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Distribusi Stunting dan Determinan Stunting di Provinsi Nusa Tenggara Timur, Indonesia Tahun 2021: Analisis Spasial

Distribution of Stunting and Determinants of Stunting in the Province of East Nusa Tenggara, Indonesia in 2021: A Spatial Analysis

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ABSTRACT

The problem of stunting is still fundamental in Indonesia's human development. East Nusa Tenggara Province is an archipelago dryland area with the highest prevalence of stunted children under five in Indonesia. This study aims to determine the relationship of child characteristics with the prevalence of stunting. This type of research is an observational study with a cross-sectional design. This study used individual secondary data from the Indonesian Nutritional Status Survey in 2021 consisting of 7,835 children under five. The results of the spatial analysis showed that in the child's characteristic factor, there was a relationship between short birth length and low birth weight with stunting prevalence. It is hoped that there will be a special model of stunting control interventions that are integrated and of high quality through multisectoral cooperation in the dryland areas of the islands of East Nusa Tenggara Province.

ABSTRAK

Permasalahan stunting masih menjadi permasalahan mendasar dalam pembangunan manusia Indonesia. Provinsi Nusa Tenggara Timur (NTT) merupakan wilayah lahan kering kepulauan yang memiliki angka prevalensi stunting tertinggi di Indonesia. Penelitian ini bertujuan untuk mengetahui hubungan faktor karakteristik anak dengan kejadian stunting. Jenis penelitian ini adalah analitik observasional dengan desain cross sectional. Penelitian ini menggunakan data sekunder individu Survei Status Gizi Indonesia (SSGI) tahun 2021 yang terdiri dari 7.835 balita. Hasil analisis spasial menunjukkan terdapat hubungan antara faktor karakteristik anak terhadap stunting. Diharapkan adanya model khusus intervensi pengendalian stunting pada terkait pencegahan kejadian stunting sejak dini di wilayah lahan kering kepulauan Provinsi NTT.

Keywords: *Children under five, household factors, individual factors, toddler, stunting determinants*

Kata Kunci: Faktor anak, berat bayi lahir rendah, balita, stunting

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INTRODUCTION

Stunting is a chronic malnutrition problem caused by insufficient nutritional intake, for a long time due to the provision of food that does not match nutritional needs, causing children to be too short compared to other children of the same age. Stunting is defined as a very short body condition compared to children of their age with a deficit of 2 SD below the median body length or height of the international reference population[1]. One of the short-term effects of stunting is disruption of metabolism in the body, growth, and muscle mass, and brain development intelligence. The long-term impacts are permanent physical, mental, and intellectual growth and development disorders, low immunity and work productivity, and risk of chronic diseases such as diabetes mellitus, coronary heart disease, hypertension, cancer, obesity, heart disease, and stroke [2].

Regionally, the prevalence of stunting in Indonesia is still high. World Bank data for 2020 shows that the prevalence of stunting in Indonesia ranks 115th out of 151 countries in the world[3]. Based on the 2021 Indonesian Children Nutritional Status Study data, the prevalence of stunting is currently still at 24.4%[4]. Stunting has become a national priority in Indonesia, including in the Province of East Nusa Tenggara with a target of reducing the stunting rate to 14% in 2024.

The province of East Nusa Tenggara is in first place out of 34 provinces with stunting prevalence rates in Indonesia. Data from Basic Health Research shows that the problem of stunting from 2013 to 2018 has experienced a decrease in prevalence where 51.7% (2013) became 42.6% (2018).[5,6] However, this prevalence rate is still above the national and WHO prevalence thresholds, which is 20%.

The influence of location is important to see the pattern of problems with stunting and its determinants. Research on the spatial distribution of stunting determinants has not been studied much, especially looking at the spatial interactions of stunting cases and their determinants in East Nusa Tenggara Province. Understanding spatial distribution is very important for developing public health policies related to stunting.

Knowing, the spatial distribution of hotspots can help the government in handling stunting effectively and efficiently. So, for this reason, this study wants to see the pattern of the spread of stunting based on regional characteristics and the interrelationships between locations within it, as well as look at the spatial relationship between the determinants of stunting and cases of stunting. The benefits of this research are to present mapping information on stunting cases and profiles of children under five with stunting and can be used as material for consideration for the government regarding decision-making on stunting prevention and control in East Nusa Tenggara Province.

METHODS

A nationally representative survey, the Indonesian Children Nutritional Status Study, was used to conduct the presented study. Data are available from 22 districts of East Nusa Tenggara Province. The applied sampling structure (a two-stage stratified sampling frame) was based on the Indonesian Socio-economic Survey. The primary stage units are the villages and the census enumeration blocks for rural and urban areas, respectively. In the next stage, i.e., the second stage, from every preceding sampling unit/village/block, households were picked out for the survey grounded on the probability of systematic sampling. It was a survey steered by the National Bureau of Statistics.

The Indonesian Children Nutritional Status Study provided data on 7,835 children of age groups 0–59 months. The outcome variables were stunting. Other independent variables included in\ the study consisted of low birth weight (percentage) and short birth length (percentage). Geographical locations with the widespread occurrence of low birth weight and short birth length were obtained through spatial cluster detection.

Spatial regression analysis can be used to determine a relationship based on location or place information. One of the spatial regression models

is Spatial Autoregressive Model (SAR). Mariana (2013) states that SAR is a model that has a spatial relationship to the dependent variable. The spatial weighting matrix becomes a basic component of the spatial model, this matrix shows that there is a relationship between one location with surrounding locations. This study uses a weighting matrix spatial Queen, which is used in determining the spatial regression model to determine factors that cause stunting.

RESULTS

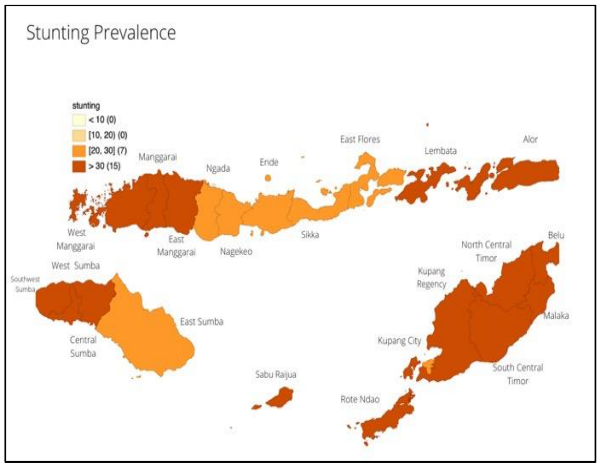

Figure 1. Map of stunting cases by district/city in East Nusa Tenggara Province in 2021

The results of the spatial analysis (figure 1) show that most of the regencies in the province of East Nusa Tenggara have stunting rates above 30 percent, namely 15 regencies/cities. The remaining 7 Regencies/Cities have a stunting rate of 20-30 percent and no District/City has a stunting rate of 10-20%.

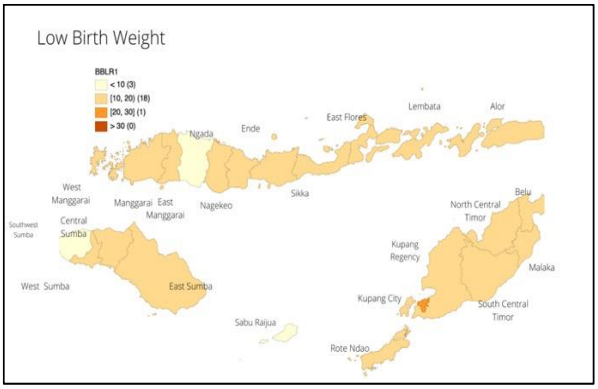

Figure 2. Map of cases of children with low birth weight by district/city in East Nusa Tenggara Province in 2021

The results of the spatial analysis (figure 2) show that most districts in the province of East Nusa Tenggara have low birth weight rates ranging from 10-20 percent, namely 18 districts/cities. The remaining 3 districts/cities have low birth weight rates at less than 10 percent as many as 3 regencies/cities and 1 district/city has LBW rates at 20-30%.

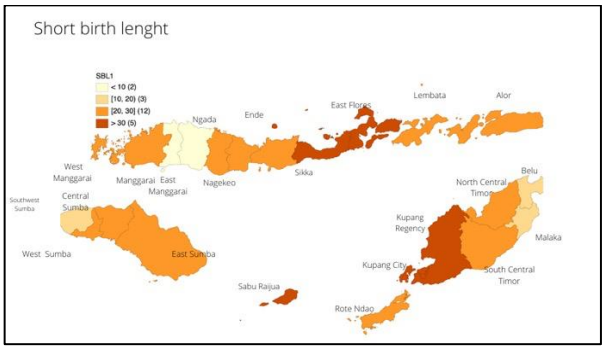

Figure 3. Map of short birth length cases by district/city in East Nusa Tenggara Province in 2021

The results of the spatial analysis (figure 3) show that most districts in the Province of East Nusa Tenggara have short birth length rates ranging from 20-30 percent, namely 12 districts/cities. The remaining 5 districts/cities have a short birth length rate exceeding 30%.

Spatial Analysis in Flores Island using Spatial Autoregressive Regression (SAR)

Table 1 Spatial Autoregressive Regression of Low Birth Weight and Stunting in Flores Island

Variable	Coefficient	Std.Error	z-value	Probability
W_stunting	0.235754	0.252352	0.934226	0.35019
CONSTANT	36.9015	9.8046	3.7637	0.00017
Low birth weight	**-1.07271**	**0.43615**	**-2.4595**	**0.01391**
REGRESSION DIAGNOSTICS		DF	Value	Probability
DIAGNOSTICS FOR HETEROSKEDASTICITY	Breusch-Pagan test	1	0.0011	0.97405
DIAGNOSTICS FOR SPATIAL DEPENDENCE	Likelihood Ratio Test	1	0.7256	0.39431
R-squared : 0.505781 Log likelihood : -23.2505 Sq. Correlation : - Akaike info criterion : 52.501 Sigma-square : 18.9681 Schwarz criterion : 52.7393 S.E of regression : 4.35524				

Table 1 presents the results of a spatial autoregressive regression analysis conducted on data concerning low birth weight and stunting in Flores Island. Low birth weight has a coefficient of -1.07271 with a standard error of 0.43615. The z-value of -2.4595 and probability of 0.01391 suggest a statistically significant negative relationship between low birth weight and the outcome variable (stunting). The Breusch-Pagan test with a value of 0.0011 and a probability of 0.97405 indicates no evidence of heteroskedasticity in the regression model. The Likelihood Ratio Test with a value of 0.7256 and a probability of 0.39431 suggests no significant spatial dependence in the model. Additionally, the regression statistics show that the model explains approximately 50.58% of the variance in the outcome variable (R-squared = 0.505781). The log-likelihood value is -23.2505, and various information criteria (Akaike and Schwarz) are provided to assess the model fit, with lower values indicating better fit. The standard error of the regression is 4.35524, providing an estimate of the variability of data points around the regression line.

DISCUSSION

Flores Island is one of the East Nusa Tenggara Province archipelagos with the highest prevalence rate of stunting in Indonesia. The high prevalence of stunting indicates a public health problem that needs serious attention from all parties. Stunting occurs due to various causes. Some of them are due to the child factor. The results showed that the condition of the baby at birth, such as the baby's weight and length, also influenced stunting in children. The distribution of stunting does not occur randomly but is based on the neighborhood relationship between regions (Districts/Cities).

The results of calculating the spatial regression, the relationship between low birth weight and stunting cases spatially in Flores Island in 2021 shows that the distribution pattern is clustered. Then proceed with the significance test (pv = 0.0014), it is concluded that there is a spatial relationship between low birth weight babies and cases of stunting. This is in line with previous research in India which found that, through spatial analysis, cases of stunting in India spread to areas with very high LBW cases. The high rate of LBW is a determining factor influencing the spread of stunting and the vulnerability to the development of stunting in the region[8].

Stunting can be caused by several factors, including the condition of the mother/prospective mother, the fetus, and the period of infancy/toddler, including diseases suffered during infancy [9]. There are direct causes of stunting problems such as babies with low birth weight (LBW), food status, and infection status [10]. This is not only related to health problems, but is also influenced by various other conditions indirectly such as environmental factors, economic status, number of family members, mother's height, and antenatal care [11,12]. The strongest predictor of stunting is low birth weight (LBW). This is because babies who have a history of LBW are more prone to experiencing disturbances in cognitive growth and development, as well as susceptibility to chronic diseases [13]. Low birth weight has a relationship with the prevalence of stunting OR 5.67 (95% CI 2.37-13.57) compared to a history of normal birth weight [14]. There is a link between birth weight and growth rate and development in the long term. Thus, the impact that will be felt by children with LBW is failure to thrive (growth faltering). Growth that lags normal will cause children to experience stunting [15].

Other studies have also found that there is a positive correlation between short birth length and the prevalence of stunting. However, this study obtained different results from previous studies in Indonesia which stated that the length of the baby is not the main factor influencing the prevalence of stunting, but rather due to other factors. Low birth weight is closely associated with fetal and neonatal morbidity and mortality. Compared to national data in 2013, the proportion of low birth weight is much lower. Data from the Indonesian Ministry of Health shows the prevalence of low birth weight was 10.2% in 2013. Although the percentage of conditions in East Nusa Tenggara was lower than the national level, it has to be a concern since low birth weight has negative impacts to infants. In this study, it was found that low birth weight and short birth length were associated with stunting. Low birth weight occurred due to intra-uterine growth restriction during pregnancy.

A baby who suffered from IUGR as a fetus was effectively born malnourished. Growth deficits since birth seemed to significantly increase the risk of stunting up until 2 years of life and contribute to a short stature as well as increasing the risk of developing chronic diseases later in life. The link between LBW and child malnutrition could be described by the increased vulnerability of children with LBW to infections such as diarrhea and lower respiratory infections and the increased risk of complications including sleep apnea, jaundice, anemia, chronic lung disorders, fatigue, and loss of appetite compared to children with normal birth weights[16].

CONCLUSIONS

Based on the results of the analysis, it was concluded that there is a spatial relationship between low birth weight and short birth length and stunting in the East Nusa Tenggara archipelago, especially in Flores Island with a clustered distribution pattern. The government should focus on districts with high rates of LBW and short birth lengths through specific and sensitive nutrition interventions. Future research can look at the spatial pattern of the prevalence of other nutritional cases such as wasting and underweight and also other factors such as environmental conditions, which will contribute to controlling and preventing nutritional events in the region.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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