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DETERMINANTS OF STUNTING RISK FACTORS FOR TODDLERS AGED 6-36 MONTHS IN THE MALANG REGENCY, INDONESIA

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ABSTRACT

Stunting remains the most prevalent nutritional issue among toddlers in Indonesia. In 2022, the Malang Regency reported a stunting prevalence of 23%. Data from the Ardimulyo Health Center in August 2021 showed 372 stunted children. This study aimed to analyze the risk factors for stunting in children aged 6-36 months, focusing on child, mother, father and household factors. The research utilized a case-control design with a population comprising all children aged 6-36 months. The case sample included 50 stunted children, while the control sample consisted of 50 non-stunted children of the same age range. Respondents were the parents of the case and control children. Samples were selected through purposive sampling, with both case and control samples drawn from Wonorejo Village. Data collection involved interviews using questionnaires and physical measurements. Data were analyzed using bivariate (chi-square test) and multivariate (multiple logistic regression test) methods. The study identified several risk factors for stunting in children aged 6-36 months. Significant factors included a history of low birth weight (LBW) (p=0.035), lack of exclusive breastfeeding (p=0.008), inappropriate complementary feeding (p=0.009), history of infectious diseases (p=0.002), maternal knowledge (p=0.000), and family income (p=0.016). Among these, maternal knowledge emerged as the most dominant factor in the multivariate analysis (p=0.000). This finding underscores the critical role of maternal education in influencing child health outcomes. In conclusion, multiple factors contribute to stunting in children aged 6-36 months, with maternal knowledge being the most significant. Therefore, enhancing mothers' understanding of nutrition and child care practices is crucial in mitigating the risk of stunting. Efforts to improve maternal education on these topics could play a key role in reducing stunting rates in Indonesia. Additionally, interventions should address the broader socioeconomic factors that influence child health, such as improving family income and access to healthcare services. This holistic approach is essential for creating sustainable improvements in child nutrition and health outcomes. Overall, the findings highlight the multifaceted nature of stunting and the need for comprehensive strategies that address both direct and indirect determinants. Public health initiatives should focus on increasing awareness and education among mothers, ensuring adequate nutrition during pregnancy and early childhood, and providing support for low-income families. By targeting these areas, it is possible to make significant strides in reducing the prevalence of stunting and improving the overall health and well-being of children in Indonesia.

Key words: Risk factors, stunting, nutrition, vulnerable population, children aged 6-36 months

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INTRODUCTION

With the highest prevalence among children under the age of five in Indonesia, stunting is the most significant nutritional issue that has yet to be resolved [1]. According to World Health Organization (WHO) (2020), stunting is short or very short based on length/height for age, which is less than -2 standard deviation (SD) on the WHO growth curve and occurs due to irreversible conditions resulting from inadequate nutritional intake and/or recurrent/chronic infections in the first 1000 days of life [1, 2]. The substantial occurrence of stunting indicates the existence of underlying issues, specifically inadequate community and facility health services that fail to meet established standards and public ignorance regarding the determinants of stunting [2]. The primary risk factors associated with stunting include low birth weight (LBW) [3, 4], frequent infectious diseases [5], insufficient breast milk and complementary feeding [6], incomplete immunization status [7], maternal height below 145 cm [8, 9], fewer than four prenatal check-up visits [3], family socioeconomic status [8], inadequate sanitation, and diarrhea [9]. Several determinants impact the prevalence of stunting in infants between the ages of 6 and 24 months such as family income, environmental sanitation, and food availability, in addition to maternal parenting styles. Other determinants include level of information exposure, nutritional knowledge, unemployed mothers, and dietary parenting styles [10].

Cultural practices that may contribute to stunting include, premature introduction of solid foods to infants, especially prior to when they are developmentally ready. This can interfere with exclusive breastfeeding. Other factors include cultural beliefs and practices surrounding child feeding. For example, certain traditional foods may lack essential nutrients needed for healthy growth, and food taboo restrictions for pregnant women and young children. Extended family members, such as grandparents, often play a significant role in decision-making related to feeding practices that do not align with recommendations for optimal nutrition and health [11, 12,13].

The programs carried out by the Indonesian government to eradicate stunting are specific nutrition interventions and sensitive nutrition interventions. Specific nutrition interventions are related to improving nutrition and health. Sensitive nutrition interventions such as providing clean water and sanitation help to reduce the rate of stunting [12].

In the long-term, stunting causes a decrease in intellectual capacity. Disorders of the structure and function of nerves and brain cells that are permanent can cause a decrease in the ability to absorb lessons at school age, which will affect productivity as an adult. Apart from that, malnutrition also causes growth disorders (short and/or

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thin) and increases the risk of non-communicable diseases such as diabetes mellitus, hypertension, coronary heart disease and stroke [14].

Indonesia is a country with the third highest prevalence of stunting among children under five among Association of Southeast Asian Nations (ASEAN) countries, after Timor Leste and Laos People's Democratic Republic (PDR) [15]. Based on the results of the Indonesian Nutrition Status Study of the Indonesian Ministry of Health, the prevalence of stunted toddlers in 2022 was 21.6% [15]. This indicates that stunting in Indonesia will affect nearly a quarter of infants in 2022. Despite a 2.8% decline compared to 2021, this value remains relatively high compared to the WHO maximum threshold of 20% [1]. As reported by Study of Indonesia's Nutritional Status, the prevalence of stunting in East Java was 19.2% in 2022, and 23% in the Malang Regency [14]. In August 2022, weighing data from Malang Regency revealed that malnutrition affected 11,522 children, or 8.6% of the total population. Stunting is characterized by stunted growth, impediments to cognitive and motor development, suboptimal body mass, and metabolic disorders in children. Stunting results in a lasting decline in cognitive abilities and the capacity to retain information during school years, ultimately impacting an individual's productivity as an adult [16].

Notwithstanding the wealth of research on risk factors for stunting among vulnerable populations of 6-36-month-old infants, there remain areas of inquiry that require further investigation [17]. Integrated risk factor analysis, which considers the combined effects of multiple risk factors on stunting in vulnerable toddler populations, is one of the voids [18, 19]. Additionally, longitudinal studies are required to determine how these risk factors affect stunting in infants aged 6 to 36 months over time [20]. Furthermore, it is crucial to conduct research on latent risk factors that have received limited attention, including maternal mental health, paternal influences and cultural practices, in order to determine how they affect stunting in infants aged 6-36 months who belong to vulnerable populations [21]. In addition, further investigation is warranted into the determinants of stunting that are particular to vulnerable populations. This should include factors like displacement, conflict and healthcare accessibility, which may exert distinct influences on the prevalence of stunting among infants between the ages of 6 and 36 months [17, 18, 20, 21]. In low-resource settings, assessing the efficacy of interventions that target risk factors for stunting among vulnerable infant populations constitutes the final area of research that lacks completion. By addressing these research gaps, the understanding of risk factors for stunting in vulnerable toddler populations aged 6-36 months can be improved, and this knowledge can guide the development of targeted interventions aimed at reducing the prevalence of stunting in these specific age groups.

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Further investigation is warranted to identify the risk factors that contribute to stunting in children under the age of three in light of these issues and the persistently high prevalence of this condition. In order to reduce stunting, it is crucial to comprehend its determinants and relative effects, as this will facilitate the establishment of priorities, and the development of effective interventions. This research work examined the household and child, maternal, paternal, and stunting risk factors for children aged 6-36 months in the Wonorejo Village Health Center area of Malang Regency, Indonesia.

MATERIALS AND METHODS

Design

The present study employed a retrospective case-control design to examine the causal relationship between the determinants of stunting (risk factors), and the incidence of stunting (outcome) in children aged 6-36 months. The likelihood ratio values of each determinant factor provide insight into the magnitude of the risk. This study was carried out for a period of six months (2021, March-August) in the Malang Regency.

Sample

The case sample consisted of 50 non-stunted children of the same age as the controls and 50 stunted children, with the population consisting of all children aged 6-36 months. In this investigation, mothers and fathers of both case and control offspring participated as respondents. The aim of investigating the incidence of stunting in children was to determine the differences in the incidence of stunting between the case group and the control group in terms of the risk factors that contribute to the incidence of stunting, namely child factors, maternal factors, paternal factors and household factors. The inclusion criteria for the purposive sample selection process were as follows: 1) the child had not experienced any illness at the time of data collection, 2) the child had been reared solely by the mother, and 3) the father resided at home with the child. The control sample was also collected from Wonorejo Village, where the case sample originated.

Variables

The dependent variable in this research is the incidence of stunting, whereas the independent variables consist of the child factor, maternal factors, paternal factor and household factors.

Instrument

The information was gathered via interviews and a questionnaire. A history of immunizations, exclusive breastfeeding, complementary nutrition, infectious diseases, and birth weight and length are all considered child factors. Knowledge, parental style, height, education, and occupation are maternal factors, whereas

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height, education, and occupation are paternal factors. Family income, the number of family members and environmental sanitation are examples of household factors. Prior to implementation, the questionnaire underwent testing on 30 mothers of toddlers residing in the Lawang Community Health Center area of Srigading Village, which shared nearly identical attributes with the research site, including a significant prevalence of stunted toddlers. The data pertaining to the child's immunization history, birth weight and height, and antenatal care (ANC) were extracted from the maternal and child health handbook document. The historical record of exclusive breastfeeding was gathered via interviews and a questionnaire concerning the period of time spent lactating from birth to six months of age. Age of administration, frequency, quantity, texture, and type comprise the history of complementary foods; the overall assessment is then classified as either excellent or poor. A history of infectious disease was established by considering the individual's exposure to ARI (Acute Respiratory Infection), gastroenteritis, and worms from the moment of birth until the data collection period.

Analysis

The cumulative score is classified as either prevalent or rare. An infectious disease is considered frequent if it affects a person at least twice within six months; it is considered rare if it occurs less than twice. The extent to which a mother can provide accurate responses to inquiries pertaining to stunting, encompassing its definition, causes, risk factors, signs and symptoms, consequences, and preventive measures, constitutes maternal knowledge. The final knowledge score of the mother was classified as either excellent or subpar. Parenting patterns were discerned through the administration of a questionnaire that inquired about the mother's practices regarding nourishing her child, monitoring her child's growth and development, encouraging development, averting infections, and utilizing child health services. The parenting style assessment of the final mother was classified as either excellent or subpar. A questionnaire detailing the implementation of the five pillars of Community-Based Total Sanitation—namely: cessation of open defecation, hand hygiene with soap, treatment of potable water and food, waste management, and domestic liquid waste management—was utilized to identify environmental sanitation. The ultimate assessment of environmental sanitation is classified as either excellent or inadequate. Stunting is quantified anthropometrically using the length/height ratio of the z-score index in relation to age and the 2016 WHO anthropometric standards.

Ethical Clearance

This study received approval from the Research Ethics Board of the Poltekkes Kemenkes Malang (No:248 / KEPK-POLKESMA/ 2021). All participants provided written informed consent and adolescent participants.

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Data Analysis

A multivariate, univariate and bivariate analysis was performed on the data. Analysis of univariate data was done using frequency distribution test. The bivariate analysis employs the chi-square test to ascertain the degree of association between factors hypothesized to be associated with stunting, with a 95% confidence interval (CI) and a significance level of 0.05. Multivariate analysis identifies the most influential risk factors for variables resulting from bivariate analysis with a p-value less than 0.25 by employing multiple logistic regression.

RESULTS AND DISCUSSION

Based on the results of univariate analysis (Table 1), the largest gender of the entire sample was female (12 to 24 months), the average age of the children was 13 months, the average age of the mothers was 25.5 years, and the fathers was 28.9 years.

The univariate analysis (Table 2) of the total number of respondents in the case and control groups with respect to child factors reveals that a significant proportion of children (76%) were not born with a low birth weight (LBW), had a body length greater than 48 cm at birth (62%), did not receive exclusive breast milk (73%), received inadequate complementary feeding (44%), frequently contracted infections (66%), and received complete immunizations (27%). The majority of the mothers exhibited inadequate knowledge regarding stunting, implemented ineffective parenting practices, and had a minimum height of 145 cm, a basic education, and were unemployed. The average of father's height was 155 cm, fathers had at least a rudimentary education and were employed, family income exceeded the minimum wage, family size was at least six members, and environmental sanitation was inadequate. The results of research by Titaley *et al.* [4] found that the possibility of stunting in Indonesia increased significantly among children living in households with three or more children under five years old, and households with 5-7 household members [3]. The more number children under five in the household and more household members are associated with suboptimal food distribution. As a result, children have a greater chance of experiencing stunting [22]. More toddlers also indicate less distance between births. This results in suboptimal provision of breast milk and weaning food [22]. The results of this research also show that toddlers who had access to proper sanitation were 1.45-8.51 times more likely to not be stunted. In addition, it is known that children who live in contaminated environments with inadequate sanitation have a 40% risk of experiencing stunting, and it is significantly higher in rural and suburban areas, that is, 43% and 27%, respectively as compared to those living in urban areas. This condition is reinforced by research in 13 provinces in Indonesia, which found that households that have good sanitation contribute

positively to reducing the incidence of stunting and severe stunting in children under five [22].

A bivariate analysis (Table 3) of child factors indicates that among the six risk factors that were examined, stunting incidence is associated with four of them. Significantly (p=0.035) associated with the incidence of stunting is a history of being born with low birth weight (less than 2,500 grams) with an odds ratio (OR) of 3.165; this indicates that children born with Low Birth Weight (LBW) have a 3.165-fold increased risk of developing stunting in comparison to those born not LBW (greater than 2,500 grams). The research findings of Titaley *et al.* [4] regarding the determinant factors for stunting in children under 2 years of age in Indonesia show that LBW have a higher chance of being stunted. Toddlers who have a low birth weight have a risk of becoming stunted 1.7 times when compared to toddlers who have a normal birth weight [3]. The likelihood of stunting in Indonesia increases significantly among children weighing <2500 grams at birth [3]. One of the main determinants of stunting in children aged 12-23 months in Indonesia is LBW, which makes babies have a greater chance of being stunted, and because stunting often starts in the womb, the possibility of being stunted tends to remain until the early childhood stage [4].

The study emphasizes the significance of birth weight as a determinant of childhood stunting. Low Birth Weight infants exhibit a heightened vulnerability to stunting, with the effects often originating in utero and persisting into early childhood. Optimal postnatal feeding practices can mitigate the adverse effects of intrauterine growth restriction [23]. However, inadequate nutrition compounded by unfavorable environmental conditions can exacerbate the risk of stunting, underscoring the importance of early interventions to address nutritional deficiencies [3]. The growth of LBW babies tends to be slower than babies with normal birth weight. Sub-optimal child growth during the prenatal period is often the result of maternal malnutrition [4]. However, during the postnatal period, optimal feeding practices can reduce the effects of poor intrauterine growth. Thus, after birth, if food intake is inadequate and exacerbated by unhealthy environmental conditions, children will be more susceptible to infections, leading to poor nutrient absorption and, ultimately, poor growth [24].

There is a statistically significant association between exclusive breastfeeding and the incidence of stunting (OR = 3.802, p = 0.008). This implies that infants who do not receive exclusive breast milk are 3.802 times more likely to experience stunting than those who do. Exclusive breastfeeding and timely introduction of complementary foods play pivotal roles in child growth and development [25]. The study findings highlight a significant association between inadequate breastfeeding practices and stunting incidence. Failure to implement early breastfeeding initiation, failure to provide exclusive breast feed (EBF), and the early weaning process can

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be one of the factors causing stunting [14]. Problems with child growth will occur if continued breastfeeding is not accompanied by adequate complementary food at the appropriate age [6]. Additionally, a history of exclusive lactation was found to be a risk factor substantially associated with the incidence of stunting, according to the findings of this study. Consistent with the findings of Lestari *et al.* [20], concluded that the variable breast milk has a statistically significant relationship with stunting. Exclusive lactation can reduce the prevalence of stunting in children under the age of five [22, 26]. Providing complementary nutrients to breast milk is a risk factor that is substantially associated with the incidence of stunting, according to the findings of this study.

There is a significant association between the incidence of stunting and the consumption of weaning foods (p=0.009) OR 3.222. Stopping breastfeeding too early can increase the risk of malnutrition. In the context of providing weaning food, it is very important to consider the safety, quality and quantity of the food provided [27, 28]. If breastfeeding for a long period of time is not accompanied by appropriate weaning food for their age, the baby will experience malnutrition, which will have an impact on their growth. Linear growth disorders can occur if children are not given optimal and high-quality weaning foods [6, 29]. This implies that children who do not consume sufficient quantities and quality of weaning foods are 3.222 times more at risk than infants who consume adequate quantities of complementary foods. Sub-optimal complementary feeding practices contribute to the risk of stunting, emphasizing the importance of quality, quantity, and safety in infant feeding practices [30]. Insufficient complementary feeding alongside continued breastfeeding can impede linear growth, underscoring the need for comprehensive nutritional interventions [22].

There is a significant relationship between the incidence of stunting and the frequency of infectious diseases in children (p=0.002) OR 3.020. Based on research in 2014, it was found that children aged 6-24 months who suffered from diarrhea had a risk of stunting of 5.04 times. Children who suffer from acute respiratory infections (ARI) have a risk of stunting of 5.71 times [20]. Other research states that children with acute respiratory infections and diarrhea at the age of 24 months have an increased risk of stunting by 7.46 times compared to children who do not experience infection [5]. This implies that children who encounter infectious diseases on a regular basis are 3.020 times more likely to develop stunting than those who do so infrequently or never.

Frequent infections emerged as another significant risk factor associated with stunting incidence. Infectious diseases, often exacerbated by poor hygiene and sanitation, disrupt nutrient absorption and can lead to weight loss in children [31, 32]. Prolonged exposure to infections without adequate nutritional support can

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exacerbate the risk of stunting, highlighting the interplay between infectious diseases and nutritional status in childhood growth [27]. Problems with child growth will occur if continued breastfeeding is not accompanied by adequate complementary feeding according to their age. Complementary feeding begins to be given when the baby reaches 6 months of age. With increasing nutritional requirements, impaired linear growth may occur if a child receives inadequate complementary foods [6]. A history of frequent infections is a risk factor that is significantly associated with the incidence of stunting. Infectious diseases caused by poor hygiene and sanitation (for example, diarrhea and worms) can disrupt the absorption of nutrients in the digestive process. Some infectious diseases suffered by babies can cause the baby to lose weight [33]. If this condition occurs for a long time and is not accompanied by adequate intake for the healing process, it can result in stunting [27]. A documented history of recurrent infections is a substantial risk factor that correlates with the prevalence of stunting. Viral illnesses resulting from inadequate sanitation and hygiene, such as diarrhea and worms, have the potential to impede the digestive process' nutrient assimilation. Prolonged occurrence of this condition in the absence of sufficient nutrition to support the healing process may lead to the development of stunted growth [27, 34].

A bivariate analysis of maternal factors revealed that among the six risk factors examined (Table 4), only maternal knowledge exhibited a statistically significant association with the occurrence of stunting (p=0.000; OR 7.944). Mothers who have a low level of knowledge may face challenges in choosing food ingredients, which can lead to sacrificing the quality and balance of nutrition, and failing to meet the nutritional needs of families and children. Meanwhile, mothers who have a high level of knowledge will find it easier to make decisions regarding their child's nutritional status by choosing quality food ingredients. This ensures that the nutritional needs of children and families are balanced and met [35]. This means that mothers who have insufficient knowledge about stunting have a risk of 7.944 times increasing the prevalence of stunting in their children, compared to mothers who have sufficient knowledge.

Based on a bivariate analysis of paternal factors, of the 3 risk factors studied (Table 5), there are no risk factors that are significantly related to the incidence of stunting in children.

A bivariate analysis of household factors indicates that among the three risk factors examined, only family income exhibited a statistically significant association with the incidence of stunting (p=0.016, OR 3.299). Family income has been identified as the risk factor associated with the incidence of stunting, according to this study. The ability to purchase food for one's family is correlated with socioeconomic status. Families in a high economic status will have the means to purchase and provide for

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their basic requirements, including sustenance that is essential for the development of children. Families characterized by a high income but a low level of education are unable to provide for the nutritional requirements of both their offspring and other family members. Despite the mother or both parents possessing a high level of nutrition knowledge, it will be challenging to provide for the child's nutritional requirements if the family's economic status is low. Wealthy households have greater access to better sanitation facilities, health facilities, and water sources of superior quality. As a consequence, the possibility of children from affluent households experiencing stunting is smaller than children from households with lower affluence. There is a close correlation between the level of welfare and food security as well as adequate food for the children living in the house [22]. The study elucidates the influence of socio-economic factors, particularly family income, on stunting prevalence. Lower economic status limits access to essential resources, including nutritious food, healthcare services, and sanitation facilities, exacerbating stunting risk. Conversely, households with higher economic status can afford better-quality food and access to healthcare, reducing the likelihood of stunting among children. Additionally, parental education, particularly paternal education, plays a crucial role in improving household welfare and facilitating access to resources necessary for child growth and development [8, 22]. This indicates that families with incomes below the district minimum wage run the risk of a 3,299-fold increase in the prevalence of stunting in their children in comparison to families with incomes exceeding the district minimum wage.

Variables that had a p-value <0.25 from the results of the bivariate analysis were then carried out in a multivariate analysis, namely the variables of history of exclusive breastfeeding, complementary feeding, history of infections, health services and immunizations, mother's knowledge, and family income. The results of multivariate analysis with logistic regression are shown in Table 7.

Based on Table 7, the results of the multivariate analysis between risk factors for stunting, five variables were obtained which showed significant risk factors (p-value < 0.05). The five risk factors are history of birth weight, history of infection, mother's knowledge, family income, and environmental sanitation. The most dominant variable related to the incidence of stunting is a history of infectious disease with the largest OR value, namely 8.28, meaning that children who frequently suffer from infectious diseases are at risk of experiencing stunting 8.28 times greater than children who never or rarely experience illness due to infection.

Based on a multivariate analysis of risk factors for stunting, four variables were found to be significant risk factors (p-value <0.05). These variables are the history of complementary feeding, history of infections, mother's knowledge about baby nutrition and infection prevention, and family income. The most dominant variable

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related to the incidence of stunting is knowledge with the largest OR value, namely 9.088, meaning that mothers who have less knowledge have their children at risk of experiencing stunting 9.088 times greater than mothers who have good knowledge about stunting.

The regression coefficient for all variables is positive, which means that every time there is an increase in exclusive breastfeeding, quality of complementary feeding, a decrease in infectious diseases, an increase in maternal knowledge about stunting, an increase in family income, it will be possible to reduce the incidence of stunting in children aged 6-36 months.

The constant negative value (-10.646) means that if the child is not given exclusive breast milk, does not receive complementary feeding, often suffer from infectious disease, the mother has less knowledge, and the family income is low, then there will be no reduction in the incidence of stunting.

In relation to the prevalence of stunting, maternal knowledge emerged as the preeminent factor among all the risk factors that have been examined. Poor parental practices during the initial one thousand days of a child's existence are the most significant determinants in stunting prevalence [11, 36]. A dearth of knowledge on the part of the mother concerning health and nutrition, both prior to and during pregnancy, and in the postpartum period, contributes to inadequate parental practices [11]. Consistent with the research outcomes of Kusumawati [10], the following maternal factors contribute to the occurrence of malnourished toddlers: level of education, nutritional awareness, unemployment, parental approaches, and information exposure. According to the findings of a study concerning maternal behavior in preventing stunting in infants, education, knowledge, attitudes, spouse support, information exposure, and exposure to information are all associated with stunting prevention behavior [37]. In the realm of parenthood, mothers wield a significantly greater impact than fathers. The mother, in her role as a caregiver, will oversee the provision of a balanced nutritional intake for the infant.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

In summary, this study highlighted the significant impact of various factors on stunting among toddlers in Wonorejo Village. Maternal knowledge emerged as a crucial determinant, alongside factors like low birth weight, feeding practices, infections, and socio-economic status. These findings stress the need for holistic interventions focusing on education, healthcare access, and socio-economic empowerment to address stunting effectively. Further research and community-based efforts are essential to develop targeted strategies and ensure optimal growth and development for all children.

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Conflict of Interest

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Table 1: Frequency Distribution of Respondents' Demographics

No	Demography		n	%	Mean	SD
1.	Child's gender	Boy	47	47	-	-
		Girl	53	53		
2.	Child's age	6-11 m	46	46	13,26	5,398
		12-24 m	54	54		
3.	Mother's age	17-25 m	46	46	25,47	5,527
		26-35 m	41	41		
		36-45 m	13	13		
4.	Father's age	17-25 m	38	38	28,9	4,985
		26-35 m	43	43		
		36-45 m	18	18		

Table 2: Relationship between children's risk factors and the incidence of stunting

Children' factors	Category	Stunting (%)	Non-stunting (%)	p-value	OR	CI 95%
History of LBW	LBW (<2.500 gr)	17 (34)	7 (14)	0,035	3,165	1,176-8,518
	Not LBW (≥2.500 gr)	33 (66)	43 (86)			
History of birth length	<48 cm	24 (48)	14 (28)	0.064	2,374	1,035-5,444
	≥48 cm	26 (52)	36 (72)			
EBF	Not EBF	42 (84)	29 (58)	0,008	3,802	1,482-9,750
	EBF	8 (16)	21 (42)			
Complementary feeding	Poor	29 (58)	15 (30)	0,009	3,222	1,412-7,355
	Good	21 (42)	35 (70)			
Infectious disease	Often	23 (46)	11 (22)	0,002	3,020	1,265-7,209
	Seldom	27 (54)	39 (78)			
Immunization	Incomplete	18 (36)	9 (18)	0,072	2,563	1,017-6,457
	Complete	32 (64)	41 (89)			

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Table 3: Relationship between mother's risk factors and the incidence of stunting

Mother' factors	Category	Stunting (%)	Non-stunting (%)	p-value	OR	CI 95%
Mother's knowledge	Poor	44 (88)	24 (48)	0,000	7,944	2,872-21,977
	Good	6 (12)	26 (52)			
Parenting	Poor	34 (68)	35 (70)	1,000	0,911	0,390-2,126
	Good	16 (32)	15 (30)			
Mother's height	< 145 cm	5 (10)	13 (26)	0,068	0,316	0,103-0,969
	≥ 145 cm	45 (90)	37 (74)			
Mother's education	Elementary	42 (84)	41 (82)	1,000	1,152	0,405-3,277
	Intermediate and High	8 (16)	9 (18)			
Mother's job	Doesn't work	44 (88)	44 (88)	1,000	1,000	0,299-3,341
	Work	6 (12)	6 (12)			
Antenatal care	<4 times	26 (52)	33 (66)	0,222	0,558	0,249-1,250
	≥4 times	24 (48)	17 (34)			

Table 4: Relationship between Father's risk factors and the incidence of stunting

Father' factors	Category	Stunting (%)	Non-stunting (%)	p-value	OR	CI 95%
Father's height	< 155 cm	13 (26)	14 (28)	1,000	0,093	0,373-2,186
	≥ 155 cm	37 (74)	36 (72)			
Father's education	Elementary	34 (68)	32 (64)	0,833	1,195	0,522-2,737
	Intermediate and High	16 (32)	18 (36)			
Father's job	Doesn't work	8 (16)	6 (12)	0,733	1,397	0,447-4,367
	Work	42 (84)	44 (88)			

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Table 5: Relationship between Father's risk factors and the incidence of stunting

Household factors	Category	Stunting (%)	Non-stunting (%)	p-value	OR	CI 95%
Family income	Less than distric minimum wage	21 (42)	9 (18)	0,016	3,299	1,322-8,231
	More than distric minimum wage	29 (58)	41 (82)			
Number of family members	≥6 people	38 (76)	41 (82)	0,623	0,695	0,263-1,834
	<6 people	12 (24)	9 (18)			
Environment sanitation	Poor	27 (54)	29 (58)	0,840	0,850	0,386-1,874
	Good	23 (46)	21 (42)			

Table 6: Factors that Influence Stunting in toddlers 6-36 months in Wonorejo Village, Singosari District, Malang Regency

Independent variable	Coefficient of regression	Constant	OR	95% CI	Nilai p
EBF	1,003	-10,646	2,727	0,878-8,466	0,083
Complementary feeding	1,501		4,485	1,570-12,812	0,005
Infection disease	1,328		3,775	1,209-11,790	0,022
Mother's knowledge	2,207		9,088	2,672-30,907	0,000
Family income	1,138		3,121	1,027-9,485	0,045

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