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STUNTING IN CHILDREN UNDER TWO YEARS OLD IN RURAL AREAS WONOSOBO REGENCY, CENTRAL JAVA, INDONESIA: DOES ANEMIA MATTER?

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ABSTRACT

Background: *Stunting is a serious problem if it is not treated better. Several factors are known to influence stunting, what about anemia in children under two old? This study aims to know the factors that influence stunting, especially anemia in children under two old in rural regions.* ***Method:*** *Cross sectional research in rural regions in Wonosobo Regency involving 285 respondents. This study analyzed five independent variables (gender, age, Hb status, maternal education, and maternal occupation). Meanwhile, the dependent variable is stunting. The author uses a logistic regression test at the final stage.*
Results: *This research shows that there is no relationship between gender, age, maternal education, maternal employment, and stunting p =>0.05. Meanwhile, what had a significant relationship was the anemia status of children under two old with p-value of < 0.05. Logistic regression analysis proves that anemia in children under two years old has a risk of 2,105 times stunting compared to those who are not anemic (95% CI: 1.168 – 3.795).*
Conclusion: *This research shows that anemia in children under two old influences the incidence of stunting in rural regions in Wonosobo Regency Central Java Indonesia.*

Keywords: *stunting, anemia, children, rural*

INTRODUCTION

In several countries, the incidence of stunting among the children has experienced a remarkable decline, even though it is not as expected. Each country has its speed and strategy to achieve this. The strategies implemented in several countries scope the health sector and non-health sector. In Indonesia, the composition of the contribution from the health and nutrition sector is 40% and the non-health sector is 50%. These are often called nutrition-specific and sensitive interventions (Bhutta et al., 2020), and it is estimated that the health sector is 30% and non-health 70% (TNP2K, 2018).

In Rwanda, stunting remains a major public health challenge. The majority of fatalities associated with stunting can be attributed to nutritional practices observed during the initial five years of an individual's life (Habimana & Biracyaza, 2019). In Indonesia, stunting is a key nutritional concern. Stunting represents a significant consequence of persistent malnutrition in pediatric populations and exerts enduring effects on growth and developmental trajectories across successive generations(Julianti & Elni, 2020). The rate of stunting in Indonesia varies from year to year, increasing in the 2010 - 2013 period, then decreasing in the 2014 - 2018 period, and then in 2021 show decreasing to 24.4%, and in 2022 it decreased to 21.6% (SSGI, 2023).

Several research results show that there is a wide gap in the incidence of stunting between rural and urban regions. Stunting in rural regions is a problem that needs specialy. Problems in rural regions occur almost all over the world. Factors related to rural regions

include: low education and knowledge about health, poverty, and access to health service facilities. Multiple studies show that stunting rates are considerably higher among children in rural regions than those in urban settings(Ashar et al., 2024), (Laksono, Sukoco, et al., 2022), (Suratri et al., 2023), (Sserwanja et al., 2021), (Wulandari & Laksono, 2023). Low education is also associated with less knowledge (Yunitasari et al., 2021). These factors often become a circle of problems that are difficult to overcome. Breaking the chain of problems is a challenge that requires more attention. With conditions of insufficient knowledge, poverty, and poor access to health services, this creates problems with children's nutritional status which has the potential to cause anemia.

The government has made efforts to treat child anemia. Treatment of anemia starts from the upstream, namely giving iron tablets to young women, pregnant women, and the postpartum period. With this provision, it is hoped that the baby born will not experience anemia. Handling anemia in children under five is not easy, various programs have been carried out but have not met the expected targets. Anemia in children under five in Indonesia is still very high, in Aceh, the results of the Word Vision Indonesia Survey (2010) amounted to 67.8% of children under five suffering from anemia, while 2019 Riskesdas data found that anemia in children old 12-59 months was 30.3% in the city and 25.8% in rural regions. Anemia is more common in children under five with iron deficiency status, namely 73.1% compared to non-deficient children, 31.7%. The results of research in rural regions in Wonososbo Regency show that 72.4% of stunted children under two old also experience anemia (Ashar et al., 2020).

METHODS

Research with a crosssectional survey design was conducted in 2020 with 285 respondents in rural Wonosobo District Central of Java Indonesia. Samples from 20 existing villages were selected randomly. To maintain data quality, the team's perception equation was carried out on questionnaires, editing, coding and tabulation, data cleaning, and data analysis. Stunting is the dependent variable, while the variables gender, age, Hb status, mother education, and mother employment are the independent variables.

In the initial stage of sampling, this study used Chi Square to analyze bivariate comparisons. We used logistic regression in the last stage. We used previous tests to analyze the multivariate relationship between all independent factors and shopping behavior and stunting. Next, we used SPSS application during the statistical stage analysis. This research was conducted in accordance with research principles and obtained approval from the research ethics commission with number: LB.02.01/2/KE/.045/2019 and received approval from respondents in the form of signing an informed consent.

RESULTS AND DISCUSSION

RESULTS

Table 1. Descriptive statistics on the nutritional status of children under two old in rural Wonosobo District, Central of Java Indonesia (n=285)

Variable	Nutritional Status		*p*-value
	Stunted (n= 67)	Normal (n =218)	
Children's gender			
Girls	20.49%	79.51%	0.056
Boys	25.77%	74.23%	
Children"s age (month)			
0 - <12	23.18%	76.82%	0.721
12 – 24	79.6%	20.4%	
Hemoglobin Status			
Not Anemia	19.81%	80.19%	0.013
Anemia	33.33%	66.67%	
Mother's education			
Primary	27.91%	72.09%	0.286
Secondary	21.98%	78.02%	
Higher	17.63%	82.35%	
Mother's employment			
Employed	24.81%	75.19%	0.732
Unemployed	22.44%	77.56%	

Table 1 shows that stunting affects around 25% of children under 2 yo who live in rural regions. Male children under the age of two have a higher prevalence than females, and the majority of them are older than 12 months. Besides that, more than a third of children under two in rural regions suffer from anemia. In terms of education, almost 30 percent of mothers have elementary school education and almost a quarter do not work.

Table 2. Logistic regression of nutritional status of children under two old in rural Wonosobo District, Central of Java Indonesia (n=285)

Predictor	*p*-value	Stunted		
		AOR	95% CI	
			Lower	Upper
Children's gender				
Girls	-	-	-	-
Boys	0.259	0.718	0.404	1.276
Children"s age (month)				
0 - <12	-	-	-	-
12 – 24	0.814	0.935	0.533	1.629
Hemoglobin Status				
Not Anemia	-	-	-	-
Anemia	0.013	2.105	1.168	3.795
Mother's education				
Primary	-	-	-	-
Secondary	0.254	0.449	0.114	1.775
Higher	0.439	0.587	0.152	2.263
Mother's employment				
Employed	-	-	-	-
Unemployed	0.513	0.826	0.467	1.463

AOR; Adjusted Odds Ratio. *p<0.050, CI; Confidence Interval

Table 2 displays the findings of the logistic regression analysis, in which gender, age, mother education, and maternal employment are not associated with stunting, but the anemic status of children under two old is strongly related to stunting, with 2.1 times the probability of experiencing stunting.

DISCUSSION

Table 1 demonstrates that nearly 25% of children under 2 years in rural regions experience stunting. Stunting in rural regions is a problem that requires specially. Problems in rural regions occur almost all over the world. Factors related to rural regions include: low education and knowledge about health, poverty, and access to health service facilities related to demographics. According to various studies, stunting is more prevalent among children in rural regions than to urban regions (Ashar et al., 2024), (Laksono, Sukoco, et al., 2022), (Suratri et al., 2023), (Sserwanja et al., 2021), (Wulandari & Laksono, 2023). The results of research in Congo show that there's a considerable discrepancy between rural and urban regions, with rural regions having a higher proportion of children suffering from stunting than urban regions (Christian et al., 2020). The same thing is also common in rural regions of eastern and western Rwanda (Habimana & Biracyaza, 2019). Children in rural regions face a 1.10 times higher risk of stunting than children in urban regions (Kismul et al., 2017).

Table 1 shows that boys experience stunting at a slightly higher rate than girls. The results of this research show the same thing as the results of further analysis of Indonesian nutritional status survey (SSGI) data in eastern Indonesia, that boys are more prone than girls to endure stunting (Ashar et al., 2024), (Kismul et al., 2017). In the Central African Republic, almoust one-third of all children under the age of five were stunted, with boys having a higher prevalence (Kusumawardani et al., 2023), as were the results of research in the Congo in 2017(Christian et al., 2020). In both rural and urban regions, the sole relevant determinant was the child's gender (Laksono, Wulandari, et al., 2022). Other studies reveal that boys are 1,320 times more likely than girls to experience stunting (Vonaesch et al., 2017). Boys to be more active during toddlerhood. This mobility requires more energy. If this is not balanced with adequate nutritional intake, energy imbalance can occur and will disrupt growth.

This research also showed that the majority of stunting occurs in children aged 12 to 24 months. This is in conformity with the results of the 2024 Ashar study, which indicated that stunting occurs more greater in children age 12 to 23 months compared to

children under 12 months (Ashar et al., 2024). Other studies reveal that children aged 24 to under 36 months and 36 to under 48 months have a higher risk of stunting than those younger than 6 months (Laksono et al., 2024). This means that when children grow older, they have a greater change of stunting (Wulandari & Laksono, 2023). A study conducted in the eastern section of Indonesia, Maluku province, show that children aged 12 to 23 months are 4.09 times more likely to acquire stunting than those under 12 month (Kismul et al., 2017). Further examination of 2018 Basic health research data in the NTT province of Eastern Indonesia show that the highest proportion of stunting is in children aged 12 to 23 months 45.2% (Suratri et al., 2023). Other studies reveal that children age 12 to 23 months had a 3.033 times higher probability of developing stunting than those under 12 months (Vonaesch et al., 2017).

This study also shows that almost 30% of mothers' education is only elementary school. Several other studies show that better maternal education will protect their child under two years old from experiencing stunting (Laksono, Sukoco, et al., 2022), (Suratri et al., 2023). In rural regions of Eastern and Western Rwanda, maternal education is significantly linked to stunting (Habimana & Biracyaza, 2019). This implies that when a mother's education level of grows, the likehood of her child experience stunting diminishes (Laksono et al., 2024). Other research also indicate that a higher level of mother's education reduces the likehood of a toddler experiencing stunting (Wulandari & Laksono, 2023). Mothers with elementary education are 1,587 times more likely to produce a stunted child than mothers with higher education (Chowdhury et al., 2022). In Papua, Eastern Indonesia, Mothers with elementary school education are 1,263 times more likely to produce stunted children than Mothers with higher education (Laksono, Wulandari, et al., 2022)

This research also shows that almost a quarter of the mothers who experience stunting are working, slightly higher than non-working mothers. Statistical investigation revealed that the mother's employment position is not connected to stunting. Nonetheless, the researchers discovered that the prevalence of stunting was greather among the children of worked moms. This is aligns with the results of research in Peru based on the results of further analysis of DHS data with 4,637 respondents in children aged 6 – 36 months (Wulandari et al., 2022). The same thing was also conveyed from the results of the 2022 Laksono research showing that: Mothers employment within rural environments is associated with an elevated likehood of offspring under the age of two experiencing growth stunting (Habimana & Biracyaza, 2019), (Laksono, Sukoco, et al., 2022). This means that work factors influence the occurrence of stunting (Chavez-Zarate et al., 2019). Other research based on further analysis of SSGI data showed that working women are 1.116 times higher risk of stunting and children aged 12 to 23 months whose mothers work are 2.831 times more likely to be stunted than children under the age of 12 months (Danso & Appiah, 2023). Based of this research and several similar earlier studies, reveals that working mothers influence stunting. This finding can be a guideline that as long as the mother is working, parenting patterns while the mother is working can be a problem that requires further study. The questions that need answers are, what parenting style is provided, and who replaces the mother's role while the biological mother is working.

Table 2 illustrates the outcames derived from the logistic regression analysis, revealing that variables such as child gender, child age, mother's education, and occupation do not significant relationships with stunting. However, this research shows that more than 30% of children under two old in rural regions experience anemia. Logistic regression analysis shows that anemia is significantly to stunting.

Children under two old with anemia are 2,105 times more likely to have stunting. Muhammed also said something similar in 1918 that anemia and stunting often occur together in young children (Supadmi et al., 2024). Other research suggests that anemia in children aged 6-23 months has major impact on their growth and development (Mohammed et al., 2019). In Haiti, anemia is a serious problem for the growth, development, and survival of children (Castro-Bedriñana et al., 2020). Anemia in under-five children is related to conditions at birth, which meant that the mother's condition during pregnancy will influence the anemia status of the newborn. Anemia prevention is aimed at mothers during pregnancy, with the hope that the child's condition at birth will not be anemic. In several countries, when treating anemia in toddlers, the strategy used is to provide iron supplements to women of childbearing age , maternal pregnant, maternal postpartum, and children under two old (Castro-Bedriñana et al., 2020).

CONCLUSION

This research reveals that anemia in children under two old influences the oourrence of stunting in rural regions in Wonosobo Regency, Central Java, Indonesia.

STRENGTHS AND LIMITATIONS

This study aims to see how the characteristics of childrend under two years old in rural areas are related to stunting, does anemia have an effect? On the other hand, this study has limitations, namely the sample setting in rural areas, cannot describe urban areas. Research with samples in different areas, with larger samples may provide better results.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest

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