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FACTORS ASSOCIATED WITH STUNTING AMONG TODDLERS IN THE WORKING AREA OF PANDRAH PUBLIC HEALTH CENTER, BIREUEN DISTRICT

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ABSTRACT

Stunting is a condition in which toddlers cannot grow normally due to malnutrition for a long time, so that children's height tends to be shorter than their age. In addition to inhibiting physical growth, stunting also inhibits mental growth and children's health. Stunting cases in 2018 nationally reached 30.8%, Aceh was 37.3%, while Bireuen was 35.1% where the highest cases occurred in the work area of the Pandrah Health Center with 161 cases. The purpose of this study was to determine the factors associated with the incidence of stunting in children under five in the Pandrah Public Health Center, Bireuen Regency in 2020. This research is analytical observational using case control design. The population in this study were toddlers aged 24-59 months who experienced stunting in the work area of the Pandrah Health Center, Bireuen Regency with the mother of the toddler as the respondent. Sampling using the case control study formula as many as 30 toddlers experienced stunting and 30 toddlers did not experience stunting. Data collection was carried out for 7 days from 10 to 16 July 2020 using a questionnaire through interviews. Data analysis used chi-square test with SPSS computer program. The results of the univariate study showed that under five children were not stunted more in infants whose mothers were not SEZ during pregnancy (93.4%), mothers were not anemic during pregnancy (86.7%), under-fives were not LBW (90%), and toddlers with adequate energy intake (90%). Meanwhile, stunting was more in toddlers who were not exclusively breastfed (96.7%), toddlers with early MP-ASI (96.7%), and toddlers who had experienced infectious diseases (83.3%). The results of the bivariate study showed that there was a significant relationship between SEZ

of pregnant women (p=0.019) (OR=7,000), anemia (p=0.025) (OR=4.333), LBW (p=0.000) (OR=29.571), exclusive breastfeeding (p=0.001) (OR=37.923), early complementary feeding (p=0.001) (OR=37.923), and infectious diseases (p=0.004) (OR=5.714) with stunting in toddlers. However, there was no significant relationship between energy intake (p = 0.286) (OR = 2.250) and stunting in children under five in the Pandrah Public Health Center, Bireuen Regency. It is hoped that Pandrah Health Center officers can provide counseling and guidance on the factors that cause stunting, especially the importance of exclusive breastfeeding.

Keywords: *Stunting, Toddlers, SEZ of Pregnant Women, Anemia of Pregnant Women, LBW, Exclusive Breastfeeding, Early MP-ASI, Energy Intake, Infectious Diseases.*

INTRODUCTION

Stunting is a condition in which toddlers fail to grow normally due to prolonged nutritional deficiencies. Children with stunting require special attention, as it not only hinders physical growth but also affects mental development and overall health (Setiawan, Machmud, and Masrul 2018). Stunting indicates the presence of chronic nutritional problems in toddlers. This condition can be influenced by the health status of the mother or prospective mother, fetal development, and the infant or toddler period, including any illnesses suffered by the child. However, stunting can only be confirmed when the child reaches the age of two years (Kemenkes 2016).

Based on data from the World Health Organization (WHO) over the past three years, the global prevalence of stunting has remained relatively stagnant. In 2018, the highest stunting prevalence was found in Oceania at 21.9%, while the lowest was in North America at 2.6% both being developed regions. Indonesia, a developing country, ranked third globally for the highest number of stunting cases in the same year. According to the Nutritional Status Monitoring (NSM) data (2018), in recent years, stunting has shown a higher prevalence compared to other nutritional problems. The results of the Basic Health Research Survey (Riskesdas 2018) revealed that Aceh ranked third among 34 provinces in Indonesia with the highest stunting prevalence, at 37.3%, which is higher than the national average of 30.8%. This means that one in three toddlers in Aceh suffers from stunting. Bireuen District ranks third in the province, with a stunting prevalence of 35.1%.

The high prevalence of stunting is caused by multiple interrelated factors. One of the contributing factors is anemia during pregnancy. Anemia in pregnant women poses a risk to the newborn and may lead to stunting in toddlers due to inadequate nutritional intake. This is supported by a study conducted by Widyaningrum and Romadhoni (2018), which found that mothers who experienced anemia during pregnancy were four times more

likely to give birth to children with stunting compared to those who did not suffer from anemia during pregnancy. Exclusive breastfeeding is also one of the factors influencing the incidence of stunting. Breast milk plays a crucial role in meeting the nutritional needs of infants. Babies who are exclusively breastfed have stronger immune systems, which reduces the risk of infectious diseases (Cynthia, Bikin Suryawan, and Widiasa 2019). A study showed that children who were not exclusively breastfed were 4.643 times more likely to experience stunting compared to those who received exclusive breastfeeding (Ni'mah and Muniroh 2016).

According to data from the Bireuen District Health Office, the highest number of stunting cases in 2019 was recorded in the working area of Pandrah Public Health Center, with a prevalence of 20.3%. In previous years, stunting data from each health center in Bireuen District was unavailable, as stunting only became a focus of the local government in 2019. Although the government has implemented various programs to reduce stunting, the prevalence remains unchanged. Therefore, the author is interested in examining the factors associated with stunting among toddlers in the working area of Pandrah Public Health Center, Bireuen District. These factors include maternal undernutrition during pregnancy (chronic energy deficiency), maternal anemia during pregnancy, low birth weight (LBW), exclusive breastfeeding, early complementary feeding, inadequate energy intake, and infectious diseases.

METHODS

This study is an analytical observational research using a case-control design, conducted by comparing the exposure between case and control groups. The independent variables include maternal undernutrition during pregnancy (chronic energy deficiency), maternal anemia during pregnancy, low birth weight (LBW), exclusive breastfeeding, early complementary feeding, energy intake, and infectious diseases. The dependent variable is stunting in toddlers.

Data were obtained through interviews with health center staff and the Bireuen District Health Office. The research instruments used included medical records, maternal and child health (MCH) books, checklists, questionnaires, and a semi-quantitative food frequency questionnaire (FFQ).

1. Data Collection Method

The data used in this study consisted of primary and secondary data. Primary data were obtained from interviews using questionnaires administered to respondents who were selected as research samples. The primary data collected included:

a) Data on stunted and non-stunted toddlers obtained from the medical records of Pandrah Public Health Center, Bireuen District;

b) Data on mid-upper arm circumference (MUAC) during pregnancy, hemoglobin (Hb) levels during pregnancy, and birth weight as recorded in the Maternal and Child Health (MCH) book during the study;
c) Data on complementary feeding (CF), exclusive breastfeeding, and history of infectious diseases obtained through questionnaires and checklists;
d) Data on energy intake collected using a semi-quantitative Food Frequency Questionnaire (FFQ).

In addition to primary data, this study also utilized secondary data from the Bireuen District Health Office and Pandrah Public Health Center to obtain an overview of the area and the number of toddlers in the study location. The study population consisted of toddlers aged 24 to 59 months, totaling 93 stunted children out of 472 toddlers in the working area of Pandrah Public Health Center, Bireuen District, from January to July 2020, with their mothers as respondents. The sampling method used was proportional random sampling with a 1:1 ratio, resulting in a total sample of 60 toddlers, consisting of 30 stunted toddlers (cases) and 30 non-stunted toddlers (controls) who met the inclusion criteria. This study was conducted in the working area of Pandrah Public Health Center, Bireuen District, over a period of 7 days, from July 10 to July 16, 2020, covering 18 villages.

2. Data Analysis Method

The collected data were processed through data entry, editing, coding, and tabulation. The analysis performed in this study included univariate and bivariate analyses. Univariate analysis was conducted to describe the research variables in the form of frequency distributions. Meanwhile, bivariate analysis was performed using the Chi-square test to examine the relationships between each variable

RESULTS AND DISCUSSION

The results of the statistical test on the frequency distribution of factors associated with stunting among toddlers in the working area of Pandrah Public Health Center, Bireuen District in 2020 are presented in Table 1."

Table 1. Frequency Distribution of Factors Associated with Stunting among Toddlers in the Working Area of Pandrah Public Health Center, Bireuen District, 2020.

Variable	Total Respondents	
	n	%
Variable Dependent		
Stunting		
Stunting	30	50

Variable	Total Respondents	
	n	%
Normal	30	50
CED Pregnant Women		
CED	12	20
Normal	48	80
Anemia		
Anemia	16	26,7
Normal	44	73,3
LBW		
Yes	26	43,3
No	34	56,7
Esclusive Breastfeeding		
Non Exclusive	42	70
Exclusive	18	30
Early Complementary Feeding		
Yes	42	70
No	18	30
Energy Intake		
Low	9	15
Adequate	51	85
Infectious Disease		
Yes	39	65
Never	21	35

Based on Table 1, the proportion of stunted toddlers was 50%, and non-stunted toddlers was also 50%. The majority of pregnant women did not experience chronic energy deficiency (80%), and most did not have anemia during pregnancy (73.3%). In addition, the majority of toddlers were not born with low birth weight (56.7%), did not receive exclusive breastfeeding (70%), received early complementary feeding (70%), had adequate energy intake (85%), and experienced infectious diseases (65%).

The results of statistical analysis regarding the factors associated with stunting among toddlers in the working area of Pandrah Public Health Center, Bireuen District, in 2020 are presented in Table 2.

Table 2. Factors Associated with Stunting Among Toddlers in the Working Area of Pandrah Public Health Center, Bireuen District, 2020

Variable	Stunting		P value	OR
	Normal	Stunting		
CED Pregnant Women				
CED	12	20	0,019	7,00
Normal	48	80		
Anemia				
Anemia	16	26,7	0,025	4,33
Normal	44	73,3		
LBW				
Yes	26	43,3	0,000	29,57
No	34	56,7		
Esclusive Breastfeeding				
Non Exclusive	42	70	0,001	37,92
Exclusive	18	30		
Early Complementary Feeding			0,001	37,92

Variable	Stunting		P value	OR
	Normal	Stunting		
Yes	42	70		
No	18	30		
Energy Intake				
Low	9	15	0,286	2,25
Adequate	51	85		
Infectious Disease				
Yes	39	65	0,004	5,71
Never	21	35		

Based on Table 2, the results of the univariate analysis show that non-stunted toddlers were more prevalent among those whose mothers did not experience Chronic Energy Deficiency (CED) during pregnancy (93.4%), mothers who did not suffer from anemia during pregnancy (86.7%), toddlers who were not born with low birth weight (90%), and toddlers who had adequate energy intake (90%). Meanwhile, stunted toddlers were more prevalent among those who were not exclusively breastfed (96.7%), those who received early complementary feeding (96.7%), and those who had a history of infectious diseases (83.3%).

The results of the bivariate analysis indicated a significant association between stunting in toddlers and several factors: maternal CED during pregnancy (p=0.019; OR=7.000), maternal anemia (p=0.025; OR=4.333), low birth weight (p=0.000; OR=29.571), lack of exclusive breastfeeding (p=0.001; OR=37.923), early complementary feeding (p=0.001; OR=37.923), and history of infectious diseases (p=0.004; OR=5.714). However, no significant association was found between energy intake (p=0.286; OR=2.250) and stunting among toddlers in the working area of Pandrah Public Health Center, Bireuen District.

Discussion

The Relationship Between Maternal Chronic Energy Deficiency (CED) During Pregnancy and Stunting in Toddlers.

The study found that maternal Chronic Energy Deficiency (CED) during pregnancy is significantly associated with stunting in toddlers (p-value = 0.019 < 0.05), indicating that CED is a contributing factor to stunting. The Odds Ratio (OR) value was 7.000, meaning that mothers who experienced CED during pregnancy were 7 times more likely to have stunted children compared to those who did not, in the working area of Pandrah Public Health Center, Bireuen District.

This condition is partly explained by the age of mothers with CED and stunted children in the area, where one mother was under 20 years old and five were over 35 years old both categorized as high-risk pregnancies for both the mother and fetus. According to Aini (2019) young pregnant women

require more nutritional intake because the nutrients are used not only for their own growth and development but also shared with the fetus. Older pregnant women also need higher energy intake due to declining organ function, thus requiring sufficient nutritional intake to support the ongoing pregnancy.

If a pregnant mother fails to meet her nutritional needs, her body will use its own nutrient reserves to meet her physiological demands. If this persists, it may lead to malnutrition or CED. This is consistent with a study by Veria Setyawati (2018) which showed that both younger and older maternal ages affect the nutritional requirements during pregnancy. Younger women require additional nutrients for both themselves and the fetus, while older women require more energy due to reduced organ function. Therefore, the ideal maternal age for pregnancy is between 20 and 35 years, which is associated with better maternal nutrition.

Nutrient intake from food is a crucial factor that determines a woman's nutritional status before and during pregnancy, which will affect conception outcomes. Women who experience malnutrition before or during early pregnancy are more likely to give birth to infants with brain and spinal cord damage, as the central nervous system is highly sensitive during the first 2–5 weeks. If this nutritional deficiency continues throughout pregnancy, it increases the risk of intrauterine growth restriction and the birth of low birth weight (LBW) babies, which can lead to stunting. This risk worsens when prenatal undernutrition is followed by inadequate nutrition during the first two years of life (Aini 2019).

These findings are consistent with the study by Ruaida and Soumokil (2018) conducted at Tawiri Public Health Center, Ambon City, which found a significant association between maternal CED and stunting. Toddlers whose mothers had a history of CED during pregnancy were 4.85 times more likely to be stunted compared to those whose mothers did not have CED. Aini (2019) also found similar results in the Pabelan Health Center, Semarang, where mothers with Mid-Upper Arm Circumference (MUAC) < 23.5 cm (CED) had a 25.667 times higher risk of delivering a stunted child than those with MUAC > 23.5 cm (non-CED). In contrast, a study by Warsini, et.al (2016) in Sedayu Subdistrict, Yogyakarta, showed no significant relationship between CED during pregnancy and stunting in toddlers (p-value = 0.23 > 0.05; OR = 0.61; 95% CI: 0.32–1.14). This result may be due to the high level of awareness among pregnant women in Sedayu regarding antenatal care, allowing for early detection and prompt intervention for CED by healthcare workers.

Based on statistical univariate analysis, the result shows that 53.3% of respondents' age is between 20-45 years old, majority of respondents or 75% are housewives and unemployed, majority (81.67%) of respondents has low monthly income. Inaddition, majority of respondents (90%) are married, 61.67% are not using hormonal contraceptionand 65% do not have family

history of obesity. Regarding energy expenditure, 53.33% of respondents regularly doing physical exercise and 75% doing regulare light physical activity. Also, 83.33% of respondents sleep within adequate duration (≥ 7 hours), and based on stress level calculation, 85%of of respondents experiencing stress. And lastly, 56.7% of respondents consume less fiber on their diet (inadequate fiber intake). Based on bivariate analysis, there is significant relationship between monthly incomes, family history of obesity, physical activity with obesityamong housewives in Kueh and Seubun Ayon Villages, Lhoknga, Aceh Besar in 2020. On the contrary, there is no significant relationship between age, occupation, marital status, hormonal contraceptive use, regular physical exercise, sleep duration, stress level with obesity among housewives in Kueh and Seubun Ayon Villages, Lhoknga, Aceh Besar in 2020.

The Relationship Between Maternal Anemia During Pregnancy and Stunting in Toddlers

The study showed that maternal anemia during pregnancy was significantly associated with stunting in toddlers (p-value = 0.025 < 0.05), indicating that anemia is a contributing factor to stunting. The Odds Ratio (OR) was 4.333, meaning that mothers who experienced anemia during pregnancy were four times more likely to have stunted children compared to those who did not, in the working area of Pandrah Public Health Center, Bireuen District.

The additional energy requirements for pregnant women are 180 kcal in the first trimester and 300 kcal in the second and third trimesters, along with an additional protein requirement of 17 grams. A pregnant woman with inadequate nutritional intake may develop anemia, increasing the risk of giving birth to a low birth weight (LBW) baby and further increasing the risk of stunting (Warsini et al. 2016).

Based on the study in the Pandrah Health Center area, among 16 mothers who experienced anemia during pregnancy, 9 (56.25%) had stunted toddlers who were born with LBW, 3 (18.75%) had stunted toddlers without LBW, and 4 (25%) had non-stunted toddlers with normal birth weight.

This is consistent with a study by Warsini, et.al (2016) in Sedayu Subdistrict, Yogyakarta, which found a significant relationship between maternal anemia during pregnancy and stunting in toddlers (p-value = 0.08 < 0.05; OR = 1.65; 95% CI: 0.94–2.91). The study revealed that approximately 44.78% of mothers with anemia during pregnancy gave birth to LBW babies. Therefore, maternal anemia significantly influences birth weight outcomes

The Relationship Between Low Birth Weight (LBW) and Stunting in Toddlers

The study showed that low birth weight (LBW) is significantly associated with stunting in toddlers (p-value = 0.000 < 0.05), indicating that LBW is a major risk factor for stunting. The Odds Ratio (OR) was 29.571, meaning that toddlers born with LBW were 29 times more likely to experience stunting than those born with normal weight in the Pandrah Health Center area of Bireuen District.

This may be due to maternal undernutrition before and during pregnancy, which affects conception outcomes. Women who experience malnutrition, particularly during the final weeks of pregnancy, are more likely to deliver LBW babies, as significant fat tissue is formed in the third trimester. LBW infants often face difficulty in catching up on growth (Ruaida and Soumokil 2018). In the Pandrah Health Center area, 9 stunted toddlers born with LBW had mothers who experienced chronic energy deficiency during pregnancy.

This is consistent with the study by Ruaida and Soumokil (2018) at Tawiri Public Health Center, Ambon City, which found that mothers with CED during pregnancy were 5.93 times more likely to give birth to LBW babies compared to non-CED mothers. The study also found a significant relationship between LBW and stunting in toddlers (p-value = 0.000 < 0.05; OR = 29.4), indicating that toddlers with LBW were 29 times more likely to be stunted compared to those with normal birth weight. This is due to impaired fetal growth, which can permanently alter body structure and function. LBW infants often struggle to catch up on growth. The risk of growth failure increases when prenatal undernutrition is followed by inadequate food intake during the first two years of life with a critical period that determines the risk of stunting in adulthood. In contrast, a study by Hardiyanti and Yuniarti (2024) in Semanga Village, Sejangkung Subdistrict, Sambas Regency, found no significant relationship between LBW and stunting in toddlers (p-value = 0.616 > 0.05). However, toddlers with LBW still had a threefold greater chance of being stunted compared to those with normal birth weight (OR = 3.286).

The Relationship Between Exclusive Breastfeeding and Stunting in Toddlers

The study found that exclusive breastfeeding is significantly associated with stunting in toddlers (p-value = 0.001 < 0.05), indicating that the lack of exclusive breastfeeding is a contributing factor to stunting. The Odds Ratio (OR) was 37.923, which means that toddlers who were not exclusively breastfed were 37 times more likely to experience stunting compared to those who were exclusively breastfed in the working area of Pandrah Public Health Center, Bireuen District.

This result is likely due to the fact that most mothers in the Pandrah area combined breast milk with formula or other complementary foods before the baby reached 6 months of age. However, the specific reasons why mothers introduced complementary feeding early were not determined due to limitations in measurement tools used in the study. According to the theory presented by Nining (2014). combining breast milk with formula may meet the baby's nutritional needs, but formula milk lacks antibodies that are abundantly present in breast milk. As a result, infants become more susceptible to infections. Thus, exclusive breastfeeding influences stunting status through its role as an anti-infective agent. This is supported by Cynthia et.al (2019), who stated that breast milk plays a crucial role in fulfilling an infant's nutritional needs. Breastfeeding enhances the infant's immunity and reduces the risk of infectious diseases. Breast milk contains essential minerals such as calcium, which supports muscle and skeletal growth. This contributes significantly to the baby's linear growth, and breastfed infants tend to have greater height than formula-fed infants. Therefore, breastfeeding can help prevent stunting.

This finding aligns with research by Fikadu et.al (2014) as cited in Lubis et.al (2018), which found that children who were exclusively breastfed for less than six months had a 3.27 times higher risk of becoming stunted than those who received exclusive breastfeeding for six months. Similarly, a study by Kusumasari et.al (2021) found a relationship between exclusive breastfeeding and stunting (OR = 4.643). One of the main reasons for not practicing exclusive breastfeeding was the delayed release of breast milk after childbirth, which led mothers to give formula milk as a substitute. Once breast milk production became sufficient, breastfeeding continued alongside formula supplementation. In contrast, a study by Haryani (2016) in Cilosok Subdistrict, Sukabumi Regency, found no significant relationship between exclusive breastfeeding and stunting in children aged 1–2 years (p-value = 0.887 > 0.05). This suggests that both breastfed and non-breastfed toddlers had equal chances of experiencing stunting.

The Relationship Between Early Complementary Feeding (CF) and Stunting in Toddlers

The study also found that early introduction of complementary feeding (CF) was significantly associated with stunting in toddlers (p-value = 0.001 < 0.05). Early complementary feeding was identified as a risk factor for stunting, with an Odds Ratio (OR) of 37.923. This means that toddlers who received CF before the recommended age were 37 times more likely to experience stunting than those who received it at the appropriate age, in the Pandrah Health Center area of Bireuen District. The timing of complementary feeding plays an important role in stunting occurrence, as infants aged 0–6 months only require breast milk for their primary nutrition Mann et al. (2018).

In the Pandrah area, 42 toddlers (70%) received complementary foods too early, and 29 of them (96.7%) were stunted.

This supports Rotua (2019) theory, which suggests that complementary feeding should be given at the appropriate age around six months when breast milk alone can no longer meet the child's nutritional needs. Introducing complementary foods too early can lead to a higher incidence of infections such as diarrhea, respiratory infections, allergies, and growth disturbances, as the infant's digestive system is not yet fully developed.

Similarly, a study by Jufrizen and Hadi (2021) found a significant relationship between the timing of complementary feeding and the nutritional status of children aged 6–23 months. Children who received CF at inappropriate times were 2.8 times more likely to become stunted (OR = 2.867). This finding is in line with research by Trisira et al. (2022) in Sidomulyo, which reported a significant relationship between early CF and stunting in toddlers (p = 0.001). Reasons cited for early complementary feeding included cessation of exclusive breastfeeding and the perception among mothers that their breast milk was insufficient or not flowing well, leading to fussy babies.

In contrast, a study by Haryani (2016) in Cilosok Subdistrict, Sukabumi Regency, found no significant relationship between early complementary feeding and stunting in toddlers aged 1–2 years (p-value = 0.951 > 0.05). Although most of the infants were not exclusively breastfed, their nutritional needs for the first six months were adequately met through a combination of breast milk and substitutes.

The Relationship Between Energy Intake and Stunting in Toddlers

The study showed that energy intake was not significantly associated with stunting in toddlers (p-value = 0.286 > 0.05), indicating that energy intake is not a direct contributing factor to stunting. The Odds Ratio (OR) was 2.250, meaning that toddlers who did not receive adequate energy intake were twice as likely to experience stunting compared to those who did.

The study found that 85% of subjects had adequate energy intake. This may be due to the geographic characteristics of the Pandrah area, where the northern part borders the Malacca Strait and 10 villages are located in mountainous regions. Access to nutrient-rich foods such as vegetables, fruits, and fish is relatively easy. However, the prevalence of stunting remains high in the region. This suggests that the primary triggers of stunting are not due to energy intake, but rather the high incidence of low birth weight (LBW) births (56.7%) and low rates of exclusive breastfeeding (30%). The study also revealed that toddlers with insufficient energy intake were twice as likely to be stunted. Of the 9 toddlers (15%) who had inadequate energy intake, 6 (20%) were stunted.

This finding aligns with a study conducted in West Nusa Tenggara, which found no significant difference in average energy intake between

stunted and normal toddlers aged 24–59 months (Sundari and Nuryanto 2016). In contrast, Wahqvis and Tienboon, as cited in Sakdiah et.al (2022), found a significant relationship between energy intake and stunting. Growth retardation, reflected in a child's height not matching their age, is considered an adaptive response to prolonged low energy intake. Stunting reflects chronic undernutrition, particularly affecting linear growth. A stunted baby or young child may experience short- and long-term impacts on their overall health.

The Relationship Between Infectious Diseases and Stunting in Toddlers

The study showed that infectious diseases were significantly associated with stunting in toddlers (p-value = 0.004 < 0.05), indicating that infections are a contributing factor. The Odds Ratio (OR) was 5.714, meaning that toddlers who had experienced infectious diseases were 5 times more likely to suffer from stunting compared to those who had never experienced infections in the working area of Pandrah Public Health Center, Bireuen District. The most commonly reported infectious disease among toddlers in the Pandrah area in the past year was diarrhea. However, the exact duration of illness was not determined due to limitations in research instruments.

Infectious diseases such as short-term diarrhea (1–2 days) can reduce a child's appetite. If such episodes occur repeatedly, it may result in low body weight compared to peers. Severe and recurrent diarrhea can lead to protein-energy malnutrition (PEM) and significantly impair a child's growth. This finding is supported by a study by Apriani and Soviana (2022) in Sukaraja Village, which found a significant association between a history of infectious disease and stunting in toddlers. Diarrhea was the most frequently occurring disease among toddlers. If such conditions persist, they can lead to nutritional problems. The more frequently a toddler experiences diarrhea, the greater their risk of stunting, as reduced appetite leads to decreased nutrient intake. Desyanti and Nindya (2017) also found a significant relationship between a history of diarrhea and stunting in toddlers in the Simolawang Health Center area (p-value = 0.025 < 0.05; OR = 3.619), meaning that toddlers who had diarrhea were three times more likely to be stunted than those who had never experienced it.

According to Rusana et al. (2023), pneumonia infections in toddlers can also affect the digestive system and trigger diarrhea, in addition to affecting other organs. More than 50% of toddlers with pneumonia also suffered from diarrhea. In contrast, a study by Ketut Suarayasa et.al (2023) in Semanga Village, Sejangkung Subdistrict, Sambas Regency, found no significant relationship between infectious diseases and stunting (p-value = 0.210 > 0.05). However, toddlers who had experienced infections were still 3 times more likely to be stunted than those who had never been sick (OR = 3.386).

CONCLUSION

The bivariate analysis showed a significant association between maternal chronic energy deficiency (CED) during pregnancy, maternal anemia, low birth weight (LBW), lack of exclusive breastfeeding, early complementary feeding (CF), and a history of infectious diseases with the incidence of stunting in children under five. However, there was no significant relationship found between energy intake and stunting among children in the working area of Pandrah Health Center, Bireuen District.

One recommended effort to reduce stunting prevalence is to enhance pregnant mothers' knowledge about balanced nutrition and the importance of exclusive breastfeeding. This can be achieved through regular health education and counseling conducted by healthcare providers, aiming to reduce the incidence of maternal CED and improve exclusive breastfeeding coverage for infants aged ≤ 6 months in the working area of Pandrah Health Center, Bireuen District.

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