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Affecting factors on the incidence of Stunting in children aged 0 – 59 months in the working area of Amplas community health center in Medan city

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ABSTRACT

Stunting is one of the targets of the Sustainable Developments Goals in order to achieve the goals by 2030, with two indicators, including eliminating famine and malnutrition. Hence, by 2025 it has been predicted that the stunting rate will be 40% reduced. The purpose of this study was to determine the factors that affect the incidence of stunting in 0-59 months children. This is an analytic observational study with a case control approach. In this study, 20 samples were selected using the total sampling technique that are divided into two groups. This study were conducted from October to November 2022. Data collection was obtained by collecting electronic-Community Based Nutrition Registration and reporting anthropometric data on 1-5 years old children. Bivariate analysis using chi-square test and model summary. The results showed that the results of the nutrition chi-square test were obtained at the value of 0.000 < 0.05, the results of the exclusive breastfeeding chi-square test were obtained at the value of 0.001 < 0.05, the results of the early complementary feeding chi-square test were obtained at the value of 0.011 < 0.05, chi-square test result of Low Birth Weight obtained a value of 0.005 < 0.05, chi-square test result of Low Birth Weight of the value of 0.005 < 0.05, chi-square test result of exclusive breastfeeding obtained with a value of 0.005 < 0.05, chi-square test result of early complementary feeding obtained with a value of 0.005 < 0.05. 005 < 0.05, the results of the chi-square test for infectious diseases obtained the value of 0.000 < 0.05, the results of the chi-square test for immunization status obtained the value of 0.007 < 0.05, These results suggest that there is an association between infectious diseases and immunization status.

Keywords: Stunting, Famine and Malnutrition

1. INTRODUCTION

Stunting is a nutritional status based on the L/A or H/A index which according to anthropometric standards for assessing children's nutritional status, the measurement results are at the threshold (z-score) below -2 SD/standard deviation and below -3 SD/standard deviation (severely stunted) according to the Indonesian Ministry of Health. (1) Stunting is a condition of impaired growth in children under five years old caused by chronic malnutrition that results in children being too short for their age. Malnutrition was present when the baby was still in the mother's womb and in the early days of the baby's birth, but the stunting condition may be visible after the baby is 2 years old.

Babies with stunting tend to have lower intelligence levels. Unoptimized intelligence will make children vulnerable to disease in the future and can lead to risk of reduced productivity levels. Stunting is one of the targets of

the Sustainable Developments Goals (SDGs) in order to achieve the goals by 2030, with two indicators, including eliminating famine and malnutrition. Hence, by 2025 it has been predicted that the stunting rate will be 40% reduced.

In 2018, according to the results of the Basic Health Research report, according to the proportion of very short and short nutritional status has decreased in 2013 by 37.2% and in 2018 by 30.8%.(2) In Indonesia, the prevalence of very short and short children aged 0-23 months was 12.8% and 17.1%. North Sumatra, one of the provinces in Indonesia, has a stunting prevalence of 42.5%, which exceeds the national stunting prevalence of 37.2%. Meanwhile, the stunting limit set by World Health Organization is <20%. Consequently, the current condition in North Sumatra Province is still problematic in terms of stunting. In Medan City, the stunting prevalence was recorded at 17.4%, this represents half of the stunting prevalence rate in North Sumatra.

According to various studies and literature concerning on stunting, there is also an association between stunting and nutritional deficiencies (micronutrients and macronutrients). There are several nutrients associated with stunting such as protein, iron, zinc, calcium and vitamins D, A and C. Exclusive breastfeeding intake is also predicted to minimize the risk because it contains antibody immune components and calcium also nutrients needed by infants.(3) Malnutrition and stunting are two interrelated problems.(4) Furthermore, there are also several factors related to stunting, including the energy intake, the duration of illness, weight at birth, the educational level of the mother and the income level of the family.(5) The impacts of stunting are not only disruptions that occur in children's physical growth, but may affect the growth of the toddler's brain.(6)

Hormonal factors, genetics and lack of parental knowledge in parenting, poverty levels, environmental sanitation, limited food accessibility, lack of family access to health services, and the disparities between provinces that need to be addressed. Stunting is a nutritional problem that until now has become an attention and problem that has not been resolved. Therefore, this study is aimed to determine the factors that affect the incidence of stunting in children 0-59 months in the working area of Amplas community health center in Medan City.

2. METHOD

The study used in this scientific writing is an analytical observational study with a case control approach which is an observational analytical epidemiological research that explores the relationship between effects (diseases or health conditions) and certain risk factors. The case control research design used to assess the role of risk factors in the incidence of disease. The case control study begins with identifying patients with an effect (case) and a group without an effect (control), by retrospectively tracing the risk factors that can explain why the case is affected while the control is not affected.(7)

The study was held in the working area of Amplas health center in Medan City from 31 October 2022 to 19 November 2022. There were 20 samples selected by using total sampling technique which were divided into 2 groups with stunting as the case group and those without stunting as the control group with a proportion of 1:1 from all children aged 0-59 months according to the inclusion and exclusion criteria.

Data were obtained by collecting e-PPGM anthropometric recording data and 1-5 year old children data that had been collected by dietitians. Then we contacted the subjects and explained the purpose, objectives, procedures, and signed the informed consent. Furthermore, the interview was conducted to obtain the questionnaire data. Then the obtained data were analyzed by performing statistical analysis calculations. The data were analyzed by univariate analysis in order to obtain an overview of the frequency distribution of respondents' characteristics and for bivariate analysis by applying the chi-square test and summary model.

3. RESULTS AND DISCUSSION

3.1. Results

The characteristics of respondents consisted of gender, infant age, paternal education, paternal occupation, maternal education, maternal occupation, nutritional status, exclusive breastfeeding, early complementary feeding, birth weight, length of birth, infectious diseases, immunization status, and periodic health examinations at the health center for toddlers. Respondent characteristics can be seen in the following frequency distribution tables.

Table-1. Respondent Characteristics Frequency Distribution

Characteristics	Frequency	Percentage(%)
Groups		
Control	10	50
Case	10	50
Gender		
Boy	10	50
Girl	10	50
Age		
1 Years Old	1	5
2 Years Old	8	40
3 Years Old	3	15
4 Years Old	5	25

Characteristics	Frequency	Percentage(%)
5 Years Old	3	15
Paternal Education		
Elementary School	0	0
Junior High School	3	15
Senior High School	13	65
College	4	20
Paternal Occupation		
Government Employee	2	10
Private Sector Employee	3	15
Self Employee	11	55
Laborer	4	20
Maternal education		
Elementary School	1	5
Junior High School	6	30
Senior High School	11	55
College	2	10
Maternal Occupation		
Government Employee	2	10
Self Employee	2	10
Laborer	1	5
Housewife	15	75
Nutrional Status		
Good	10	50
Poor	10	50
Exclusive Breastfeeding		
Yes	8	40
No	12	60
Early Complimentary Feeding		
Yes	14	70
No	6	30
Birth weight		
< 2.500 gr	9	45
≥ 2.500 gr	11	55
Length of Birth		
< 48 cm	8	40
≥ 48 cm	12	60
Infection Disease		
frequently sick ≥ 6 times/year	10	50
rarely sick < 6 timesyear	10	50
Immunization status		
Complete	15	75
Incomplete	5	25
Periodic Health Examinations		
Regular 1 times/months	16	80
Irregular 1 times/months	4	20

Based on Table-1, it was found that the gender of infants had the same percentage as 50%. The age of the baby was mostly 2 years old (40%) compared to 1 year old (5%), 3 years old (15%), 4 years old (25%) and 5 (15%) years old. The percentage of paternal education was predominantly high school graduates (65%) compared to junior high school graduates (15%) and university graduates (20%). Paternal occupations were predominantly self-employed (55%) compared to civil servants (10%), private employees (15%) and laborers (20%). Maternal education was dominated by housewives (75%) compared to civil servants (10%), self-employed (10%) and laborers (5%). Nutrition percentages were equally Good and Poor (50%). Exclusive breastfeeding percentage was Slightly more No (60%) than Yes (40%). Early complementary feeding percentage predominantly Yes (70%) compared to No (30%). birth weight percentage was slightly more ≥ 2,500 g (55%) than < 2,500 g (45%). The percentage of Length of birth was more dominant ≥ 48 cm (60%) compared to < 48 (40%). The percentage of infectious diseases was equal Frequently sick ≥ 6 times/year and Rarely sick < 6 times/year (50%). Immunization status percentage is dominantly Complete (75%) compared to Incomplete (25%). The percentage of periodic health examinations at toddler health center was predominantly Regular 1 time/month (80%) compared to Irregular 1 time/month.

Table-2.Chi-Square Test Results For Nutrional Status In the Control Group and Case Group

Nutrional Status	Control		Case		Total		*p-value*
	F	%	F	%	F	%	
Good	10	50	0	0	10	50	
Poor	0	0	10	50	10	50	0.000
Total	10	50	10	50	20	100	

Based on Table-2, it was found that out of 10 respondents in the control group, there were 10 infants (50%) with good nutritional status and 0 infants (0%) with poor nutritional status. While 0 out of 10 respondents in the case group had good nutritional status and 10 babies (50%) had poor nutritional status. Based on the results of the chi-square test, the p-value = 0.000 <0.05. It is concluded that there is a significant influence between nutritional status and the incidence of stunting in the control and case groups.

Tabel-3. Chi-Square Test Results For Exclusive Breastfeeding In the Control Group and Case Group

Exclusive Breastfeeding	Group				Total		*p-value*
	Control		Case				
	F	%	F	%	F	%	
Yes	8	40	0	0	8	40	
No	2	10	10	50	12	60	0.001
Total	10	50	10	50	20	100	

Based on Table-3, it was found that out of 10 respondents in the control group, there were 8 infants (40%) who received exclusive breastfeeding and there were 2 infants (10%) who did not receive exclusive breastfeeding. Meanwhile, out of 10 respondents in the case group, there were 0 infants (0%) who received exclusive breastfeeding and there were 10 (50%) who did not receive exclusive breastfeeding. Based on the results of the chi-square test, the p-value = 0.001 <0.05, it is concluded that there is a significant influence between exclusive breastfeeding and the incidence of stunting in the control and case groups.

Table-4. Chi-Square Test Results For Early Complimentary Feeding In the Control Group and Case Group

Early Complimentary Feeding	Group				Total		p-value
	Control		Case				
	F	%	F	%	F	%	
Yes	4	20	10	50	14	70	
No	6	30	0	0	6	30	0.011
Total	10	50	10	50	20	100	

Based on Table-4, it was found that out of 10 respondents in the control group, there were 4 infants (20%) who received early complementary foods and 6 infants (30%) who did not receive early complementary foods. Meanwhile, out of 10 respondents in the case group, there were 10 infants (50%) who received early complementary foods and there were 0 infants (0%) who did not receive early complementary foods. Based on the results of the chi-square test, the p-value = 0.011 <0.05, it was concluded that there was a significant influence between early complementary feeding and the incidence of stunting in the control and case groups.

Table-5. Chi-Square Test Results For Birth Weight In the Control Group and Case Group

Birth Weight	Group				Total		*p-value*
	Control		Case				
	F	%	F	%	F	%	
< 2.500 gr	1	5	8	40	9	45	
≥ 2.500 gr	9	45	2	10	11	55	0.005
Total	10	50	10	50	20	100	

Based on Table-5, we found that out of 10 respondents in the control group, there were 1 baby (5%) who were < 2,500 gr and there were 9 babies (45%) who were ≥ 2,500 gr. Meanwhile, out of 10 respondents in the case group, there were 8 babies (40%) who were < 2,500 gr and there were 2 babies (10%) who were ≥ 2,500 gr. Based on the results of the chi-square test, the p-value = 0.005 < 0.05, it was concluded that there was a significant influence between birth weight and the incidence of stunting in the control and case groups.

Table-6. Chi-Square Test Results For Length Of Birth In the Control Group and Case Group

Length Of Birth	Group				Total		*p-value*
	Control		Case				
	F	%	F	%	F	%	
< 48 cm	1	5	7	35	8	40	
≥ 48 cm	9	45	3	15	12	60	0.20
Total	10	50	10	50	20	100	

Based on Table-6, it was foun that out of 10 respondents in the control group, there was 1 baby (5%) with Lenght of birth (LB) < 48 cm and there were 9 babies (45%) with LB ≥ 48 cm. While out of 10 respondents in the case group, there were 7 babies (35%) with LB < 48 cm and there were 3 babies (15%) with LB ≥ 48 cm. Based on the results of the chi-square test, the p-value = 0.20> 0.05, it was concluded that there was no significant influence between Lenght of birth and the incidence of stunting in the control and case groups.

Table-7. Chi-Square Test Results For Infectious Disease In the Control Group and Case Group

Infectious disease	Group				Total		*p-value*
	Control		Case				
	F	%	F	%	F	%	
Frequently sick ≥ 6 times/year	0	0	10	50	10	50	
Rarely sick < 6 times/year	10	50	0	0	10	50	0.000
Total	10	50	10	50	20	100	

Based on Table-7, among 10 respondents in the control group, there were 0 infants (0%) who were frequently sick ≥ 6 times/year and there were 10 infants (50%) who were rarely sick < 6 times/year While of the 10 respondents in the case group, 10 infants (50%) were frequently sick ≥ 6 times/year and there were 0 infants (0%) who were rarely sick < 6 times/year. Based on the results of the chi-square test, the p-value = 0.000 <0.05, it was concluded that there was a significant influence between infectious diseases and the incidence of stunting in the control and case groups.

Table-8. Chi-Square Test Results For Immunization Status In the Control Group and Case Group

Immunization Status	Group				Total		*p-value*
	Control		Case				
	F	%	F	%	F	%	
Complete	8	40	2	10	10	50	
Incomplete	2	10	8	40	10	50	0.007
Total	10	50	10	50	20	100	

Based on Table-8, 10 respondents in the control group, 8 infants (40%) had complete immunization and 2 infants (10%) had incomplete immunization. Meanwhile, 10 respondents in the case group, there were 2 infants (10%) with complete immunization and 8 infants (40%) with incomplete immunization. Based on the results of the chi-square test, the p-value = 0.007 <0.05, it is concluded that there is a significant influence between immunization status and the incidence of stunting in the control and case groups.

Table-9. Chi-Square Test Results For Periodic Health Examination In the Control Group and Case Group

Periodic Health Examination	Group				Total		*p-value*
	Control		Case				
	F	%	F	%	F	%	
Regular 1 times/month	10	50	6	30	16	80	
Irregular 1 times/month	0	0	4	20	4	20	0.87
Total	10	50	10	50	20	100	

According to Table-9, it is known that out of 10 respondents in the control group, there are 10 infants (50%) who routinely check their health regularly once a month at the toddler health post and there are 0 infants (0%) who do not routinely check their health regularly once a month at the toddler health post. Meanwhile, of the 10 respondents in the case group, there were 6 infants (30%) who had regular 1-time/month periodic health examination and there were 4 infants (20%) who had irregular 1-time/month periodic health examination at the toddler health center. Based on the results of the chi-square test, the p-value = 0.87> 0.05, it is concluded that there is no significant influence between periodic health examination with the incidence of stunting in the control and case groups.

Table-10. Models Summary Factors that Most Affect The occurrence of stunting

Risk Factors of *Stunting*	*Cox and Snell R Square*	*Nagelkerke R Square*
Nutritional Status	0.750	1.000
Exclusive Breastfeeding	0.571	0.761
Early Complimentary feeding	0.422	0.563
Birth Weight	0.424	0.565
Infectious Disease	0.420	0.723
Immunization Status	0.320	0.427

According to Table-10, it is known that the dominant risk factor that most affects the occurrence of stunting is nutritional status (Cox and Snell R Square and Nagerkerke R Square values of 75% and 100%) followed by exclusive breastfeeding (Cox and Snell R Square values of 57% and 76%). Then followed by early complimentary feeding (Cox and Snell R Square and Nagelkerke R Square values of 42% and 56%) and then followed by weight at birth (Cox and Snell R Square and Nagelkerke R Square values of 42% and 56%). While, previous infection (Cox and Snell R Square values of 42% and 72%) And immunization status (Cox and Snell R Square values of 21% and 42%).

3.2. Discussion

According to the data testing in this study, the chi-square analysis test was used. The chi-square test for nutritional status has p-value of 0.000 or p-value <0.05, which means that there is an influence between nutritional status and the incidence of stunting. The results of this study are similar to Ika's research that there is a relationship between nutrition and the incidence of stunting which can be seen from the results of the chi-square correlation with significance of 0.000 <0.05. Thus, having good knowledge about nutrition can prevent stunting.(8)

The chi-square test value on exclusive breastfeeding has a p-value of 0.001 or p-value <0.05, which means that there is an influence between exclusive breastfeeding and the incidence of stunting. This study is similar to Anita's research that there is a relationship between exclusive breastfeeding and the incidence of stunting with the results of the chi-square test 0.000 <0.5. Meanwhile, in the odds ratio test, the OR value = 61 means that those who are not exclusively breastfed have a 61-fold chance of experiencing stunting compared to babies who are exclusively breastfed.(9)

The chi-square test value on early complementary feeding resulted in a p-value of 0.011 or a p-value <0.05, which means that there is an influence between early complementary feeding and the incidence of stunting. The results of this study are in line with Imtihanatun's research conducted in Babakan Surabaya Village, Kiaracondong Bandung District in 2009 which reported that there was a significant influence of complementary feeding on the prevention of stunting. Because complementary feeding is important for baby's growth so that the baby's nutritional requirements are fulfilled.(10)

The chi-square test value for LBW showed p-value of 0.005 or p-value <0.05, which means that there is an influence between LBW and the incidence of stunting. This study is in line with Resky's research conducted in Sidrap Regency which states that the results of the study have a relationship between weight at birth and stunting with p value 0.003 <0.05.(11)

The chi-square test value on LB resulted in a p-value of 0.20 or a p-value> 0.05, which means that there is no influence between LB and the incidence of stunting. This study is in line with Putri's research that the results of the analysis explain there is no relationship between lenght of birth (p=0.227 and OR = 1.645) with the incidence of stunting, because lenght of birth describes the linear growth of babies while in the mother's womb.(12)

The chi-square test value in infectious diseases produces obtained p-value of 0.000 or p-value <0.05, which means that there is an influence between infectious diseases and the incidence of stunting. This study is in line with Erwina's results that infectious diseases in infants contribute to the risk of stunting by 3 to 8 times higher than infants who do not have a history of infectious disease.(13)

The chi-square test value on immunization status showed p-value of 0.007 or p-value <0.05, which means that there is an influence between immunization status and the incidence of stunting. This study is in line with Yosintha who concluded that there is a relationship between immunization on the incidence of stunting toddlers with p value <0.05 (0.000 <0.05) and there would be a risk of stunting in infant with incomplete immunization compared to infants with complete immunization.(14)

The chi-square test result on periodic health checks at the posyandu resulted in a p-value of 0.87 or a p-value> 0.05, which means that there is no influence between periodic health checks at the posyandu and the incidence of stunting. This study is in line with Rindha, where the research results found that there was no relationship with the incidence of stunting and suggested periodic monitoring of the incidence of stunting.(15)

4. CONCLUSION

According to the results of the analysis, the main risk factors that most affect the incidence of stunting in the working area of Amplas Community Health Center in Medan City for children aged 0-59 months is nutritional status, then followed by exclusive breastfeeding and birth weight.

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