



**SPATIAL MAPPING ANALYSIS OF STUNTING INCIDENTS IN BIREUEN DISTRICT**

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**ABSTRACT**

The prevalence of stunting in Indonesia still really needs attention from all sectors, even though there has been a decline in the last decade, the figure is in the highest category among countries in Southeast Asia. Objective: This research was conducted with the aim of analyzing the spatial distribution of stunting incidents in Bireuen Regency. Method: This research is an analytical descriptive observational study with an ecological study design and using a spatial epidemiology approach. Researchers use Geographic Information Systems (GIS) and spatial analysis based on secondary data. Spatial analysis in this study was used to determine the distribution pattern of stunting and spatial correlation with the incidence of stunting in Bireuen Regency. Results: Based on spatial mapping analysis carried out in the Regency, it was found that the highest prevalence of stunting occurred in 2022, showed that the prevalence of stunting is in the very high category (in red), namely there are 3 villages with a percentage (>40%) spread across Jeumpa and Peusangan Regencies (figure 7). However, the largest number of locus villages were found in 2023 with a total of 50 villages (figure 5). Conclusions: Based on spatial analysis, the results showed that the prevalence of stunting from 2021-2023 was very high in 2022, namely there were 3 villages with a percentage (>40%) spread across Jeumpa and Peusangan Districts. However, the largest number of locus villages were found in 2023 with 50 villages. The Bireuen Regency Government continues to strive to prevent stunting so that the next generation in Bireuen Regency becomes a smart and high-quality generation capable of competing globally.

Keywords: bireuen; distribution; spatial; stunting

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**INTRODUCTION**

The prevalence of stunting in Indonesia still really needs attention from all sectors, even though there has been a decline in the last decade, the figure is in the highest category among countries in Southeast Asia. Based on data from the 2021 Indonesian Nutrition Status Survey (SSGI), the prevalence of stunting in Indonesia in 2021 was 24.4% (SSGI, 2021). This prevalence is still high when compared with the World Health Organization (WHO) provision of 20% (WHO, 2018). Currently, the number of children under five who are stunted in Indonesia is more than five million spread across 34 provinces. Figure 1 shows the distribution of stunted toddlers by province in Indonesia. The highest prevalence is seen in the Nusa Tenggara, Kalimantan and Sulawesi regions. Meanwhile, the Java-Bali and Maluku regions are in the medium and low categories. Aceh Province on Sumatra Island is in the quite

high category, namely 33.18%, so Aceh Province is included in the 7 provinces with the highest stunting cases in Indonesia (SSGI, 2021).

Figure 1 distribution of stunted toddlers by province in Indonesia. The prevalence of stunting in Aceh Province is in the quite high category. Reference: Laksono dan Kusri, 2020 Efforts made by the Indonesian Government include the issuance of Presidential Regulation of the Republic of Indonesia Number 72 of 2021 concerning the acceleration of stunting reduction (Perpres, 2021). Stunting is a health problem that can be a genetic problem. The Director of Community Nutrition at the Indonesian Ministry of Health stated that the genetics of parents, especially mothers, can contribute to stunting by 26%. Apart from that, stunting is also a degenerative disease that must be resolved immediately in Indonesia in order to produce a smart and high-quality generation.

Stunting occurs due to growth and development disorders experienced by children due to malnutrition, recurrent infections, and inadequate psychosocial stimulation provided by parents. Children who experience stunting will be more susceptible to disease and as adults are at risk of developing degenerative diseases (WHO, 2018). Apart from that, stunting in toddlers will have short-term impacts such as disruption of brain development, intelligence, physical growth disorders and metabolic disorders in the body. Meanwhile, the long-term impact is a decrease in cognitive abilities and learning achievement, a decrease in the body's immunity, making it susceptible to disease and a high risk of developing diabetes, obesity, heart and blood vessel disease, cancer, stroke and disability in old age (Sandjojo, 2017).

Apart from the Indonesian Government, the Aceh Government also continues to strive to carry out convergent actions to reduce stunting as an implementation of Presidential Regulation of the Republic of Indonesia Number 72 of 2021 concerning the acceleration of stunting reduction. One of the efforts made by the Aceh Government is to recruit a stunting task force. Furthermore, Bireuen Regency also continues to strive to accelerate stunting reduction by determining stunting focus locations (*loci*). Based on the Bireuen Regent's Decree, the stunting focus locations (*loci*) in 2023 were 50 villages. Based on this description, the research team carried out an analysis of the spatial distribution of stunting incidents in Bireuen Regency.

## **METHOD**

This research is an analytical descriptive observational study with an ecological study design and using a spatial epidemiology approach. Ecological studies are studies carried out using data grouped by geographic area, or also called aggregate data (Lawson et al, 2016). Meanwhile, spatial epidemiology is a study that describes and analyzes geographic variations in disease related to demographic, environmental, behavioral, socio-economic, genetic and infection risk factors, which can also be called disease mapping (Lawson et al, 2016). Researchers use Geographic Information Systems (GIS) and spatial analysis based on secondary data. Spatial analysis in this study was used to determine the distribution pattern of stunting and spatial correlation with the incidence of stunting in Bireuen Regency.

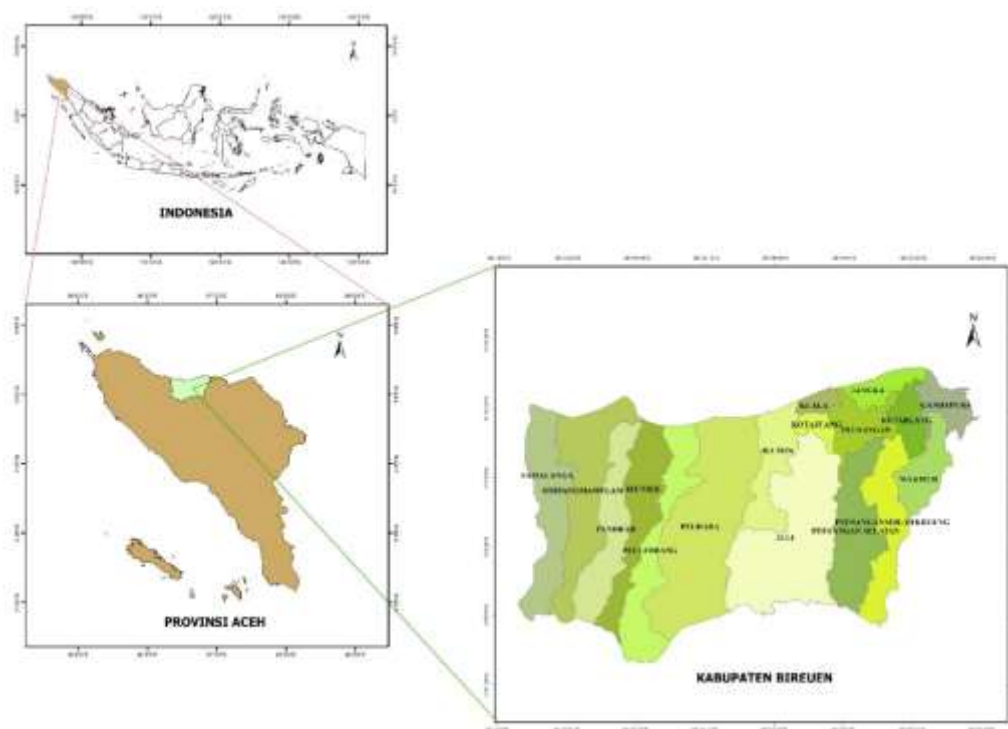


Figure 2 Research Location(Bireuen Regecy)  
Source: GIS visualization result, 2023

## RESULTS

### Spatial Distribution of Stunting Focus Location (Locus) Villages in 2021

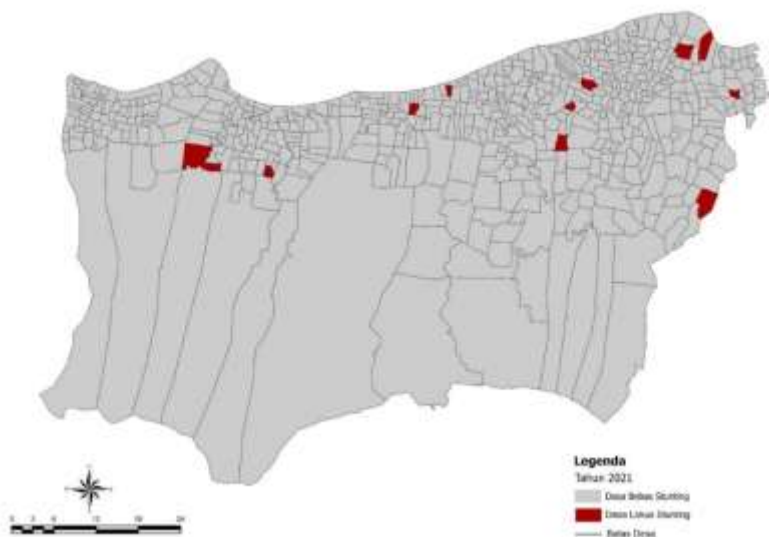


Figure 3 spatial distribution of locus villages in 2021  
Source: GIS analysis result, 2023

Based on (figure 3) above, the spatial distribution of stunting locus villages is spread across 5 sub-districts and the distribution of stunting locus villages is 11 villages. In 2021, the largest number of locus villages were found in Pandrah and Gandapura Regencies with 3 villages in each Regency.

### Spatial Distribution of Stunting Focus Location (Locus) Villages in 2022

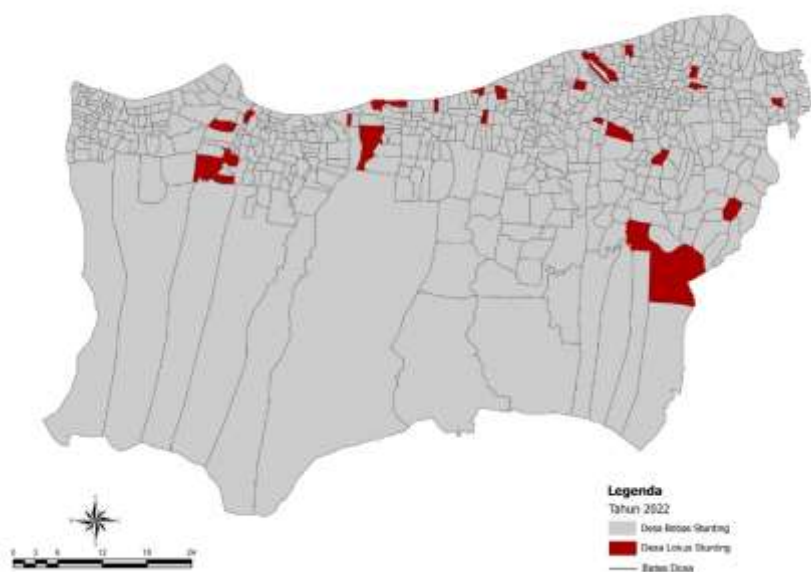


Figure 4 spatial distribution of locus villages in 2022  
Source: GIS analysis result, 2023

Based on (figure 4) above, the spatial distribution of stunting locus villages is spread across 8 sub-districts and the distribution of stunting locus villages is 25 villages. In 2022, the largest locus villages were found in Jeumpa, Peusangan, Gandapura and Pandrah Regencies with 4-5 villages in each Regency.

### Spatial Distribution of Stunting Focus Location (Locus) Villages in 2023

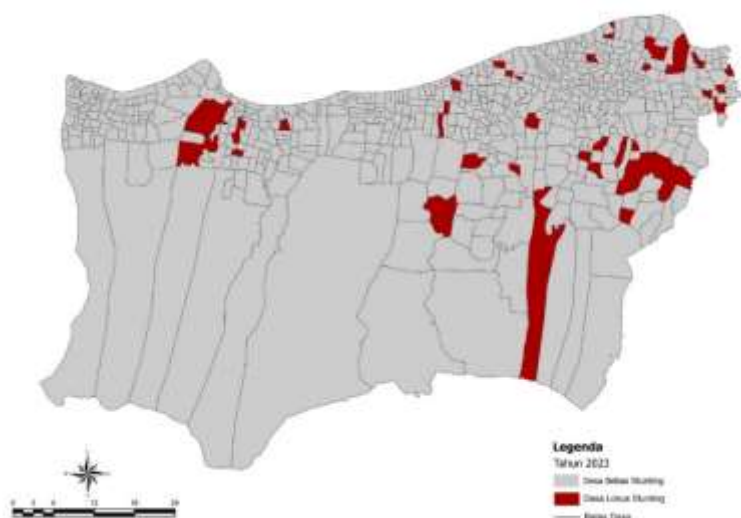


Figure 5 spatial distribution of locus villages in 2023  
Source: GIS analysis result, 2023

Based on (figure 5) above, the spatial distribution of stunting locus villages is spread across 12 sub-districts and the distribution of stunting locus villages is 50 villages. In 2023, the

largest locus villages were found in Pandrah and Gandapura Regencies with 10-12 villages in each Regency.

### Spatial Distribution of Stunting Prevalence in Stunting Focus Location (Locus) Villages in 2021

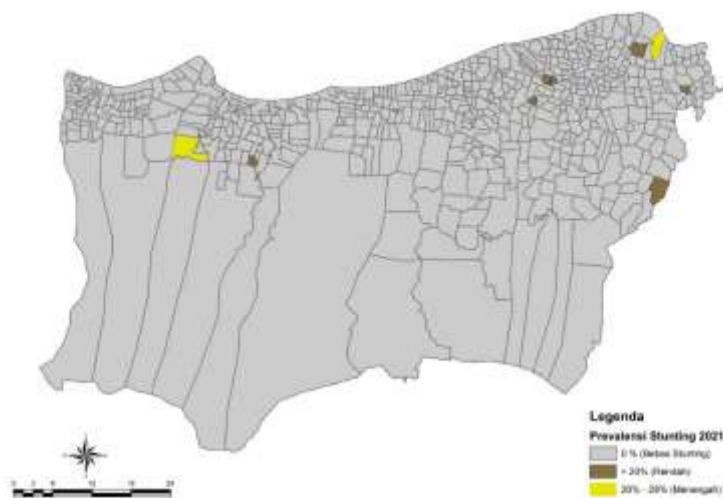


Figure 6 spatial distribution of stunting prevalence in locus villages in 2021  
Source: GIS analysis result, 2023

Based on (figure 6) above, it shows that the prevalence of stunting is in the middle category (yellow), namely there are 3 villages with a percentage (20-29%) spread across Gandapura and Pandrah Regencies.

### Spatial Distribution of Stunting Prevalence in Stunting Focus Location (Locus) Villages in 2022

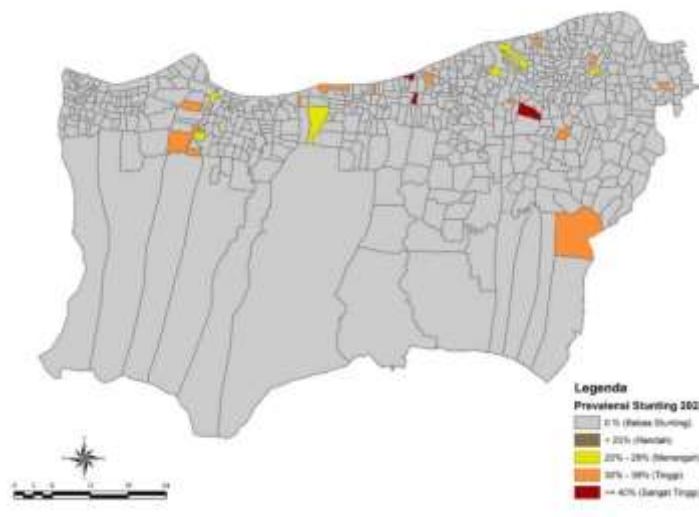


Figure 7 spatial distribution of stunting prevalence in locus villages in 2022  
Source: GIS analysis result, 2023

Based on (figure 7) above, it shows that the prevalence of stunting is in the very high category (in red), namely there are 3 villages with a percentage (>40%) spread across Jeumpa and Peusangan Regencies.

## Spatial Distribution of Stunting Prevalence in Stunting Focus Location (Locus) Villages in 2023

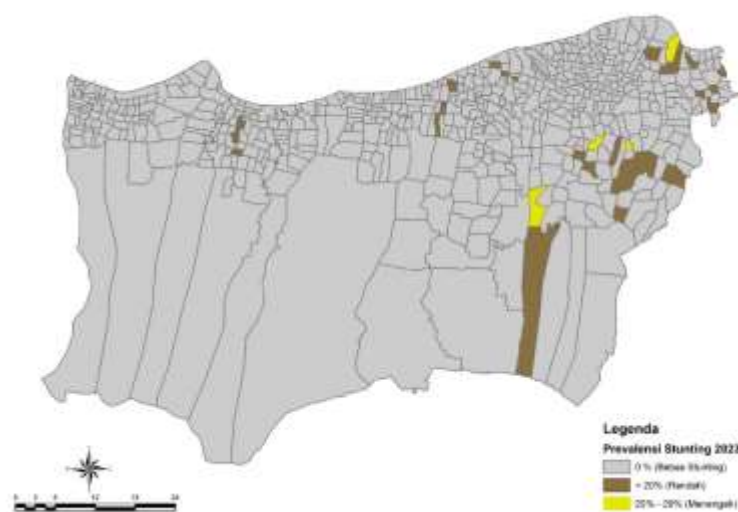


Figure 8 spatial distribution of stunting prevalence in locus villages in 2023  
Source: GIS analysis result, 2023

Based on (figure 8) above, it shows that the prevalence of stunting is in the middle category (yellow), namely there are 4 villages with a percentage (20-29%) spread across Peusangan Siblah Krueng, Peusangan Selatan and Gandapura Regencies.

### DISCUSSION

Based on the spatial mapping analysis carried out in the Regency, the results showed that the highest prevalence of stunting occurred in 2022, indicating that the prevalence of stunting is in the very high category (colored red), namely there were 3 villages with a percentage (>40%) spread across Jeumpa and Peusangan Regencies (figure 7). However, the largest number of locus villages were found in 2023 with 50 villages (figure 5). The stunting case that occurred in Bireuen Regency was caused by a lack of public knowledge, especially parents, about nutrition for children's health, not providing exclusive breast milk, a lack of parental attention in paying attention to toddler nutrition and also because the number of births was too close. Apart from that, the community does not yet have proper toilets that meet Clean and Healthy Living Behavior standards.

This research sourced from (WHO, 2018; Presidential Decree, 2021; Sandjojo, 2017; Trihono, 2015) which stated that stunting occurs due to growth and development disorders experienced by children due to poor nutrition, repeated infections and inadequate psychosocial stimulation. Many programs had been implemented to prevent and reduce the incidence of stunting directly (specific nutrition interventions) and indirectly (sensitive nutrition interventions). Specific nutritional intervention efforts are focused on the First 1000 Days of Life group. Sensitive nutrition interventions carried out include sanitation and the environment, health insurance, poverty alleviation, family disasters, and nutrition education for all groups.

Stunting can occur due to direct and indirect factors. The direct factors of stunting are maternal nutrition during pregnancy, toddler nutrition, and infectious diseases. Toddlers who experience stunting find it difficult to improve their growth and development so that it will continue until adulthood (Apriluana G & Fikawati S, 2018). Therefore, it is necessary to regularly monitor growth and development during the golden period so that growth and development abnormalities

that occur in toddlers can be detected early (Liviana et al, 2019). Apart from that, it is necessary to stimulate the fetus from the womb so that the fetus can grow and develop optimally (Nuraina et al, 2022).

Stunting can also occur because indirect factors can occur from various aspects, one of which is water, sanitation and hygiene (WASH), which consists of sources of drinking water, physical quality of drinking water and ownership of latrines (Uliyanti et al, 2017). Aspects of environmental sanitation and personal hygiene play an important role in the incidence of stunting, such as the frequency of children being exposed to infectious diseases, the low habit of washing hands properly with soap which can increase the incidence of diarrhea. Things that are considered minor, such as open defecation, can have a broad impact on health (Laili AN, 2018). In addition, research (Nuraina et al, 2023) shows that personal hygiene has an effect on the incidence of stunting with a p-value of 0.001 (<0.05), personal hygiene has a significant influence on the incidence of stunting.

The effort made by Bireuen Regency to prevent stunting is the Bu Gateng Program. The Bu Gateng program was implemented when Posyandu collaborated with PKK Gampong (Village) to ensure that they provided healthy and nutritious food for pregnant women who were present at the same time during posyandu activities in their respective Gampongs. This is in accordance with the policy of the Regent of Bireuen based on Regent Regulation no. 29 of 2020 concerning Integrated Stunting Reduction in Bireuen Regency, Part Five Providing Supplementary Food (PMT) Me Bu Gateng. Article 9 paragraphs 1 to 5: (1) The PMT Me Bu Gateng innovation program aims to improve nutrition and quality health services during pregnancy; (2) The Gampong Government stipulates PMT Me Bu Gateng activities in Gampong regulations as traditions and customs that must be carried out; (3) The target for PMT Me Bu Gateng is all pregnant women, especially families of 1000 HPK in each gampong area; (4) Pregnant women receive PMT Me Bu Gateng every month starting from the first trimester of pregnancy until full term pregnancy; (5) The menu given to pregnant women is in accordance with the balanced nutrition menu that has been prepared by the Puskesmas nutrition staff.

## **CONCLUSION**

Based on the spatial analysis carried out, the results showed that the prevalence of stunting from 2021-2023 was very high in 2022, namely there were 3 villages with a percentage (>40%) spread across Jeumpa and Peusangan Regencies. However, the largest number of locus villages were found in 2023 with 50 villages. The Bireuen Regency Government continues to strive to prevent stunting so that the next generation in Bireuen Regency becomes a smart and qualified generation capable of competing globally.

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