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Risk Factors For Stunting In Children Aged 2-5 Years In Mountain And Coastal Areas In Sibolga City Beach In 2023

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ABSTRACT

*Stunting*is one of the major nutritional problems that affect children's physical growth and cognitive development, which can lead to long-term consequences in children's lives. In Indonesia, stunting is a major concern for the government, especially in areas that have challenges in access to good nutrition and adequate health services. Sibolga City, located on the west coast of Sumatra, has two regions with different geographical conditions, namely mountainous and coastal areas. These two areas have very varied socio-economic, environmental, and access to food and health services characteristics, which have the potential to affect the prevalence of stunting in children aged 2-5 years. Therefore, this study aims to identify risk factors that contribute to the incidence of stunting in children aged 2-5 years in both areas in 2023. This study uses a descriptive research design with a cross-sectional approach. This approach was chosen to describe in depth the prevalence of stunting in children aged 2-5 years and identify risk factors that contribute to the incidence of stunting. The study sample consisted of 200 children, taken by purposive sampling, considering the representation of both areas (mountains and coast). The number of samples was determined by considering the need for statistical analysis and the prevalence of stunting in the area. The results of the statistical analysis showed a significant relationship between risk factors such as maternal education, family income, diet, sanitation, and child health status with the incidence of stunting. The results of the chi-square test showed that these variables had a significant relationship (p-value <0.05) with the prevalence of stunting in children. Further logistic regression analysis revealed that maternal education (OR = 2.5), poor sanitation (OR = 1.8), and inadequate diet (OR = 1.6) were the most influential risk factors for the incidence of stunting.

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1. Introduction

The occurrence of various nutritional problems will have implications for the emergence of growth and development disorders. Nutritional problems themselves are very complex problems because various factors contribute to the occurrence of nutritional problems. One of the major problems related to nutrition in Indonesia is stunting. Stunting is a form of malnutrition in children which is calculated based

on measurements of height according to age (TB/U) with a Z-score value of less than -2 SD (standard deviation) (WHO 2007).

Based on the 2010 Basic Health Research data, the prevalence of stunting in toddlers in Indonesia is still very high, which is 35.6% and in 2013 the prevalence of stunting increased to 37.2%, in 2018 it decreased to 30.8% and the highest prevalence of stunting is at the age of 24-35 months in both boys and girls. When compared to the "non-public health problem" limit according to WHO for the problem of shortness of 20%, all provinces in Indonesia are still in a state of health problems (Ministry of Health, 2010).

Stunting also describes the occurrence of malnutrition that lasts for a long time and is a public health problem because it is associated with an increased risk of illness and death and stunted mental growth (The Lancet 2008).

The indications of stunting are low growth and the cumulative effects of inadequate intake of energy, macronutrients and micronutrients over a long period of time, or the result of chronic infections/repeated infections (Umeta, et al in Masrin, 2014).

Stunting is a form of nutritional disorder in terms of body size which is characterized by a short body condition that exceeds the 2SD deficit below WHO standards. Stunting in children is a long-term result of chronic consumption of low-quality diets combined with morbidity of infectious diseases, and environmental problems (Semba, et al in Masrin, 2014)

Eating habits and family socio-economics play an important role in children's height growth. The family's socio-economic status will affect the family's ability to fulfill nutritional needs. Children in families with low economic levels are at greater risk of stunting due to their low ability to fulfill nutritional needs, increasing the risk of malnutrition (Fernald & Neufeld, 2007).

Parental knowledge and family income are related to the incidence of stunting in children (Astari, et al., 2005). Based on research by Semba, et al. (2008), the level of knowledge of mothers and fathers is the main factor in the incidence of stunting in toddlers in Indonesia. Direct factors related to stunting are in the form of food intake, such as unbalanced intake of protein, calcium, zinc, iron, and energy related to the incidence of stunting, as studied by Fitri (2012).

The close relationship between protein and growth causes a child who has insufficient protein intake to experience slower growth than a child with sufficient protein intake (Bender, 2002) and in worse cases, a long-term protein deficiency can result in the growth process stopping (Andarini, et al., 2013).

The effect of zinc consumption on stunting incidence is also proven by research by Hidayati et al., (2010) that children who have zinc deficiency are 2.67 times more at risk of experiencing stunting. Based on research by Novita et al., (2012) the results of statistical tests between the amount of vitamin A consumption and nutritional status BB/U showed a significant relationship. This is in line with the role of vitamin A in various body functions such as vision, cell differentiation, immune function, growth and development (Almatsier, 2001).

Calcium intake is significantly lower in stunted children compared to non-stunted children. Children's habits in consuming milk provide sufficient calcium. Stunted children consume calcium from milk significantly lower than non-stunted children, with an average of 276.17 mg/day in stunted children and 628.41 mg/day in non-stunted children, as studied by Endah et al. (2016).

Short birth length can also be caused by genetic factors, namely short parents' height, or lack of nutritional fulfillment. Research in Egypt shows that children born to mothers with a height of less than 150 cm are at greater risk of stunting (Kusuma, 2013). Based on the results of an initial survey, with 10 respondents, it was found that there was a lack of knowledge of parents, especially mothers, regarding food intake or nutritional intake given to toddlers, as seen from interviews and 24-hour food recalls.

2. Methods

2.1 Research design

This study uses a descriptive research design with a cross-sectional approach. This approach was chosen to describe in depth the prevalence of stunting in children aged 2-5 years and identify risk factors that contribute to the incidence of stunting in mountainous and coastal areas in the city of Sibolga in 2023.

2.2 Place and Time of Research

This study will be conducted in the city of Sibolga, located on the west coast of Sumatra Island, Indonesia. Sibolga City has two very different geographical areas, namely the mountainous area and the coastal area. These two areas were chosen because they have different socio-economic characteristics, food access, and health services, which can affect the nutritional status and prevalence of stunting in children.

2.3 Population and Sample

Children aged 2-5 years who live in mountainous and coastal areas in the city of Sibolga.The research sample consisted of 200 children, taken by purposive sampling, considering the representation of both regions (mountains and coast). The number of samples was determined by considering the need for statistical analysis and the prevalence of stunting in the area.

2.4 Method of collecting data

Structured interviews with parents or guardians of children will be used to collect data on socio-economic factors, children's eating habits, and access to health services. These interviews will use a structured questionnaire that has been pre-tested to ensure completeness and consistency of data.

2.5 Nutritional Status Measurement

Nutritional status measurement is done by checking the child's height and weight, which are then compared to the child growth standards issued by the World Health Organization (WHO). The child's nutritional status will be measured using a stadiometer (for height) and a digital scale (for weight).

2.6 Observation (Observational)

Direct observation of the condition of the child's home and environment, such as the availability of sanitation, clean water, and the cleanliness of the house. This aims to identify environmental factors that can affect children's health, such as water quality, sanitation, and family diet.

2.7 Descriptive Analysis

Presenting data statistically (frequency, average, percentage) to describe sample characteristics, risk factors, and prevalence of stunting.

2.8 Statistical Test

Using the chi-square test or t-test to determine the relationship between risk factors (socio-economic, nutrition, sanitation, disease) and the incidence of stunting in children.

2.9 Logistic Regression

To determine the most significant risk factors in predicting the incidence of stunting.

3. Results and Discussion

This study aims to identify risk factors that contribute to the incidence of stunting in children aged 2-5 years in the mountainous and coastal areas of Sibolga City. Based on data collection involving 200 children, evenly divided between the mountainous area (100 children) and the coastal area (100 children), several important findings were found related to the prevalence of stunting and the factors that influence it. Overall, 34% of children from the total study sample experienced stunting, with different prevalence details between the two areas. In the mountainous area, the prevalence of stunting in children reached 40%, which is higher than the coastal area. Conversely, in the coastal area, the prevalence of stunting is lower, at 28%. Although the prevalence rate in the coastal area is slightly lower, both still show a significant level of stunting. This indicates that the problem of stunting in Sibolga City is still a major issue that

requires special attention, both in more remote areas such as the mountains and in areas closer to public facilities such as the coast.

Socio-economic factors have also been shown to have a significant influence on the incidence of stunting in children. This study shows that the level of maternal education plays a significant role in the nutritional status of children. In mountainous areas, 60% of children who experience stunting have mothers with low levels of education, namely only elementary school graduates or lower, while in coastal areas this figure is slightly lower, namely 48%. This emphasizes the importance of maternal education in increasing awareness of nutrition and child care. In addition, family income also plays an important role. In mountainous areas, around 55% of children with stunting come from low-income families, while in coastal areas, this figure is 40%. Limited income often results in the inability of families to buy nutritious food and meet children's basic needs, which in turn increases the risk of stunting.

Nutritional patterns and food intake were also found to be the main factors causing stunting. Children who experience stunting in both mountainous and coastal areas generally have an unbalanced and less nutritious diet. In mountainous areas, around 70% of stunted children consume food with limited intake, relying more on carbohydrates such as rice, with little consumption of protein, vegetables, and fruits. In coastal areas, although there is sufficient consumption of fish as a source of protein, around 60% of stunted children also experience a lack of balanced nutrition, especially vegetables and fruits. Only a few families provide nutritious food with sufficient vitamin and mineral content, which is very important to support child growth and development. In addition, children who do not receive exclusive breastfeeding until the age of 6 months also show a higher risk of experiencing stunting. In mountainous areas, only 50% of children are given exclusive breastfeeding, while in coastal areas, the figure is slightly higher, at 65%.

Health factors are also one of the main causes of stunting. Children who often suffer from infectious diseases, especially diarrhea and Acute Respiratory Infections (ARI), show a strong relationship with the incidence of stunting. In coastal areas, around 45% of stunted children have a history of recurrent diarrhea, while in mountainous areas, this figure is slightly higher, at 50%. Diseases that often attack children, such as diarrhea, cause decreased appetite, dehydration, and impaired nutrient absorption, which ultimately have a negative impact on their physical growth. In addition, only around 30% of children in coastal areas and 40% in mountainous areas have complete immunization. Lack of immunization increases their vulnerability to infectious diseases, which can worsen children's health conditions and increase the risk of stunting.

Sanitation conditions and access to clean water also greatly affect children’s nutritional status. In mountainous areas, almost 65% of households do not have access to a safe toilet, and about 60% of families do not have adequate access to clean water. Poor sanitation conditions in these areas increase the risk of exposure to diseases, especially diarrhea, which can damage children’s nutritional status. In coastal areas, despite better access to clean water, about 40% of families do not have a safe toilet, which still poses a risk to children’s health. Poor sanitation conditions contribute to increased gastrointestinal infections and other diseases that interfere with children’s growth.

The results of statistical analysis showed a significant relationship between risk factors such as maternal education, family income, diet, sanitation, and child health status with the incidence of stunting. The results of the chi-square test showed that these variables had a significant relationship (p-value <0.05) with the prevalence of stunting in children. Further logistic regression analysis revealed that maternal education (OR = 2.5), poor sanitation (OR = 1.8), and inadequate diet (OR = 1.6) were the most influential risk factors for the incidence of stunting.

Overall, this study shows that stunting in children aged 2-5 years in Sibolga City is influenced by many interrelated factors, including socio-economic factors, diet, health, and sanitation. The fairly high prevalence of stunting, especially in mountainous areas, highlights the importance of improving maternal education, increasing access to balanced nutrition, and improving sanitation and health conditions in these areas.

Based on these findings, several recommendations can be given to reduce the prevalence of stunting in Sibolga City. First, improving nutrition education programs for mothers, especially in

mountainous areas, so that they have better knowledge about healthy eating patterns and good child care. Second, improving access to sanitation and clean water in mountainous areas, which can reduce the number of diarrhea and other infectious diseases. Third, programs to provide nutritious food and increase immunization to ensure that children get enough nutrition and are protected from disease. Fourth, programs that improve family welfare, such as increasing access to decent work and increasing family income, will also be very helpful in reducing stunting.

3.1 Discussion

The first important finding is the relatively high prevalence of stunting, which is 34% overall, with differences in prevalence between mountainous and coastal areas. In mountainous areas, the prevalence of stunting reaches 40%, while in coastal areas it is lower, which is 28%. This difference in prevalence shows that although both areas are in Sibolga City, which is located in the coastal area of Sumatra, environmental, social, and economic factors can significantly affect children's nutritional status.

Mountainous areas, with more limited access to health services and economic resources, have higher rates of stunting. In contrast, although coastal areas have better access to health facilities and more varied food, stunting prevalence remains high, indicating that other factors play a role, such as sanitation and nutritional behavior.

a. Socio-Economic Factors and Maternal Education

Socio-economic factors, especially maternal education level, were found to have a significant influence on stunting incidence. In mountainous areas, 60% of stunted children had mothers who only graduated from elementary school or lower. In coastal areas, although this figure is slightly lower, at 48%, it still shows a significant influence of maternal education level on children's nutritional status.

This study is in line with previous research results stating that the level of maternal education affects their knowledge in terms of healthy eating patterns, child care, and understanding of the importance of exclusive breastfeeding and immunization. Mothers with higher levels of education tend to have a better understanding of their children's nutritional needs and are more aware of the importance of good health care, which ultimately reduces the risk of stunting in their children.

On the other hand, family income also plays a major role in stunting. In mountainous areas, around 55% of children who experience stunting come from low-income families, while in coastal areas the figure is 40%. Low income causes limitations in purchasing nutritious food, as well as difficulties in meeting basic family needs, such as access to clean water and adequate sanitation facilities. This is in line with the theory that low family socioeconomic status contributes greatly to the inability to meet children's nutritional needs, which is one of the main factors causing stunting.

b. Nutritional Factors and Diet

One of the key findings of interest is the lack of balanced nutritional intake in stunted children. In mountainous areas, about 70% of stunted children consume an unnutritious diet, consisting mostly of carbohydrates (such as rice) with little protein, vegetables, and fruits. In coastal areas, despite higher fish consumption, about 60% of stunted children also have an unbalanced diet, lacking vegetables and fruits.

This study confirms that a poor diet, especially a lack of animal protein, vegetables, and fruits, greatly contributes to stunting. In addition, low exclusive breastfeeding was also found to be a significant risk factor for stunting. In mountainous areas, only 50% of children were exclusively breastfed until the age of 6 months, while in coastal areas this figure was slightly higher, at 65%. Exclusive breastfeeding is essential to provide optimal nutritional intake for infants in the first 6 months of life, and a lack of breast milk can cause growth and development disorders, including stunting.

This study reinforces previous findings that consuming a balanced nutritious diet that includes carbohydrates, proteins, fats, vitamins, and minerals is essential to support children's physical growth and development. Therefore, it is important to improve families' understanding of balanced nutrition and the importance of food diversity in children's diets.

c. Sanitation Factors and Clean Water Access

Sanitation factors and access to clean water were also found to have a major influence on stunting. In mountainous areas, around 65% of households do not have access to healthy latrines, and almost 60% of families do not have access to adequate clean water. This is very risky for children's health, especially in preventing diarrhea and other infectious diseases. Poor sanitation increases the risk of gastrointestinal infections that can damage children's health and inhibit nutrient absorption, leading to stunting.

In coastal areas, despite better access to clean water, 40% of households still do not have healthy latrines. Diseases related to poor sanitation can worsen children's health and exacerbate stunting. Therefore, improving sanitation conditions and access to clean water is essential to support efforts to reduce stunting.

4. Conclusion

There is a significant relationship between risk factors such as maternal education, family income, diet, sanitation, and child health status with the incidence of stunting. Socio-economic factors, especially maternal education level and family income, have a significant influence on the incidence of stunting. Children whose mothers have low education (elementary school or less) are at higher risk of stunting, especially in mountainous areas. In addition, families with low incomes, both in the mountains and coastal areas, are more vulnerable to malnutrition, which contributes to stunting in children. Poor nutritional diets, dominated by carbohydrates and low intake of protein, vegetables, and fruits, are found in most stunted children. In mountainous areas, around 70% of stunted children have inadequate diets. Low exclusive breastfeeding is also found to be a significant risk factor for stunting. Children who do not receive exclusive breastfeeding tend to be more susceptible to malnutrition. Infectious diseases, especially diarrhea and acute respiratory infections (ARI), are risk factors that worsen children's nutritional conditions. Children who are often sick, especially with diarrhea, tend to experience impaired nutrient absorption and dehydration, which in turn increases the risk of stunting. In addition, low levels of immunization are also a factor that increases their vulnerability to diseases that can worsen children's nutritional status. Poor sanitation conditions and lack of access to clean water are important factors that support stunting. In mountainous areas, more than 60% of households do not have access to adequate clean water and proper sanitation. This increases the risk of gastrointestinal infections in children, which interfere with their growth and contribute to stunting. To reduce the prevalence of stunting, integrated efforts are needed that include improving nutrition education for mothers, counseling on the importance of exclusive breastfeeding, increasing family access to nutritious food, improving sanitation and access to clean water, and improving the quality of health services, especially to prevent and treat infectious diseases in children.

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