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**RISK FACTOR ANALYSIS OF FAMILY CHARACTERISTICS AND HEALTH HISTORY OF CHILDREN UNDER FIVE ON THE INCIDENCE OF STUNTING IN SIDENRENG RAPPANG**

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**Abstract**

**Background:** Stunting is one of the global nutritional problems that are still widely found, especially in developing countries. in Asia alone 87 million children were stunted. the prevalence of stunting in Sidenreng Rappang district was 26.10% in 2019. The purpose of this study was to look at the risk of family characteristics and health history on the incidence of stunting.

**Subjects and Method:**

The research design used was an observational study with an epidemiological design, namely a case-control study. The number of case samples obtained was 51 respondents so that the control sample was also 51 people and the total sample used was 102 respondents. The statistical test used is chi-square analysis and logistic regression

**Results:** We found significant correlation between mother’s education and the incidence of stunting with p-value = 0.022 or α < 0.05, low birth weight (LBW) with p-value = 0.000 or α < 0.05, and history of infection with p-value 0.043 or α < 0.05. As for household members, there is no significant correlation with stunting with p-value = 0.596 or α > 0.05. In other, we found that the risk of stunting in mothers with low education was 2,988 times higher than those with high education with OR = 2,988 (CI=1.236-6.735). Whereas for a household member, the household member that was more than 4 people were 0.625 times higher than those have 4 or less with OR = 0.625 (CI=0.227-1.874). LBW is 10.444 times more at risk than those born with normal weight with OR = 10.444 (CI = 3.276-33.300). Toddlers with a history of infection are at 2.496 times higher risk than those without a history of infection with OR = 2.496 (CI=1.105-5.639).

**Conclusion:** The highest risk factor for stunting is the low birth weight factor.

**Keywords:** Stunting, Mother’s Education, LBW, Infection History

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**BACKGROUND**

The three main indicators used to define malnutrition, namely, stunting, underweight, and wasting, the three indicators represent different nutritional problems for children as measured by the index of height for age, weight for height, and weight for age. The Lancet said that pregnant women and children who have malnutrition have a strong association with stunting at the age of two years and have long-term consequences(García Cruz *et al.*, 2017). Stunting is a chronic malnutrition problem caused by inadequate nutritional intake for a long time due to feeding that is not following nutritional needs (Millennium Challenge Account Indonesia, 2013)(Owino *et al.*, 2016). According to WHO, stunting is defined as a condition where height is at <=-2.0 height-for-age z-score (Mahmudiono, Sumarmi dan Rosenkranz, 2017).

In 2016, 22.9 percent or 154.8 million children under the age of 5 years were reported to be stunted worldwide, while in Asia alone 87 million children were stunted (UNICEF, 2020). Indonesia is the fifth largest stunting country in the world, according to the 2013 Basic Health Research, of 37.2% (nearly 9 million) under five, there are 29.6% are stunted. (UNICEF, 2020). According to the Ministry of Health's 2020 performance report, the number of stunting cases in South Sulawesi was 34.8% (Kemenkes, 2021). Based on the 2019 Central Statistics Agency report, the stunting prevalence in Sidenreng Rappang district was 26.10% (Pelaksanaan, Susenas dan Tahun, 2019).

Special nutrition intervention efforts for toddlers are focused on the first 1000 days of life (DOL) group, namely pregnant women, breastfeeding mothers, and children 0-23 months because the most effective prevention of growth and development delays occurs in 1000 (DOL) (Agosti *et al.*, 2017). Negative Results Possible impacts Nutritional problems in the short term are disorders of brain development, intelligence, growth disorders, and metabolic disorders of the body. In the long term, the dire consequences are cognitive decline and learning, decreased immunity leading to illness, and a high risk of diabetes, obesity, cardiovascular disease, cancer, stroke, and disability in old age and uncompetitive quality. Work causes low economic productivity. The 1000 DOL period is 270 days during pregnancy and 730 days when the baby is born for the first time(Kemenkes RI, 2018). A recent longitudinal study of children from Brazil, Guatemala, the Philippines, India, and South Africa showed that growth retardation was associated with early school dropout, with adults stunting under 2 years, a year earlier than those who did not grow retardation(Kemenkes RI, 2018). Chronic malnutrition (stunting) is not caused by one factor alone but is caused by many factors, where these factors are interrelated. Three main factors cause growth retardation, namely (Fu *et al.*, 2017): 1) imbalanced food intake (based on the nutrient content in the diet namely carbohydrates, proteins, fats, minerals, vitamins, and water), 2) past low birth weight (LBW) and 3) medical. In general, the causes of growth retardation can be divided into 3 levels, namely community, household (family), individual level. At the city level, the economic system, the education system, the health and sanitation system, and the drinking water system are factors that cause stunted growth. Household (family) level, namely H. Inadequate food quality and quantity, income level, number and structure of family members, inadequate child care, inadequate health care, and inadequate sanitation and drinking water are factors that cause stunted growth. These factors occur because of the p-factor.

**SUBJECTS AND METHOD**

1. **Study Design**

The research design used was an observational study with an epidemiological design, namely a case-control study. This research was carried out in Sidenreng Rappang Regency in 2021.

1. **Population and Sample**

The target population in this study was all stunting toddlers in the Sidenreng Rappang district based on data from the 2019 statistical agency report. The sample selection technique is simple random sampling. The withdrawal of the number of control samples in this study used the Lemeshow formula (1997). The number of case samples obtained was 51 respondents so that the control sample was also 51 people and the total sample used was 102 respondents.

1. **Study Variables**

The independent variable in this study is stunting and the dependent variable is family characteristics consisting of maternal education and household members and health history consisting of a history of low birth weight and a history of infectious diseases.

1. **Operational Definition of Variables**

Stunting in this study is a condition experienced by toddlers when height measurements show at <=-2.0 height-for-age z-score. Maternal education is the level of formal education the mother has taken and received a graduation certificate. Household members in this study are the number of individuals who live permanently in one house. A history of LBW is a toddler's weight at birth below 2500 grams. The history of infection means that the toddler has been exposed to an infectious disease.

1. **Study Instruments**

The instruments used in this study were questionnaires and observation sheets. Stunting data and history of LBW were obtained based on records of Posyandu activities. Mother's education data is taken based on the mother's information as evidenced by a graduation certificate. Data on household members and history of infection are recorded based on the results of observations and information from respondents.

1. **Data analysis**

The statistical test used to see the effect of the dependent variable on the independent is the chi-square test with a significance level of <0.05. while the statistical test of logistic regression was used to test the risk factors.

1. **Research Ethics**

Research ethical issues including informed consent, anonymity, and confidentiality, were addressed carefully during the study process.

**RESULTS**

1. **Sample Characteristics**

**Table 1. Frequencies of toddlers based on family characteristics and history of infection**

|  |  |  |
| --- | --- | --- |
| Variables | n = 102 | |
| n | % |
| **Mother's education**  Low  High  **Household member**  more than 4  4 or less  **Low birth weight**  LBW  Normal  **History of Infection**  Yes  No | 36  66  85  17  28  74  41  61 | 35.3  64.7  83.3  16.7  27.5  72.5  40.2  59,8 |

Table 1 shows the results of this study indicate that of the 102 respondents, there are 36 respondents (35.3%) with low education and 66 respondents (64.7%) with high education. Based on the number of household members, 85 respondents (83.3%) were more than 4 people and 17 respondents (16.7%) were 4 or fewer. There are 28 respondents (27.5%) who have a history of low birth weight and 74 respondents (72.5%) who were born with normal weight. Based on the history of infectious diseases, there were 41 respondents (40.2%) who had been exposed to infectious diseases and 61 respondents (59.8%) who did not.

1. **Bivariate Analysis**

**Table 2. Correlation analysis of influencing factors on stunting**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variables | Sample | | | | p-value | OR  (95% CI) |
| Case | | Control | |
| n | % | n | % |
| **Mother's education**  Low  High | 24  27 | 47.1  52.9 | 12  39 | 23.5  76.5 | 0.022 | 2.889  (1.236-6.735) |
| **Household member**  more than 4  4 or less | 41  10 | 80.4  19.6 | 44  7 | 86.3  13.7 | 0.596 | 0.652  (0.227-1.874) |
| **Low birth weight**  LBW  Normal | 24  27 | 47.1  52.9 | 4  47 | 7.8  92.2 | 0.000 | 10.444  (3.276-33.300) |
| **History of Infection**  Yes  No | 26  25 | 51.0  49.0 | 15  36 | 29.4  70.6 | 0.043 | 2.496  (1.105-5.639) |

Based on the results of chi-square analysis, it was found that there was a significant correlation between mother’s education and the incidence of stunting with p-value = 0.022 or α < 0.05, low birth weight (LBW) with p-value = 0.000 or α < 0.05, and history of infection with p-value 0.043 or α < 0.05. As for household members, there is no significant correlation with stunting with p-value = 0.596 or α > 0.05. Based on the results of risk analysis, it was found that the risk of stunting in mothers with low education was 2,988 times higher than those with high education with OR = 2,988 (CI=1.236-6.735). Whereas for a household member, the household member that was more than 4 people were 0.625 times higher than those have 4 or less with OR = 0.625 (CI=0.227-1.874). LBW is 10.444 times more at risk than those born with normal weight with OR = 10.444 (CI = 3.276-33.300). Toddlers with a history of infection are at 2.496 times higher risk than those without a history of infection with OR = 2.496 (CI=1.105-5.639).

**DISCUSSION**

This study shows that there is a significant association between mother's education and the incidence of stunting (p-value = 0.022 or < 0.05) and mothers with lower education are 2.899 times more at risk than those with high education (OR = 2.889, CI = 1,236-6.735). These results are in line with research on the determinants of stunting in children in Indonesia which found that one of the determinants of stunting was low maternal education (Beal *et al.*, 2018). Another study in Pakistan showed that mothers without formal education were more susceptible to nutritional disorders than those with formal education (Khan, Zaheer dan Safdar, 2019)(Fadare O *et al.*, 2019). A mother's education can show her capacity in terms of knowledge. Avoiding stunting in children requires adequate knowledge. Fulfillment of nutrition from pregnancy to toddler age needs to be supported by family knowledge and awareness. If a mother knows the importance of exclusive breastfeeding, then she will try to continue to maintain it until her child is 6 months old. on the other hand, if she does not know it, then there is no motivation to do it. A study conducted in Nigeria found that mother's knowledge had a positive effect on the nutritional status of children(Fadare O *et al.*, 2019). Therefore, the education of mothers or prospective mothers needs to be considered by all parties. For mothers with low education, increasing knowledge can be done by counseling and mentoring nutritional problems to prevent nutritional disorders in children, especially stunting.

Household member in this study had no significant effect on stunting with p-value = 0.596, and OR = 0.652 (CI=0.227-1.874). The results of this study show different results from research conducted on toddlers in Sumatra which shows that the dominant factor associated with stunting is household members (Oktarina dan Sudiarti, 2014). Based on these results, we assume that household members do not have a direct influence on saturation, but can be the second factor that plays a role in the main factor. With these results, we suggest that there are further researchers who can investigate more deeply the influence of household members on stunting so that they can enrich scientific knowledge.

History of LBW had a significant effect on the incidence of stunting with p-value = 0.000 and OR = 10.444 (CI = 3.276-33.300). A study aimed to analyze risk factors and various nutrients associated with stunting among children aged 6–60 months, found that LBW is the main risk factor contributing to stunting and is strongly associated with low zinc levels (Bahagia Febriani *et al.*, 2020). Another study showed that LBW was a predictor of stunting in children aged 0-11 months (Sartika *et al.*, 2021). Babies born with low birth weight have a very high risk of growth deficiency (Pawar *et al.*, 2018). Low birth weight is an indication of nutritional deficiency in the baby while in the womb (Zhao *et al.*, 2020). So that the appropriate intervention to deal with this problem must be maximized so that growth can return to normal. Babies born with low weight can cause growth disorders, especially during the first 1000 days of life which is an important period in the growth of toddlers. Starting from the age of 23 months of pregnancy, the baby's growth needs to be taken seriously because from that time on it can have an impact on the first 1000 days of life (Petry *et al.*, 2016). Therefore, stunting prevention can be carried out from gestational age, especially in terms of nutrition.

History of infection in this study had a significant effect on the incidence of stunting with p-value = 0.043 and OR = 2.496 (CI = 1.105-5.639). A studies have shown that the incidence of stunting is associated with diarrhea and acute respiratory distress in infants under five years old (Arini *et al.*, 2020). An other study show Zika virus infection during pregnancy can have implications for growth disorders in the fetus (Yockey *et al.*, 2018). Infectious diseases are one of the direct causes of growth retardation. The relationship between infectious diseases and food compliance cannot be separated. The presence of infectious diseases will worsen the situation with insufficient food intake. Malnourished children are more prone to infectious diseases. Infectious diseases Children suffering from infectious diseases with a duration The longer the time, the greater the likelihood of being stunted.This infectious disease is usually characterized by decreased appetite and vomiting, so the young child's ingestion does not meet his needs. Conditions like these have bad effects on child growth.

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**CONFLICT OF INTEREST**

We declare that there is no conflict of interest in the process of this research

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