

Geospatial Analysis On Stunting Prevalence And Strategies

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ABSTRACT

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Stunting is a condition in which children under the age of five fail to thrive due to chronic malnutrition, resulting in the child being too short for his age. The issue of short children reflects the community's socioeconomic conditions because the nutritional problems displayed by short children are chronic. Stunting is influenced by environmental factors and geographical conditions (population density, climatic conditions, and inadequate sanitation) in addition to maternal characteristics and child-rearing patterns, so spatial analysis is critical in overcoming this problem at the rural level. Various stunting prevention programs have been implemented, but they have not been effective, and there has not been an adequate reduction. This research aims to determine the relationship between geographical conditions and the distribution of stunting sufferers, as well as stunting prevention strategies, in Bulukumba Regency. Secondary data were obtained from reports of stunting cases at the Bulukumba District Health Office, and interviews were used in this study. The chi-square test was used in data analysis to determine the relationship between variables, specifically the incidence of stunting and geographical conditions. Meanwhile, the empirical bayesian smoothing rates developed by Clayton and Kaldor (1987) are used in the Geoda software program version 1.6.7 to identify the distribution of cases because stunting cases are not fully representative if they occur in a larger population but are not densely populated due to a larger area. This study was carried out in Bulukumba Regency with a population of 24-59-month-old children. The findings indicate that there is a link between population density and stunting distribution. This research serves as the foundation for decision-makers to develop relevant strategic policies to accelerate stunting prevention in Bulukumba Regency.

Keywords: Geospatial; Geographical Condition; Stunting Prevalence

INTRODUCTION

Up to date, stunting is one of the world's nutritional issues. Stunting is a type of growth failure (growth faltering) caused by nutritional inadequacy that lasts from pregnancy to 24 months and becomes a problem because it is associated with the emergence of events and deaths, brain development is less than optimal, causing

development to be delayed, and mental growth to be inhibited. Inadequate catch-up growth aggravates the problem ((Kamaruddin, Jusni, et al., 2019; Kamaruddin & Karlina, 2019). The proportion of stunted toddlers in Indonesia remains high and must be addressed. Stunting affected 22.7% of children under the age of five worldwide in 2017, with Asia accounting for 55% of the total (Oktavianisya et al., 2021). Stunting affects 37% of children under the age of five in Indonesia, and in comparison to several neighboring countries, Indonesia has a higher prevalence of stunting among children under the age of five than Myanmar (35%), Vietnam (23%), Malaysia (17%), Thailand (16%), and Singapore (4%). In 2018, the World Health Organization (WHO) estimated that 178 million children under the age of five were disrupted development as a result of stunting. According to the results of the Indonesian Nutrition Status Study of the Ministry of Health (Kemenkes) in 2021, the prevalence of stunting in children under the age of five in Indonesia was 24.4%. As a result, nearly a quarter of children under the age of five are stunted. Although it has decreased, it still falls short of the government's target of 14% by 2024 (Kemenkes, 2015).

One of the nutritional issues that the Indonesian government is focusing on is the issue of short children or stunting. The Indonesian government is committed to dealing with and reducing stunting prevalence, as discussed at a limited meeting on stunting interventions held in 2017 with the chairman of the National Team for the Acceleration of Poverty Reduction, with the meeting discussing the need to strengthen coordination and coverage programs carried out by the relevant Ministries or Institutions, in order to improve the quality of programs to reduce stunting rates in areas that have high stunting rates. In addition, in a global order called Scaling Up Nutrition, the policy of the Focus on Nutrition Improvement Movement aimed at the first 1000 days of life will be reviewed ((Rahmadhita, 2020).

Handling stunting necessitates cross-sectoral collaboration and the participation of numerous stakeholders, including the government, business, the community, and others. Government countermeasures include specific interventions carried out by the Ministry of Health, Provincial and Regency or City Offices, and sensitive interventions related to environmental health, poverty reduction, and women's empowerment (Nisa, 2018). The government has issued various policies and regulations in the context of stunting prevention in order to achieve the target of reducing stunting in children under the age of five. The policies are as follows: 1) Presidential Regulation No. 83/2017 on Strategic

Food and Nutrition Policy; 2) Minister of Health Regulation No. 29/2019 on Management of Nutritional Problems for Children Due to Disease; 3) Presidential Regulation No. 18/2020 on the National Medium-Term Development Plan for 2020-2024; and 4) Presidential Regulation No. 72/2021 on the Acceleration of Holistic, Integrative, and Quality Education regarding regulation of Indonesia (Nisa, 2018).

The government has made numerous efforts to prevent and overcome the problem of stunting in children under the age of five, including offering blood-added tablets to pregnant women, promoting exclusive breastfeeding, providing macro and micro nutritional supplements, and providing non-food assistance, and cash. However, the results failed to address the stunting issue ((Kamaruddin, Hasrawati, et al., 2019;). Several studies show that stunting increases the risk of degenerative diseases and lowers academic achievement (Several studies have found a link between stunting and impaired cognitive function and school-age children's learning achievement ((Ernawati et al., 2020; Patricia, 2017)). Furthermore, it can cause immune function depression, metabolic changes, decreased motor development, and stunted children will grow into adults who are at risk of obesity, glucose tolerance, coronary heart disease, hypertension, osteoporosis, and decreased performance and productivity (Kanade et al., 2011).

Many studies showed that poverty, sanitation, and environmental health are all factors that contribute to stunting in children under the age of five. Furthermore, low maternal education and knowledge have a significant impact on the prevalence of stunting in toddlers (Azam et al., 2020). Community socioeconomic conditions, characteristics of mothers during pregnancy, access to health services, antenatal care, and parenting, as well as the environment and geographical conditions (population density, climatic conditions, and inadequate sanitation), are all factors (Erniawati & Kamaruddin, 2020). Stunting is thus a predictor of poor human resource quality, which will further impede the development of the nation's potential, as nutrition from childhood to adolescence has a profound effect on healthy growth (Aridiyah et al., 2015; Delara et al., 2012).

The World Health Organization (WHO) collected data on the prevalence of stunting in children under the age of five, and Indonesia is the third country with the highest majority in the Southeast Asia region. From 2005 to 2017, the average prevalence of stunting among children under the age of five in Indonesia was 36.4% ((Kementerian

Kesehatan RI, 2014). Indonesia's stunting prevalence rate remains above 20%, indicating that it has not met the WHO target of less than 20%. In Indonesia, more than one-third of children under the age of five are shorter than the national average. Short children have the potential to become adults who are less educated, poorer, less healthy, and more vulnerable to non-communicable diseases such as obesity, cardiovascular, etc. According to the growing prevalence of stunting in all provinces of Indonesia, with a wide disparity between provinces ((Georgiadis & Penny, 2017).

Stunting is a multifaceted problem that affects children not only from low-income families but also from families earning more than 40% of the national average. This demonstrates that there are other factors that can contribute to stunting. This is supported by research (Sokolovic et al., 2014), which finds a significant relationship between stunting incidence and geographical conditions in Manggarai Regency (p-value 0.05). The level of distribution of a population is shown by population density. According to the estimates, the average population density in Indonesia in 2020 will be 141,408 people per square kilometer. As a result, the purpose of this research was to learn more about the relationship between geographical conditions and the distribution of stunting at the rural level, as well as stunting prevention strategies in Bulukumba Regency, South Sulawesi Province.

The importance of this research is to emphasize the importance of baseline data on stunting from each province in Indonesia's territory to be used as the foundation for developing government programs in the health sector related to interventions to reduce the incidence of stunting.

MATERIALS AND METHODS

The research design used in this study was a quantitative cross-sectional study with a population aged 2-5 years. The information is derived from stunting case reports at the Bulukumba District Health Office. Bivariate analysis (Chi-square) was used to examine the relationship between geographical factors such as population density and area of residence and the distribution of stunting patients. Meanwhile, a spatial empirical Bayes analysis was performed using Geoda software to determine the distribution of cases based on geographical conditions. In addition, an examination of stunting prevention strategies used in Bulukumba Regency.

The interview method was used in this study. Interviewing is a method of gathering information for research purposes by asking and answering questions face to

face between the interviewer and the respondent or person being interviewed for the purpose of collecting research data.

RESULTS

Bulukumba Regency is located in South Sulawesi Province, at the southernmost tip of the island. Bulukumba Regency is bounded to the north by Sinjai Regency, to the south by Selayar Islands Regency, to the east by Bay of Bone Regency, and to the west by Bantaeng Regency. The total area is 1,154.58 km², or about 2.5% of South Sulawesi's total area. Bulukumba is divided into 10 districts, 27 sub-districts, and 109 villages. The largest sub-districts are Gantarang and Bulukumpa. While Ujung Bulu is the smallest area and the Regency city's center (Figure 1).



Figure 1. Map of Bulukumba Regency, Province of South Sulawesi

The prevalence of stunting varies in Bulukumba Regency, according to research findings obtained by using spatial empirical Bayes analysis with Geoda software to identify case distribution. According to the findings, the prevalence of stunting in Bulukumba distributed throughout 10 sub-districts and 20 working areas of the Public Health center (Figure 2). The highest incidence of stunting occurred in Gantarang District at the Ponre Health Center, Bontonyeleng, with 745 (40.69%) stunted toddlers, according to secondary data obtained from stunting case reports at the Bulukumba District Health Office in 2021. Meanwhile, the Caile Health Center in Ujung Bulu District had the lowest incidence of stunting, with 41 (4.10%) stunted toddlers.

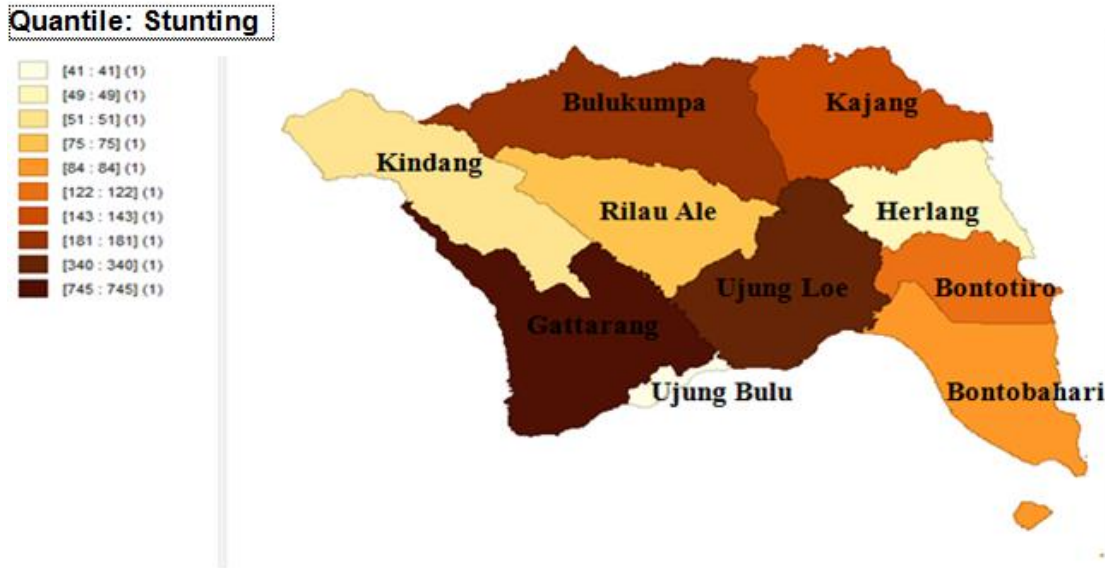


Figure 2. The results of mapping the distribution of stunting cases in Bulukumba Regency

Still, according to secondary data obtained from the Bulukumba District Health Office in 2021, the Public Health center of Bontonyeleng had the highest stunting rate with a total of 404 stunting cases, while the Public Health center of Manyampa area had the lowest stunting incident with 6 stunting cases (Figure 3).

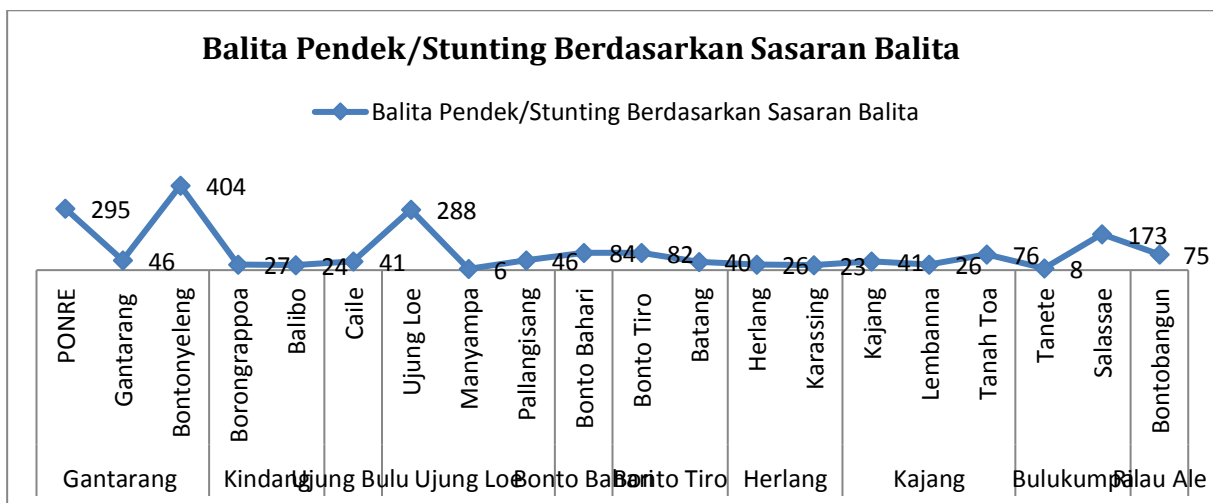


Figure 3. The prevalence of stunting is determined using the target number of toddlers per health center working area

Bulukumba Regency is divided into two regions: the lowland area, which includes seven sub-districts, Gantarang District, Ujungbulu District, Ujung Loe District, Bontobahari District, Bontotiro District, Kajang District, Herlang District, and Bulukumpa District. While, Gantarang District, Kindang District, Bontobahari District, Bontotiro District, Kajang District, Herlang District, Bulukumpa District, and Rilau Ale District comprise the highlands. In terms of geographical conditions, the highest

population density was found in Gantarang District, at 18.59%, and the lowest in Bontotiro District, at 6.19%.

Following the bivariate analysis with the correlation test, it is known that there is a significant relationship with a p-value of 0.003 between the incidence of stunting and population density. Meanwhile, to identify the distribution of cases based on the area of residence, it was discovered that two sub-districts, namely Kajang and Bontobahari Districts, had a significant relationship between the distribution of stunting cases and the area of residence. According to the findings of this study, the prevalence of stunting is increasing in both densely populated and rural areas (Fig. 4).

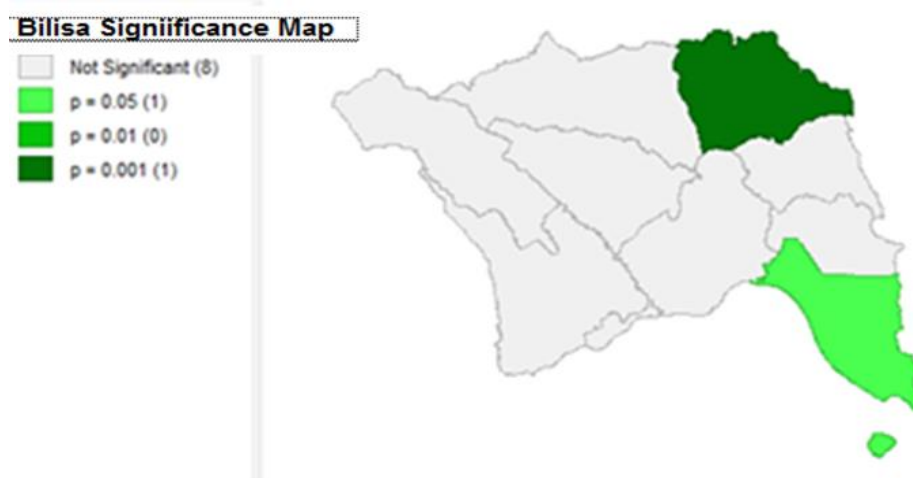


Figure 4. The prevalence of stunting is increasing in both densely populated and rural areas

DISCUSSION

Based on secondary data from the Bulukumba District health office, the highest cases of stunting were in Gantarang District, with 745 (40.69%) toddlers with a distribution per work area, namely the Bontonyeleng Health Center with 404 stunting toddlers, the Gattareng Health Center with 46 stunting toddlers, and the Caile Health Center with 295 stunting cases. Meanwhile, the Ujung Bulu District had the lowest distribution of cases, with 41 (2.24%) cases, with a distribution per work area that included the Caile Health Center, which had 41 stunting cases. According to the target of 17,770 toddlers, the incidence of stunting in Bulukumba Regency in 2021 was 1,831 (10.30%).

According to the findings of bivariate analysis with autocorrelation, there was a significant relationship between population density and the distribution of stunting cases, with a p-value of 0.003, while the distribution of cases based on area of residence yielded two sub-districts that were significantly related, namely Kajang and Bontobahari

sub-districts. As a result, involving various cross-sectors is one of the priorities for addressing stunting cases in Bulukumba Regency. As a result, it is hoped that the Quality Family Village, a government program, will have its activities converged for the treatment of stunting. Family development, as the framework for implementing the population and family planning program, is concerned with the social conditions of the community, such as the problem of stunting, so that the benefits of the family planning program can be felt more directly by the community, particularly those in poor areas, densely populated, underdeveloped, remote, and fishing areas.

Danila (2019), concluded that there was a significant relationship between the incidence of stunting and geographical conditions such as population density and area of residence in Manggarai Regency. According to research by Aridiyah et al (2015), the factor that most influences the occurrence of stunting in children under the age of five in rural and urban areas is the level of zinc adequacy (Danila et al., 2019).

According to the results of interviews, the implementation of the stunting prevention strategy in Bulukumba Regency is still guided by the 2018-2024 National Strategy for the Acceleration of Stunting Prevention in Toddlers through various nutrition programs, both specific, namely 1). Pregnant women provide extra food, as well as blood and calcium supplementation, as well as malaria and HIV prevention. 2) Breastfeeding mothers and children aged 0 to 23 months, promoting and counseling breastfeeding, PMBA (feeding infants and children, malnutrition management, child monitoring and growth, vitamin A supplementation, worm prevention and control techniques). 3). Adolescents receiving blood-added tablet supplementation 4) Children aged 24-59 months with acute starch nutrition management, supplementary feeding for children with acute malnutrition, growth and development monitoring, supplementation (vitamin A capsules, taburia, zinc), and intestinal worm prevention. In terms of nutrition-sensitive interventions, these include: 1) increasing access to and quality of drinking water and sanitation, 2) improving access to and quality of nutrition and health services, 3) raising awareness, commitment, and practice of parenting and nutrition for mothers and children, and 4) increasing access to nutritious food. Pregnant women and children aged 0-2 years, or 1,000 HPK households, are the priority targets. However, depending on regional conditions, some special or additional programs exist in various regions. Based on interviews with the person in charge of the Puskesmas nutrition program, which became an additional program, namely focusing on pregnant women

regarding nutritional needs during pregnancy, which was carried out during pregnant women classes.

An implementing team in the stunting prevention program has been formed in Bulukumba Regency, and Human Development Cadres have been formed in each working area of the public health center to assist in screening children under the age of five. Although the stunting rate in several working areas of the public health center in Bulukumba Regency had continued to fall from the previous year, it had not yet reached the target of zero stunting. Every time a project is implemented, the local government works together. The Bulukumba Regency government declared zero stunting, implying that every citizen and family in Bulukumba who experienced stunting cases carried out stunting prevention efforts according to their respective roles and potentials, encouraged all people to live a clean and healthy life, and met the nutritional needs of pregnant women. and toddlers, ensuring that each baby receives exclusive breastfeeding for up to two years, as well as uniting child development and presenting a complete basic work.

However, various obstacles were discovered during the implementation of the stunting prevention program, including the mother's knowledge that also supports the stunting prevention program, which is related to the feeding toddlers and parenting patterns directives. This is consistent with the findings of (Salsabila et al., 2021) research, which found that increasing knowledge and parenting is one of the efforts to reduce stunting rates. Various factors influence child development along its journey, including the mother's education about child growth and development, the mother's knowledge/insight about child growth and development, the environment/sanitation, genetics (heredity), socio-cultural economy, the mother's upbringing, and nutritional intake. Nutritional status, as well as a history of pregnancy, has a significant impact on the incidence of stunting in Saronggi District, Sumenep Regency (Wardita et al., 2021). As a result, mothers must ensure adequate nutritional intake, exclusive breastfeeding, and good parenting, and health workers must improve health education programs, particularly those addressing stunting, so that maternal knowledge can increase and stunting problems can be addressed immediately. Because the most important factor influencing the prevalence of stunting is the consumption of nutritious foods (Oktavianisya et al., 2021; Salsabila et al., 2021)..

CONCLUSIONS

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