

## DETERMINANTS OF STUNTING BASED ON ECOLOGICAL APPROACH IN STUNTING LOCUS AREA IN BANYUMAS DISTRICT

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### ABSTRACT

*Stunting is a long-term malnutrition issue that results in growth abnormalities in children, with the child's height being lower or shorter (dwarf) than the average for their age. The prevalence of stunting in Indonesia in 2018 was 28%, while in Banyumas District was 32%. The study analyzed the determinants of stunting incidences based on the ecological approach at the stunting locus village in the Banyumas District. This research was quantitative research on the relationship between intrapersonal, interpersonal, institutional, community, and public policies and the classification of stunting. The subject was all mothers of stunted toddlers in the stunting locus village (ten villages) in seven sub-districts in Banyumas District (90 mothers) chosen by stratified random sampling technique. The inclusion criterion is mothers of stunted toddlers. The validity and reliability of the questionnaire tested on 30 respondents before the study. Data analytic techniques used factor analysis to identify the factors related to stunting incidences. The findings of a reduction in factor analysis are reached with three factors out of the 14 factors, namely factor 1, 2, and 3 had 45.657%, 10.511%, and 8.374% variance values. The highest determinants of stunting were the institutional factor (BKB, nutrition officers, midwives, Puskesmas, and Posyandu. An integrated effort between healthcare workers and the regional health office is necessary to reduce the incidence of stunting among under-fives.*

**Keywords:** *determinant factors, stunting, toddlers, ecological approach*

### ABSTRAK

Stunting adalah masalah kurang gizi kronis yang disebabkan oleh kurangnya asupan gizi dalam waktu yang cukup lama, sehingga mengakibatkan gangguan pertumbuhan pada anak yakni tinggi badan anak lebih rendah atau pendek (kerdil) dari standar usianya. Prevalensi stunting di Indonesia 28% sedangkan di Kabupaten Banyumas memiliki pravelansi stunting 2018 sebesar 32%. Tujuan penelitian adalah melakukan analisis faktor-faktor determinan kejadian stunting berbasis ecological approach pada daerah lokus-lokus stunting di Kabupaten Banyumas. Penelitian ini merupakan jenis penelitian kuantitatif. Metode kuantitatif digunakan untuk menganalisis hubungan antara intrapersonal, interpersonal, institusi, komunitas, kebijakan publik dengan klasifikasi stunting. Populasi penelitian ini adalah seluruh ibu balita stunting yang berada di daerah lokus-lokus stunting di sepuluh desa dalam tujuh kecamatan. Sample penelitian ini berjumlah 90 ibu dengan kriteria inklusi ibu yang memiliki balita stunting di sepuluh desa Kab. Banyumas dengan teknik *proportional stratified random sampling*. Dilakukan uji validitas dan realibilitas kuesioner pada 30 responden kemudian kuesioner yang telah valid dan reliable dibagikan kepada 90 responden utama. Teknik analisa data dengan menggunakan analisis faktor untuk mengetahui faktor determinan yang mempengaruhi balita stunting. Dari 14 faktor penyebab stunting diperoleh hasil reduksi analisis faktor menjadi tiga faktor dengan varian faktor 1 sebesar 45,657%, faktor 2 sebesar 10,511%, faktor 3 sebesar 8,374%. Faktor 1 determinan stunting terbesar institusional yaitu BKB, Petugas gizi, Bidan, Puskesmas dan Posyandu. Perlu upaya yang terintegrasi dari petugas kesehatan dan instansi kesehatan setempat untuk mengurangi kejadian balita stunting.

**Katakunci:** faktor determinan, kejadian stunting, balita, ecological approach

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## **Introduction**

Stunting is a long-term malnutrition issue that results in growth abnormalities in children when their height is lower or shorter than the average for their age.<sup>1</sup> The stunting problem threatens the Indonesian qualities of human resources and competitiveness.<sup>2</sup> It is because stunted children's brain development is also affected and will affect their aptitude and accomplishment in school, productivity, and creativity. The stunting children also have short physical growth. One of the Sustainable Development Goals (SDGs) aims for stunting care, which is part of the 2nd SDG to end hunger and all kinds of malnutrition by 2030 and achieve food security.<sup>3</sup>

Africa had the highest prevalence of stunting in the last five years, at 37.1%, followed by Asia at 19% and Latin America at 10%.<sup>4</sup> Laos was ranked first with 33% of the region's population, followed by Cambodia with 32%, the Philippines with 29%, Indonesia with 28%, and Myanmar with 27%. While in Indonesia, NTT had the highest rate of stunting (43.8%), followed by West Sulawesi (40.4%), NTB (37.3%), Gorontalo (34.9%), and Aceh (34.2%). With a 27.7% stunting rate, Central Java was ranked 18th out of 34 Provinces.<sup>5</sup> According to the National Baseline Health Research, the prevalence of stunting in the Banyumas District was 32% in 2018. However, according to the Simultaneous weighing of children conducted by the Banyumas District Health Office in 2019, it was 14%.

Based on the 2019 Banyumas District Welfare Statistics from the 2019 National Socio-Economic Survey (Susenas) 90.29% of households in Banyumas District already owned a house. Although the level of home ownership was high, there were some uninhabitable houses and houses without access to drinking water and sanitation. Stunting was in rural areas. The most education level in Banyumas District in 2019 was elementary school graduates (599,369 or 41.7%). The coverage of households using proper drinking water sources was 83.2% of the 100% target and using suitable sanitation was 90% of the 100% target.<sup>6</sup>

Stunting has many reasons, one of which being malnutrition. The number of stunting cases in Banyumas Regency in 2018 was still extremely high, making it one of the priority regions for dealing with stunting at the federal, state, and local levels. According to the 2013 Riskesdas data, the prevalence of stunting in the Banyumas area was 33.1%; in 2018, it was 32%. This demonstrates that Banyumas Regency's stunting prevalence is still well below the 14% national target.

Methods used in the ecological approach include intrapersonal (knowledge, attitudes, characteristics), interpersonal (cadres, families, caregivers), community (puskesmas, posyandu, family development for toddlers/ BKB, nutrition officers, midwives), institutional (geographic location, sanitation, living conditions), and public policy on the prevalence of stunting.<sup>7</sup> The study

to identify the primary causes and the most effective intervention approach for the issues in the stunting locus village, Banyumas Distric, based on the Ecological Approach methodology. The frequency of stunting in children aged 1 to 5 years is significantly correlated with sociodemographic factors and family food security.<sup>8</sup> Compared to urban regions, stunting has more prevalent in rural settings.<sup>9</sup> Ecological Approach used since there hasn't been a thorough investigation on the environmental factors related to the prevalence of stunting. This study identified the cause of the issue in the stunting locus village in the Banyumas district based on the Ecological Approach using factor analysis. This research had been declared ethical by the Ethics Committee of Health Research Public Health Faculty of Dian Nuswantoro University based on certificate No : 348/EA/KEPK-Fkes-UDINUS/I/2023.

## **Method**

This ecological study analyze the relationship between intrapersonal, interpersonal, institutional, community, public policies and the classification of stunting. The research location was in the stunting locus area, which includes ten villages in seven sub-districts in Banyumas District. The study identified intrapersonal factors (knowledge and attitude), interpersonal factors (cadres, families, and caregivers), institutional factors (Puskesmas, Posyandu, BKB/Family Development for toddlers, Nutrition Officers, Midwives), community factors (Geographical Location, Sanitation, Living Conditions), and public policy (Local Government Regulations, Program Policies). The prevalence of stunting was the number of stunted toddlers.

Up to fifteen questions were used to gather information about the respondents' characteristics. There are six knowledge questions and four attitude questions in the intrapersonal factors section. Three cadre questions, three family questions, and three caregiver questions are included in the interpersonal factors. There were six questions on the institutional factor: three from the puskesmas, three from the posyandu, two from the BKB, three from the nutritionist, and four from the midwife. There are two questions about geographic location, two questions about sanitation, and two questions about living for the community aspect. There are two questions on local government and four questions about program policy in the public policy element.

The participants in this study were all mothers of stunted toddlers who lived in ten villages in seven sub-districts of stunting locus areas met the inclusion criteria, and mothers with toddlers are not stunted. met the exclusion criteria. The sampling of respondents used stratified random sampling (90 mothers). We observed 30 respondents to verify the questionnaire's validity and reliability. Midwife1, sanitation1, and sanitation2 were eliminated from the research instrument because they were invalid and unreliable, respectively. The study could use the questionnaire because all indicators, except midwife1, sanitation1, and sanitation2, were valid and reliable. Data analytic techniques used factor analysis to identify the factors related to stunting incidences.

## Results

The summary of respondents describes in table 1.

**Table 1. Parental traits of young children with stunting**

	Description	Mother F(%)	Father F(%)
Age	<=25 y	17 (19%)	5 (6%)
	26-35 y	54 (60%)	48 (53%)
	36-45 y	19 (21%)	32 (36%)
	>45 y	0 (0%)	5 (6%)
Education	Elementary	7 (8%)	18 (20%)
	Middle	41 (46%)	29 (32%)
	Senior	34 (38%)	37 (41%)
	Diploma	4 (4%)	2 (2%)
	Bachelor	4 (4%)	4 (4%)
Occupation	Government Employees	3 (3%)	3 (3%)
	Laborer	0 (0%)	42 (47%)
	Private Sector Employee	1 (1%)	11 (12%)
	Civil Servant	2 (2%)	3 (3%)
	Entrepreneur	4 (4%)	31 (34%)
	Housewife	80 (89%)	0 (0%)
	Total	90 (100%)	90 (100%)

According to table 1, the average age of stunting children's mothers was between 26 and 35 years old (about 60% of respondents), and the father was between 26 and 35 years old (about 53% of respondents). The most education level of stunting children's mothers was junior high school graduates (46% of respondents), and the fathers were high school graduates (41% of respondents). 89% of stunting children's mothers did not have jobs, and 47% of fathers were laborers. The KMO test and anti-image correlation were applied to determine the dominant factors presented in table 2.

**Table 2. Results of Sig KMO and Anti-image Correlation**

Variable	Anti-Image Correlation	KMO Sig
Knowledge	0.554	
Attitude	0.736	
Cadres	0.83	
Families	0.79	
Caregiver	0.831	
Puskesmas	0.897	
Posyandu	0.884	0.000
BKB	0.89	
Nutrition Officers	0.837	
Midwives	0.794	
Geographical Location	0.741	
Living Conditions	0.793	
Local Government Regulations	0.847	
Program Policies	0.917	

Table 2 shows the Sig KMO value was less than 0.05. Therefore, it meets the requirements for correlation matrix analysis, which aims to determine whether several existing factors have a strong correlation. Table 2 shows none of the variables in the Anti-Image Correlation stage-I values lower than 0,5. Accordingly, all variables included in the factor analysis. In the following step, we determine the number of components formed from various factors using the SPSS results in the Total Variance Explained column presented in table 3.

**Tabel 3. Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.392	45.657	45.657	6.392	45.657	45.657
2	1.472	10.511	56.168	1.472	10.511	56.168
3	1.172	8.374	64.543	1.172	8.374	64.543
4	.899	6.422	70.965			
5	.857	6.118	77.083			
6	.737	5.263	82.347			
7	.505	3.607	85.953			
8	.449	3.208	89.161			
9	.401	2.866	92.028			
10	.360	2.571	94.599			
11	.276	1.970	96.569			
12	.216	1.545	98.114			
13	.143	1.021	99.135			
14	.121	.865	100.000			

According to table 3, three components had more than one eigenvalue. Components 1, 2, and 3 had 6.392, 1.472, and 1.172 eigenvalues, respectively. Components 1, 2, and 3 also had 45.657%, 10.511%, and 8.374% variance values. Therefore, component 1 had the highest impact on the growth of young children. Table 4 presents the test results of the relationship between each variable and the three main components.

With a variation of 45.657%, component 1 includes the Puskesmas, Posyandu, BKB, nutrition officials, and midwives. Family, caregivers, living conditions, regional regulations, and program policies include in component 2 with a variation of 10.511%. Component 3 was affected by factors related to knowledge, attitudes, cadres, and location, with a variance of 8.374%. Based on this data, BKB, nutrition officers, midwives, Puskesmas, and Posyandu were the main factors related to stunting incidences among children under-five in the component with the highest connection.

**Tabel 4. Rotate Component Matrix<sup>a</sup>**

Variabel	Component		
	1	2	3
Knowledge	.166	-.171	.745
Attitude	.374	.236	.765
Cadres	.162	.401	.670
Families	.107	.694	.377
Caregiver	.346	.533	.101
Puskesmas	.734	.429	.090
Posyandu	.594	.440	.113
BKB	.820	.081	.250
Nutrition Officers	.797	.424	.129
Midwives	.772	.194	.140
Geographical Location	-.084	.399	.520
Living Conditions	.280	.779	.063
Local Government Regulations	.405	.726	.106
Program Policies	.398	.668	.097

## Discussion

Stunting has numerous causes, although frequently attributed to a genetic component from parents. Therefore, many people believe stunting is not a health problem.<sup>10</sup> Compared to behavioral, environmental (social, economic, cultural, and political) factors, and health services, genetics is the health determinant that has the least impact on an individual's health.<sup>11,12,13</sup> The study found that institutional elements, including BKB, nutrition officials, midwives, Puskesmas, and Posyandu, had the highest impact on the prevalence of stunting in the Banyumas District. It was consistent with other research that found access to healthcare services was affecting stunting.<sup>14,15,16</sup>

According to the study, cadres, families, caregivers, geographic area, living conditions, regional regulations, and program policies were affecting stunting incidences though has small correlation values. Low maternal formal education affects the high incidence of stunting and children's long-term nutritional status. Father and mother education were predictors of stunting in children under five.<sup>17,18,19,20</sup> Low education combined with less nutritional knowledge was frequently associated with the malnutrition incidence. Geographic location was another variable in stunting incidence, where toddlers living in rural regions were more at risk than toddlers living in urban areas. Stunting was significantly affected by access to clean water and sanitary facilities.<sup>21,22,23,24</sup>

Stunting prevention programs for toddlers in Banyumas District includes the provision of zinc syrup for infants with birth length less than 48 cm, formula milk for underweight and malnourished toddlers, vitamin A capsules, deworming medication, complete primary immunization, monitoring nutritional status or simultaneous weighing, data collection on under-fives and stunting toddlers, examination of Congenital Hypothyroid Screening, provision of taburia for under-fives at risk of stunting, counseling on balanced nutrition for feeding infants and children,

giving zinc syrup to toddlers with cases of diarrhea.<sup>25,6</sup> Stunting prevention programs need institutional support from BKB/Family Development for toddler programs, nutrition officers, midwives, Puskesmas, and Posyandu to be efficient.

Based on the study, the BKB/ Family Development for toddler program was a key factor for the outcomes. Therefore, health officials should encourage parents to regularly participate in the BKB program to increase their literacy rates to prevent and treat stunting children. Healthcare workers (i.e., nutritionists or midwives) should provide mothers with more counseling and education. Nutritionists should frequently give more attention to stunting children's additional nutrition. Midwives must increase the knowledge of stunted toddler mothers by routinely providing education and counseling.

## **Conclusion**

According to the study, the three factors with the highest correlation rates with stunting incidence were BKB, nutrition officers, and midwives. The correlation rates for BKB, nutrition officers, and midwives were 82%, 79%, and 77%, respectively. Therefore, we suggest nutrition officers and midwives add more information through counseling and education for the mothers of stunted children to increase mothers' literacy and prevent and treat stunting. Nutrition officers and midwives also encouraged mothers of stunting toddlers to enroll in the BKB program.

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## **Conflict of Interest:**

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