1-5 years in Panekan District with short categories are more than stunted children with very short categories. Stunting cases are known if the results are

below -2SD (Short) with the hope that it will be known faster and intervened so as not to become very short. Based on the results of data analysis, it is known that the feeding pattern for stunted children aged 1-5 years in Panekan District according to the type of feeding has applied the right feeding pattern. The type of food according to Aisyah, et al. is a variety of foods that are processed to create a healthy and balanced menu [25]. The type of food should be varied and rich in beneficial nutrients such as carbohydrates, proteins, vitamins, fats and minerals. Parents have applied the right feeding pattern but the type of food is sober so that the nutrients needed by the child's body have not been met.

Based on the results of data analysis, it is known that the feeding pattern for stunted children aged 1-5 years in Panekan District according to the frequency of eating has applied the feeding pattern appropriately. Children are considered at greatest risk of malnutrition because improper feeding patterns will have an impact on growth and development (Gibson et al., 2012). The frequency of feeding is appropriate but because there is less absorption of nutrients in the body due to comorbidities in children.

Based on the results of data analysis, it is known that the feeding pattern for stunted children aged 1-5 years in Panekan District according to the number of meals has applied the feeding pattern correctly. Nutritional problems that can occur in children are imbalances between the amount of food intake or nutrients obtained from food with the recommended nutritional needs in children from the feeding pattern given by the mother [26]. People think that feeding for toddlers is the most important thing toddlers want to eat rice while according to theory children's nutritional needs are more animal protein.

The results showed that there was an influence of feeding patterns according to the type, frequency and amount of feeding on the incidence of stunting in children aged 1-5 years. The results of the data analysis also found that children with feeding patterns according to the type, frequency and number of appropriate feedings, had a lower risk of stunting than children with improper feeding patterns according to type, frequency and amount of feeding. The results of this study are supported by the findings of research conducted by Ludong and Lubis which prove that there is a relationship between feeding patterns and the prevalence of stunting in children aged 24-59 months [27]. Liliandrini, et al. also found the same thing that there is a relationship between feeding patterns and the incidence of stunting at the age of 2-5 years [28]. The results of different studies were conveyed by Mouliza and Darmawi that there is no relationship between the type of food and the amount of food with the incidence of stunting [29].

The main factors causing stunting according to the Indonesian Ministry of Health, include diet [30]. Food consumed will affect nutritional status. Good nutritional status occurs when the body obtains sufficient nutrients that are used efficiently, resulting in optimal physical growth, brain development, work ability, and health. While deficient nutritional status occurs when the body experiences a deficiency of one or more essential nutrients. WHO in Rahayu, et al. also states that food consumption for everyone, especially toddlers aged 1-2 years, must always meet their needs [31]. Consumption of less food will cause an imbalance of metabolic processes in the body, if this happens continuously there will be impaired growth and development.

Diet affects stunting rates in children caused by infrequent feeding, uncertainty in the nutritional quality of food provided, whole food offerings, and inappropriate feeding practices [32]. Low feeding practices result in low intake of energy and nutrients that can affect linear growth in children. In addition, children do not get a balanced supply of energy and nutrients, thus disrupting their growth [33]. Improper feeding patterns will become a problem if not treated immediately. In this case, many parents are unable to apply the improper feeding pattern above because their understanding is still inappropriate. Parents or caregivers tend to persuade and calm children in various ways so that children want to eat. This will actually interfere with the child's eating concentration. Sometimes parents give formula milk excessively when their children do not want to eat, children are happy with eating armored foods which results in children always full and more difficult to recognize the right eating behavior. Difficulty eating, sometimes considered normal so that eventually complications and growth disorders arise in the future. One of the delays in handling the problem is the administration of vitamins without looking for the cause.

V. CONCLUSION

There are an association between feeding patterns and the occurrence of stunting in children aged 1-5 years. The programs that have been implemented by evaluating the nutrition case handling program regularly, in order to reduce the incidence of stunting. In order to be more motivated and provide information (counseling) to mothers in order to maintain a good nutritional status of children. community monitors more about the symptoms of stunting symptoms in children, especially parents should make more use of MCH books to increase knowledge and observe about the growth and development of their children and always apply the right feeding pattern for their children from birth to adulthood. It is recommended to research with other designs such as case control with larger samples, other factors that cause stunting.

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