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Risk factors of under-fives stunting in low-income households

Faktor-faktor risiko stunting pada balita keluarga miskin

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Abstract

Stunting prevalence in Indonesia is still high and far from the National medium term development plan 2020-2024 target. As many as 41% of stunted under-fives come from poor households in the stunting focus area of the Bantul Regency. This study assessed the risk factors for stunting in low-income households. This study was conducted in July 2023 in Bantul Regency using an unmatched case-control approach. Using a purposive sampling technique, 156 children under five (78 cases and 78 controls), aged 6-59 months, from low-income families registered in the village and receiving social assistance from the Ministry of Social Affairs, were chosen. Interviews were conducted to gather research data, and a validity- and reliability-tested questionnaire was used. Data were analyzed using descriptive statistics, chi-squared tests, and binary logistic regression. The findings demonstrated a substantial correlation ($p<0,05$) between low birth weight and antenatal care (ANC) visits and stunting; however, there was no correlation ($p>0,05$) between mothers' education level, mother's age, and children's breastfeeding status. In conclusion, low birth weight and ANC visits are risk factors for stunting among underfives. Low birth weight is the primary cause of stunting in children under five in low-income families.

Keywords: Young Children, Poverty, Stunting, Nutritional Status

Abstrak

Prevalensi *stunting* di Indonesia saat ini masih tinggi dan jauh dari target RPJMN 2020-2024. Sebanyak 41% balita stunting berasal dari keluarga miskin di lokasi fokus *stunting* Kabupaten Bantul. *Stunting* disebabkan oleh berbagai faktor risiko yang dapat merugikan balita di masa depan. Penelitian ini bertujuan untuk mengkaji faktor risiko penyebab stunting pada keluarga miskin. Studi ini menggunakan desain *unmatched case-control* dan dilaksanakan pada bulan Juli 2023 di Kabupaten Bantul. Sampel diambil menggunakan teknik purposive sampling berjumlah 156 balita (78 kasus dan 78 kontrol) berusia 6 - 59 bulan pada keluarga miskin penerima bantuan sosial Kementerian Sosial yang terdaftar pada kelurahan setempat. Data penelitian dikumpulkan melalui wawancara dengan menggunakan kuesioner yang telah diuji validitas dan reabilitasnya. Data dianalisis menggunakan statistik deskriptif, uji *chi-square*, dan regresi logistik biner. Hasil penelitian menunjukkan bahwa kunjungan ANC dan berat badan lahir balita secara signifikan berhubungan dengan *stunting* ($p<0,05$), sedangkan tidak ada hubungan signifikan ($p>0.05$) antara tingkat pendidikan ibu, usia ibu, dan status ASI eksklusif balita dengan *stunting*. Kesimpulan, faktor-faktor risiko penyebab *stunting* yaitu berat badan lahir rendah dan kunjungan ANC. BBLR merupakan faktor risiko paling berpengaruh terhadap kejadian *stunting*

Kata Kunci: Anak, Kemiskinan, *Stunting*, Status Gizi

Introduction

Malnutrition is the leading cause of death among children under five. Worldwide, an estimated 13,6 million children die each year from malnutrition, and child mortality from undernutrition is the highest in developing countries (Boah et al., 2019). One form of malnutrition is stunting. Stunting is a condition in which a child's height is too low for young children of the same age; that is, less than two negative standard deviations (SD) below the median of the World Health Organization (WHO) growth standards for young children (Asmare & Agmas, 2022). Stunted young children are more susceptible to disease, suboptimal physical and cognitive development, low income, and productivity, and are at risk of degenerative diseases in the future (Paramashanti et al., 2016).

Globally, more than 149 million children under the age of five are still stunted and 51.1 million of them will occur in Southeast Asia in 2020 (UNICEF/WHO/World Bank Group, 2021). The prevalence of stunting in Indonesia was 24,4% in 2021, which is still far from the national medium-term development plan or RPJMN 2020-2024 target, which aims to reduce the prevalence of stunting by 14% by 2024 (Kemenkes RI, 2020b, 2021a).

Stunting is caused by a variety of risk factors that are spread across socioeconomic and cultural levels, environmental and maternal levels, as well as at the level of young children themselves. Risk factors, such as maternal education level and regularity of maternal antenatal care (ANC) visits, can indirectly influence the incidence of stunting in children under five (Boah et al., 2019). Pregnancy outcomes can be adversely affected by inefficient ANC, because mothers who consistently attend ANC obtain services related to prevention, early identification, and maintenance of excellent health throughout pregnancy. The incidence of low birth weight (LBW) in infants must be decreased because it is a direct risk factor for stunting in children under five years of age. High-quality ANC is essential for this purpose (Arsyi et al., 2022; Boah et al., 2019).

Poverty and stunting in children under five years of age are interrelated, which can be mediated by low levels of education and lack of access to health facilities (M. A. Rahman et al., 2021). Low levels of maternal education can lead to low levels of literacy; therefore, mothers cannot fully understand the health information provided by health workers in the form of printed media, which can lead to poor understanding of health problems in young children (Khattak et al., 2017). Mothers from poor families also face difficulties in accessing antenatal care (ANC) because low-income families prioritize their income to meet basic family needs, thus ignoring the health of their pregnancy and resulting in pregnancy checks not being carried out optimally (Rachmawati et al., 2017).

According to data from Indonesia's Central Bureau of Statistics (BPS), 26,5 million people are living in poverty by 2021. The Special Region of Yogyakarta (DIY) Province ranks 11th (11,49%), making DIY Province the poorest province in Java, with Bantul Regency as the area with the highest poor population of 147 thousand people (BPS, 2022; BPS Kab. Bantul, 2021). The Bantul Regency Health Office in 2021 stated that of the 10 existing stunting loci, 41% of stunted young children came from poor families (Dinkes Kab. Bantul, 2022a).

Early intervention on risk factors is one of the preventive techniques needed for stunting in Indonesian children, and the identification of risk factors is needed for better interventional strategies (Wicaksono et al., 2021). Children from low-income families are vulnerable groups prone to stunting. There is little research on factors related to stunting in poor families in Indonesia, especially among recipients of social assistance from the Ministry of Social Affairs. Thus, this study aimed to identify the risk factors for stunting among children under five years of age in relation to poor families.

Methods

This study used an unmatched case-control design (1:1) and was conducted in July 2023 in 18 sub-districts in Bantul Regency, which were designated as stunting focal points based on Bantul Regent Decree No. 127 of 2022, on Sub-districts with Priority Focus Areas for Stunting Reduction (Peraturan Bupati Bantul, 2022).

The study population included all young children aged 6-59 months living in 18 stunting

hotspots, with a total of 7,388 young children based on E-PPGM (*Elektonik Pencatatan dan Pelaporan Gizi Berbasis Masyarakat*) data obtained from *Puskesmas* (Community Health Center). Based on sample size calculation, a minimum of 156 samples (78 cases and 78 controls) were obtained. Participants were selected using probability proportional size sampling, with Posyandu as the cluster. Data on children under five in the selected Posyandu clusters were then confirmed with the local village office to find out which families with children under five were receiving social assistance from the Ministry of Social Affairs based on the DTKS (*Data Terpadu Kesejahteraan Sosial*). A total of 419 young children were from poor families who received social assistance, of whom 93 had a stunted nutritional status and 326 had a normal nutritional status. After sample selection by setting inclusion: (a) Children aged 6-59 months and b. Poor families receiving social assistance from the Ministry of Social Affairs, who are registered with the local village government) and exclusion (a. Families with children who are physically challenged (have foot deformities) and ill could potentially affect the results of the study. Mothers or caregivers who were seriously ill and unable to answer questions properly) criteria, 78 stunted toddlers and 78 normal toddlers met the criteria for the minimum sample size of 156 for this study.

Stunting was defined as an anthropometric status of height or length-for-age that was less than -2 SD z-score of the WHO average growth criteria for children under five (Kemenkes RI, 2020a). Research data such as the mother's ANC history, education level, age, birth weight, and exclusive breastfeeding status of young children were collected through interviews using a questionnaire that was tested for validity (r count >0,320) and reliability (Cronbach's alpha value 0,604).

Descriptive statistics were used to determine the characteristics of the respondents, including maternal ANC history, maternal education level, maternal age, children's birth weight, age, sex, and exclusive breastfeeding status. The chi-square test was used to determine the relationship between two variables, namely the relationship between one of the independent variables, such as mother's ANC history (irregular and regular), mother's education level (no education, primary, secondary, and higher), mother's age (high-risk and ideal), children's birth weight (LBW and normal), and exclusive breastfeeding status (non-exclusive and exclusive), and the dependent variable, stunting (stunting and normal). A binary logistic regression test was used to determine the association between selected independent variables and stunting. Multivariate testing was performed using binary logistic regression tests, as the dependent variable was categorical data, and test results with a p-value <0.05 were considered statistically significant.

This study was conducted after obtaining ethical clearance from the Research Ethics Commission of the Faculty of Medicine, Universitas Sebelas Maret (no. 65/UN27.06.11/KEP/EC/2023). Informed consent was obtained from all parents.

Result and Discussion

In 18 villages designated as stunting focal points in the Bantul Regency in 2023, 156 children aged 6-59 months were included in this study. Of these, 78 had stunting and the remaining 78 had normal nutritional status, namely Bangunharjo (Sewon), Argosari (Sedayu), Sitimulyo (Piyungan), Sumberagung (Jetis), Gadingharjo (Sanden), Gilangharjo (Pandak), Wijirejo (Pandak), Girirejo (Imogiri), Imogiri (Imogiri), Sriharjo (Imogiri), Bawuran (Pleret), Pleret (Pleret), Segoroyoso (Pleret), Wonolelo (Pleret), Jagalan (Banguntapan), Tamanan (Banguntapan), Ringinharjo (Bantul), and Sabdodadi (Bantul).

The mothers of young children who were the subjects of this study mostly made regular antenatal care (ANC) visits (72,4%), had a secondary education level (80,8%), and had an ideal age when giving birth to young children (69,9%). The young children who became the research subjects were mostly male (55,8%) and age range 48-59 months (31,4%). Most young children had normal birth weights (89,1%) and were exclusively breastfed (84,0%) (Table 1).

Bivariate analysis results revealed that two variables had a significant correlation with stunting, namely antenatal care (ANC) visits (OR 2,35; 95% CI 1,13 - 4.87; p=0,032) and birth weight of young children (OR 5,46; 95% CI 1,50 – 19,88; p=0,010). Meanwhile, there was no association between the mother's age, education

level, and whether she exclusively breastfed her children under five or not (Table 2). Multivariate analysis revealed a strong correlation between stunting and a child's birth weight under five years old; a child's risk of stunting was 4,24 times higher for low birth weight children than for normal birth weight children (95% CI 1.12 – 15,98; p=0,033) (Table 3).

Antenatal Care (ANC) Visits of Mothers

The findings of this study showed a strong link between mother attendance during ANC visits and instances of stunting in young children (p=0,032). These results are in line with previous studies conducted in Nigeria and Bangladesh showing that maternal ANC visits that do not meet the frequency and irregularity criteria are indirectly the cause of stunting in young children (Hamel et al., 2015; Toma et al., 2018). This study also found that young children of mothers who had regular pregnancy checkups were 1,72 times less likely to be stunted than those of mothers who did not make regular ANC visits.

Table 1. Distribution of respondent characteristics

Variabel	Nutritional Status of Children					
	Stunting (Case)		Normal (Control)		Total	
	n=78	%	n=78	%	n=156	%
Mother's Characteristics						
Antenatal Care (ANC) Visits						
Irregular	28	35,9	15	19,2	43	27,6
Regular	50	64,1	63	80,8	113	72,4
Mother's Education Level						
No Education	1	1,3	0	0,0	1	0,6
Primary	11	14,1	9	11,5	20	12,8
Secondary	63	80,8	63	80,8	126	80,8
Higher	3	3,8	6	7,7	9	5,8
Mother's Age (year)						
High Risk (<20 or >35)	29	37,2	18	23,1	47	30,1
Ideal (20-35)	49	62,8	60	76,9	109	69,9
Children's Characteristics						
Sex						
Male	45	57,7	42	53,8	87	55,8
Female	33	42,3	36	46,2	69	44,2
Age Group (months)						
6-11	3	3,8	3	3,8	6	3,8
12-23	13	16,7	4	5,1	17	10,9
24-35	21	26,9	18	23,1	39	25,0
36-47	20	25,6	25	32,1	45	28,8
48-59	21	26,9	28	35,9	49	31,4
Birth Weight						
LBW	14	17,9	3	3,8	17	10,9
Normal	64	82,1	75	96,2	139	89,1
Exclusive Breastfeeding						
Non-Exclusive	16	20,5	9	11,5	25	16,0
Exclusive	62	79,5	69	88,5	131	84,0

Mothers who conduct check-ups during pregnancy or antenatal care (ANC) visits can prevent stunting in young children. The World Health Organization recommends having at least eight ANC visits to lower the rate of under-five mortality during pregnancy and childbirth (WHO 2016). This study assessed the frequency of antenatal care visits (ANC) during pregnancy based on Minister of Health Regulation Number 21 of 2021. The recommendations of the Ministry of Health of the Republic of Indonesia (2021) call for ANC visits to be conducted at least six times: once during the first trimester (0 -12 weeks), twice during the second trimester

(>12–24 weeks of pregnancy), and three times during the third trimester (>24 weeks to birth) (Kemenkes RI, 2021b).

A crucial tactic for enhancing health literacy and nutrition and encouraging preventative healthcare behaviors is the provision of antenatal care (ANC) visits. The best place to start when providing a variety of nutritional and health interventions to enhance nursing habits, birth preparedness, and the well-being of both the mother and fetus is through ANC services. ANC provides an opportunity to save lives through early diagnosis, disease prevention, health promotion, and treatment during pregnancy (Roba et al. 2022). Regular ANC visits and meeting the frequency according to the recommended rules are important so that mothers receive quality and comprehensive pregnancy services, can experience a positive pregnancy and childbirth experience, and give birth to a healthy baby (Kemenkes RI, 2021b). The lack of accurate assessment of gestational age due to irregular ANC can interfere with the diagnosis and/or management of complications (such as preterm birth and preeclampsia). In addition, conducting ANC at the right frequency and time can diagnose maternal diseases, such as malaria, tuberculosis, and HIV, so that appropriate treatment can be carried out (WHO, 2016).

Table 2. Bivariate analysis between risk factors with stunting

Variable	Nutritional Status of Children				p-value	OR (CI 95%)
	Stunting		Normal			
	n	%	n	%		
Antenatal Care (ANC) Visits						
Irregular	28	35,9	15	19,2	0,032*	2,35 (1,13 – 4,87)
Regular	50	64,1	63	80,8		
Mother's Education Level						
No Education	1	1,3	0	0,0	0,532	-
Primary	11	14,1	9	11,5		
Secondary	63	80,8	63	80,8		
Higher	3	3,8	6	7,7		
Mother's Age (year)						
High Risk (<20 or >35)	29	37,2	18	23,1	0,081	1,97 (0,98 – 3,96)
Ideal (20-35)	49	62,8	60	76,9		
Birth Weight						
LBW	14	17,9	3	3,8	0,010*	5,46 (1,50 – 19,88)
Normal	64	82,1	75	96,2		
Exclusive Breastfeeding						
Non-Exclusive	16	20,5	9	11,5	0,190	1,97 (0,81 – 4,79)
Exclusive	62	79,5	69	88,5		

**significant (p<0,05)*

Mother's Level of Education

Parental education is one of the determinants of the nutritional status of children under five years of age, where parents with higher education are more likely to implement better parenting practices than parents with no education (Khattak et al., 2017). Low socioeconomic status is associated with low levels of education. One problem that has been characterized as a risk factor and source of several difficulties in the educational process is poverty (Ögeyik, 2016).

The results of this study are consistent with those of studies conducted in Indonesia by Sholikah et al. (2017) and Rufaida et al. (2020), who found no connection between maternal education and early childhood nutritional status (Rufaida et al., 2020; Sholikah et al., 2017). These findings may be due to the presence of routine *Posyandu* (integrated service post) and toddler classes conducted by community health center health workers, which can increase mothers' knowledge because they receive information about young children's growth and development. Thus, the practice of parenting and nutrition in young children can be done properly, and young children can grow optimally, which is consistent with the research

conducted by Sholikah et al. (2017), where in addition to toddler classes, current technological developments can also make it easier for mothers to access information on toddler parenting to increase maternal knowledge (Sholikah et al., 2017).

Bina Keluarga Balita (BKB) activity by the National Population and Family Planning Board (BKKBN), which is conducted once a month by trained *Posyandu* cadres, is also a government initiative to increase parents' knowledge about childcare and nutrition (BKKBN, 2018). Kairani and Effendi (2019) in Bengkulu, Indonesia, found that mothers who regularly attended *Posyandu* were dominated by mothers with secondary and lower education. This is because mothers with higher education work more and do not have time to come to *Posyandu* (Khairani & Effendi, 2019).

Table 3. Multivariate analysis of selected factors with stunting

Variabel	p-value	OR (CI 95%)
Antenatal Care (ANC) Visits	0,172	1,72 (0,78 – 3,77)
Mother's Age	0,144	1,72 (0,83 – 3,57)
Birth Weight	0,033*	4,24 (1,12 – 15,98)
Exclusive Breastfeeding	0,327	1,60 (0,62 – 4,12)

**significant (p<0,05)*

The incidence of stunting among children under five years of age in North Central Timor and Malang, Indonesia, has been linked to maternal and paternal education, contrary to the findings of this study (Banhae *et al*., 2023; Supariasa *et al*., 2023). One factor that affects how nourished children are under the age of five is their parents' educational attainment. Highly educated parents are likely to use better childcare techniques (Khattak *et al*. 2017). In addition to being able to care for their toddlers well and having a better understanding of nutrition for toddler growth, educated parents are typically financially better off, allowing them to purchase enough food to meet the nutritional demands of young children (Nugraheni *et al*., 2023).

Mother's Age

These findings are consistent with earlier research conducted by Trisyani et al. (2020) in Tanggamus, Indonesia and the study by Kiik and Nuwa (2021) in Kupang, Indonesia, which found no connection between mothers' age and children's stunting (Kiik & Nuwa, 2021; Trisyani *et al*., 2020). However, it can be seen that children born to mothers with high-risk pregnancy ages have a 1.72 times higher risk of stunting compared to children born to mothers with ideal pregnancy ages. According to a study conducted in Indonesia by Manggala et al. (2018), children born to mothers who were at a high risk of stunting at the time of pregnancy (less than 20 years old or > 35 years old) had a 4,23 times higher chance of stunting than children born to mothers who were at an optimal age. (Manggala *et al*., 2018).

Several other studies have demonstrated a substantial correlation between maternal age and the incidence of stunting in children under five years of age, which contradicts the results of this study (Manggala et al., 2018; Mokwena & Kachabe, 2022; Wemakor et al., 2018). This is due to the fact that preterm birth, maternal and newborn mortality, and malnutrition are all linked to young mother ages at delivery. The nutritional needs of pregnant adolescent mothers can compete with those of the developing fetus because young mothers are still growing. Older mothers also have higher pregnancy risks such as intrauterine growth restriction, increased risk of stillbirth, preterm birth, and chromosomal abnormalities (Manggala et al., 2018; Wemakor et al., 2018).

Despite the many birth risks that result from pregnant women of high-risk age, these risks can be managed and prevented through regular antenatal care (ANC) visits. ANC can help identify risk factors early, monitor their progress, and provide necessary interventions to prevent or reduce complications as well as improve the delivery readiness of pregnant women to reduce maternal and infant morbidity (Venkateswaran *et al*., 2019). A study conducted by Indayani and Fijri (2021) in Lampung, Indonesia found that mothers of high-risk age did not experience complications during childbirth due to several factors. One is the

existence of *the Perencanaan Persalinan dan Pencegahan Komplikasi* (P4K) by the government, which allows mothers to plan a safe place to give birth during pregnancy and undergo early detection to prevent complications (Indayani & Fijri, 2021).

Birth Weight of Young Children

The findings of this study are consistent with those of other studies that have demonstrated a strong correlation between stunting and low birth weight (Aboagye et al., 2022; Aryastami et al., 2017; Woldeamanuel & Tesfaye, 2019). This study also found that young children with low birth weight (LBW) were 4,24 times more likely to have stunting than young children of normal weight. Children with low birth weight have been shown to experience both acute and chronic growth delays in utero (Lestari *et al*., 2018). Compared to children with normal birth weight, they are more vulnerable to diseases, such as diarrhea and lower respiratory tract infections, as well as a higher chance of consequences, such as sleep apnea, anemia, jaundice, chronic lung issues, lethargy, and appetite loss (Rahman *et al*., 2016).

Several factors caused stunting, but low birth weight (LBW) was the most influential factor in this study. The prevalence of BBLR in Indonesia was 6,6% in 2021, an increase from the previous result of 6,2% in 2018 (Kemenkes RI, 2021a). One of the main causes of LBW in developing countries is intrauterine growth retardation (IUGR), in which infants with medical IUGR are born malnourished. One study showed that most IUGR cases in developing countries are due to poor maternal nutrition and low maternal weight. Iron deficiency has also been linked to IUGR, which can lead to low birth weights (Aboagye *et al*., 2022).

Maternal health and nutritional status play important roles in birth outcomes; therefore, it is essential to provide appropriate healthcare, nutrition, and diet to mothers during pregnancy (Mishra *et al*., 2021). Efforts can be made to prevent the occurrence of LBW in Indonesia, including providing health education to pregnant mothers regarding LBW, monitoring the condition of the baby in the womb to prevent intrauterine growth retardation, and conducting antenatal care visits (ANCs) (Novitasari *et al*. 2020). In an effort to improve the well-being of pregnant women, the Government of Indonesia also provides cash assistance to pregnant mothers from poor families (maximum two pregnancies) through the *Program Keluarga Harapan* (PKH) of the Ministry of Social Affairs, which aims to promote behavioral change and maternal independence in accessing health services (Kemensos RI, 2022).

Exclusive Breastfeeding Status of Young Children

The results showed that almost all the young children in this study were exclusively breastfed (84%). The results are consistent with the report of the Bantul District Department, where the coverage of exclusive breastfeeding in Bantul District in 2022 is 83,3%, and the figure has met the program performance indicator of 80% (Dinkes Kab. Bantul, 2022b). The results of this study are consistent with those of studies conducted in Indonesia that found no correlation between exclusive breastfeeding and the incidence of stunting (Hadi *et al*., 2021; Kusumahati & Herdiani, 2023; Safika *et al*., 2023).

Research by Hadi et al. (2021) and Kusumahati and Herdiani (2023) found that the impact of exclusive breastfeeding on stunting was not from the perspective of nutritional intake, but from efforts to prevent infection. Children who are exclusively breastfed are resistant to infections, preventing stunting due to recurrent infections (Hadi *et al*., 2021; Kusumahati & Herdiani, 2023). The WHO and other studies have mentioned that young children who are exclusively breastfed can avoid gastrointestinal and respiratory infections (Frank *et al*., 2019; Hossain & Mihrshahi, 2019; WHO, 2014; Wibawa *et al*., 2019). There is ample evidence of the beneficial effects of breastfeeding in preventing pneumonia and diarrhea in infants, where increased practice of exclusive breastfeeding can prevent 823,000 infant deaths annually (Sari *et al*., 2021).

Exclusive breastfeeding alone will not reduce stunting rates and should be supported by improvements in infectious diseases, socioeconomic conditions, education levels, and women's empowerment (Kusumahati & Herdiani, 2023). A mother’s socioeconomic status influences the success of exclusive breastfeeding. Mothers from low-income families typically have fewer advantages in terms of access to institutional and informal breastfeeding support, gendered childcare

workloads, breastfeeding information availability, and cultural shame related to breast exposure (Newhook *et al*., 2017). A low socioeconomic status may also result in mothers being unable to provide adequate nutritional intake, both in terms of quantity and quality, for the baby. One major aspect that can affect a baby's nutritional condition is the introduction of supplementary foods at six months of age. Babies that are exclusively breastfed are at risk of stunting or growth failure if they do not consume sufficient food (Aboagye *et al*., 2022; Paramashanti *et al*., 2016).

Barriers to exclusive breastfeeding include the absence of breast milk in the first three days after birth, the increased use of formula milk, the social belief that newborns should be given honey or starchy water, and children who cry a lot. It is assumed that the child is hungry, which leads the mother or caregiver to give other foods such as formula milk, bananas, honey, and porridge (Sari *et al*., 2021). This was confirmed through interviews with the respondents in this study, which showed that there are several reasons why mothers of young children do not breastfeed exclusively, including mothers or caregivers providing young children with foods other than breast milk when they are less than six months old (starch water, honey, and steamed pumpkin), medical reasons for the mother (bed rest and infectious diseases), failure to express breast milk, and adoption after birth.

Health promotion can be facilitated by providing information on exclusive breastfeeding. Interventions can be carried out by counselling mothers and caregivers on good infant feeding and hygiene practices (Sari *et al*., 2021). Counselling or educating mothers through *Posyandu* is an effort to increase their knowledge of exclusive breastfeeding in Indonesia. It is important for mothers to participate in *Posyandu* activities because mothers from poor families who are less likely to receive formal education can gain knowledge through informal education by participating in *Posyandu* activities (Rhapsodia *et al*., 2019).

Conclusion

Children's low birth weight and irregularity of maternal antenatal care (ANC) visits were risk factors for stunted under-fives in low-income homes, while mothers' education level, mother's age, and children's breastfeeding status were not risk factors for stunting in this study. The risk factor with the greatest impact on the incidence of stunting in young children (6–59 months) is low birth weight.

Effective antenatal care (ANC) practices are essential for maximizing the health status of expectant mothers and preventing low birth weight, which is a risk factor for stunting. Therefore, enhancing the regularity and number of antenatal care visits for expectant mothers requires thorough assessment and governmental initiatives.

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