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Correlation Between Birth Weight and Exclusive Breastfeeding with Stunting in Children Aged 6–24 Months

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Stunting remains a chronic nutritional issue in Indonesia, particularly among children under the age of two. Two crucial factors influencing stunting status are birth weight and exclusive breastfeeding. This study aims to determine the correlation between birth weight, exclusive breastfeeding, and stunting in children aged 6–24 months. This study employed an analytical quantitative design with a cross-sectional approach. A total of 120 children aged 6–24 months and their mothers were selected using purposive sampling at Deket Community Health Center Lamongan. Data were collected through interviews using structured questionnaires and anthropometric measurements. Data analysis was conducted using chi-square tests and logistic regression. The analysis revealed a significant association between birth weight and stunting (p = 0.003), and a significant association between exclusive breastfeeding and stunting (p = 0.001). Children with low birth weight (<2500 grams) had a 3.1 times higher risk of stunting, while children who were not exclusively breastfed had a 2.7 times higher risk of stunting compared to those who were exclusively breastfeed. Although the study provides valuable insights, its cross-sectional nature limits causal interpretation, and recall bias may have affected the accuracy of reported breastfeeding practices. Despite these limitations, the findings underscore the need for strengthened prenatal and breastfeeding interventions to prevent stunting. Birth weight and exclusive breastfeeding are significantly associated with stunting in children aged 6–24 months. Promotive and preventive interventions through pregnancy monitoring and breastfeeding education are crucial efforts in preventing stunting.

Keywords : Stunting, exclusive breastfeeding, birth weight, early childhood.

INTRODUCTION

Stunting, characterized by impaired linear growth, poses a significant public health threat worldwide, particularly in low- and middle-income nations. The World Health Organization (WHO) defines it as a height-for-age measurement falling below two standard deviations from the median of the WHO Child Growth Standards (WHO, 2020). In Indonesia, stunting prevalence remains high despite various national strategies and interventions. The Ministry of Health reported a national stunting prevalence was reported at 21.6%, indicating a persistent challenge to achieving optimal child health and development (Kementerian Kesehatan RI, 2021).

Stunting typically occurs during the critical window of the first 1000 days of life, from conception to a child's second birthday. During this period, growth faltering caused by nutritional deficiencies and poor care practices can result in irreversible effects on physical and cognitive development. Addressing the underlying determinants of stunting, including maternal nutrition, breastfeeding practices, and access to health services, is therefore essential in national stunting reduction strategies (Black et al., 2013; Sholikha et al., 2024).

Birth weight is a significant predictor of child growth and development. Infants born with low birth weight (less than 2500 grams) are at greater risk of experiencing growth failure, especially during the first two years of life, also known as the "critical window" or the first 1,000 days (Black et al., 2013). Intrauterine growth restriction and maternal nutritional status during pregnancy play important roles in determining birth weight outcomes (Kozuki et al., 2013). Evidence shows that low birth weight is consistently associated with increased risks of stunting in early childhood (Christian et al., 2013).

Exclusive breastfeeding is one of the most effective interventions to ensure healthy growth during infancy. The WHO advocates for exclusive breastfeeding during the first six months as it supplies all the necessary nutrients and boosts immune defenses (WHO, 2017). Research indicates that children who are not exclusively breastfed are at a higher risk of stunting, reinforcing the importance of breast milk in preventing nutritional deficiencies and infections (Dewey & Begum, 2011; Lamberti et al., 2011).

The relationship between birth weight, exclusive breastfeeding, and stunting has been studied in various settings; however, findings may differ depending on local sociodemographic and health system contexts. In rural and resource-limited areas, these risk factors may interact more profoundly due to limited access to maternal and child health services. Understanding these associations in specific local settings is essential for designing effective and targeted interventions (Akombi et al., 2017).

METHODS

This research utilized a quantitative analytic design with a cross-sectional approach. The study population consisted of mothers with children aged 6–24 months residing in the working area of Deket Health Center, Lamongan. Sampling was done purposively, with a total of 120 mother-child pairs chosen based on predetermined inclusion and exclusion criteria.

Inclusion criteria included: (1) children aged 6–24 months, (2) availability of complete birth records, and (3) consent from mothers to participate in the study. Exclusion criteria included: (1) children with congenital abnormalities, (2) twins or multiple births, and (3) children currently suffering from acute illness at the time of data collection.

Data were collected using a structured questionnaire consisting of identity data, child birth weight history, exclusive breastfeeding history, and child anthropometric data (based on height/age measurements). Data were analyzed using the chi-square test to see the relationship between variables and the logistic regression test to determine the magnitude of risk. Univariate analysis was performed to describe the frequency distribution of each variable.

RESULTS AND DISCUSSION

Results

Table 1. Distribution of Respondents' Characteristics (n=120)

Variable	Category	Frequency (n)	Percentage (%)
Child's Sex	Male	65	54.2
	Female	55	45.8
Birth Weight	< 2500 grams	38	31.7
	≥ 2500 grams	82	68.3
Exclusive Breastfeeding	Yes	72	60.0
	No	48	40.0
Stunting Status	Stunted	34	28.3
	Not Stunted	86	71.7

Based on the table 1, that out of 120 children aged 6–24 months, the majority (68.3%) were born with a normal birth weight (≥2500 grams), while 31.7% had low birth weight (<2500 grams). This indicates that nearly one-third of the children began life with potential nutritional vulnerability. Furthermore, 60.0% of the children were exclusively breastfed during the first six months, while 40.0% did not receive exclusive breastfeeding, showing that a considerable portion of the population might have missed the optimal early nutrition period.

In terms of stunting status, 28.3% of the children were categorized as stunted based on height-for-age Z-scores, which signifies that stunting remains a prevalent issue in the study area. Additionally, the sex distribution of children was relatively balanced, with a slight predominance of males (54.2%). These descriptive findings suggest the need for targeted nutritional interventions focused on improving birth outcomes and breastfeeding practices.

Table 2. Correlation Between Birth Weight, Exclusive Breastfeeding, and Stunting

Variable	Category	Stunted (n=34)	Not Stunted (n=86)	p-value
Birth Weight	Low (<2500g)	20	18	0.003
	Normal (≥2500g)	14	68	
Exclusive Breastfeeding	Yes	10	62	0.001
	No	24	24	

Based on the table 2, show that among 38 children with low birth weight, 20 (52.6%) experienced stunting, while only 14 out of 82 (17.1%) children with normal birth weight were stunted. This indicates a significant correlation between birth weight and stunting (p=0.003).

Furthermore, of the 72 children who were exclusively breastfeed, only 10 (13.9%) were stunted. Conversely, 24 out of 48 (50%) non-exclusively breastfeed children were stunted. The chi-square test result shows this relationship is highly significant (p=0.001).

Discussion

The findings show that birth weight and exclusive breastfeeding are significantly associated with stunting in children aged 6–24 months. Children with low birth weight (<2500 grams) were 3.1 times more likely to be stunted compared to those with normal birth weight. This supports the findings by (Adair et al., 2013), who stated that growth disturbances during fetal life contribute to stunting during infancy.

Exclusive breastfeeding proved to be a protective factor against stunting. Children who were not exclusively breastfed were 2.7 times more likely to be stunted. This supports the findings of Dewey & Begum (2011) and Victora et al. (2016), who stated that exclusive breastfeeding supports optimal growth and reduces infection risk, which can negatively impact nutritional status.

Birth weight is an early indicator of a child's nutritional status and has a significant impact on long-term growth. Children born with low birth weight are more vulnerable to growth impairments due to limited energy and nutrient reserves (Kozuki et al., 2013). In addition, low birth weight often indicates potential intrauterine growth restrictions during pregnancy, which can affect the development of the child's organ

systems and metabolism (Black et al., 2013). Therefore, infants with low birth weight require closer monitoring of their growth and development to prevent stunting.

Additional studies have also linked low birth weight with poor maternal nutrition and lower socioeconomic status (Christian et al., 2013). Pregnant women who suffer from chronic energy deficiency or anemia are at higher risk of delivering babies with low birth weight. This highlights the importance of nutritional interventions for pregnant women, both through education and supplementary feeding programs, as a preventive strategy against stunting beginning in the prenatal period.

Breast milk not only fulfills the infant's nutritional needs but also contains antibodies that protect against gastrointestinal and respiratory infections. Recurrent infections are known to be a contributing factor to growth retardation. Furthermore, exclusively breastfeed children tend to have a better emotional bond with their mothers, which plays a role in the child's development stimulation (Black et al., 2013; Muthoharoh, 2021a).

The high proportion of stunting in children who were not exclusively breastfed may also be linked to inappropriate complementary feeding practices, such as early introduction or unsuitable types of food. This highlights the need for early nutrition education and proper parenting. This research aligns with a study by (Lestari et al., 2014), which showed that breastfeeding education, growth monitoring, and adequate nutritional intake are crucial steps in preventing stunting, particularly during the golden age of growth. The involvement of healthcare workers and community health volunteers in regular monitoring can assist in early detection of stunting risks.

Exclusive breastfeeding plays a key role in linear growth during infancy. Breast milk provides optimal nutrition that is tailored to the needs of the infant, including essential macronutrients, micronutrients, and bioactive compounds that support growth and immune function (Muthoharoh, 2021b; Victora et al., 2016). The WHO recommends exclusive breastfeeding for the first six months because of its demonstrated ability to improve nutrition and reduce infection-related growth impediments (WHO, 2020).

Infants not exclusively breastfed often receive formula or solid foods too early, which may lack adequate nutritional value and are more prone to contamination especially in resource-constrained settings (Horta & Victoria, 2013). This increases the risk of diarrhea and other infections, which are strongly associated with malabsorption and growth faltering. Research by Lamberti et al. (2011) emphasized that early cessation of breastfeeding is significantly linked with increased morbidity, particularly in infants under six months, due to enteric infections, contributing to stunting.

Furthermore, exclusive breastfeeding fosters better nutrient absorption through its protective effect on gut health. The immunological properties of breast milk, including secretory IgA, lactoferrin, and oligosaccharides, help protect the intestinal mucosa and modulate the infant's microbiome, which in turn

enhances nutrient utilization (Walker, 2000). This is particularly important because chronic inflammation from repeated infections is known to impair the growth hormone-insulin-like growth factor axis, contributing to linear growth deficits (Prendergast & Humphrey, 2014).

From a psychosocial perspective, exclusive breastfeeding also promotes maternal-infant bonding, which is associated with better caregiving practices and improved developmental outcomes. The act of breastfeeding provides not only physical nourishment but also emotional security that contributes to the child's overall well-being, indirectly supporting optimal growth and development (Britto et al., 2017).

Studies in various regions of Indonesia and other developing countries consistently show that infants who are exclusively breastfed have significantly lower odds of being stunted compared to those who are not. For example, a study by (Siregar et al., 2018) in rural Indonesia reported that children who were not exclusively breastfed had a 2.5 times higher risk of being stunted. This underscores the importance of breastfeeding promotion campaigns and community-based education programs to increase awareness and practice of exclusive breastfeeding.

The success of exclusive breastfeeding is influenced by multiple factors, including maternal knowledge, cultural beliefs, workplace policies, and access to healthcare support. Research has shown that support from healthcare workers, peer counselors, and family members greatly increases the likelihood of breastfeeding success (Rollins et al., 2016). Therefore, strengthening community-based support systems and implementing breastfeeding-friendly policies at workplaces are key strategies in addressing stunting from the early stages of life.

CONCLUSION

This study confirms that birth weight and exclusive breastfeeding are significantly associated with stunting in children aged 6–24 months. Children born with low birth weight (<2500 grams) were found to have a 3.1 times higher risk of becoming stunted, while those who were not exclusively breastfed had a 2.7 times greater risk of experiencing stunting compared to their counterparts..

Specifically, health practitioners and local health authorities should: Conduct routine nutritional counseling for pregnant women, particularly focusing on the importance of balanced intake during pregnancy to prevent low birth weight; Provide regular maternal weight gain monitoring and anemia screening as part of standard antenatal care; Train midwives and community health workers to deliver structured breastfeeding education starting from the third trimester; Establish breastfeeding support groups at the community level to assist mothers postpartum, particularly in the first six months; Integrate early growth monitoring and developmental screening into routine Posyandu (integrated health post) services to allow early detection of stunting risks.

However, the study's cross-sectional design limits the ability to infer causality, and self-reported data may be prone to recall bias, particularly in the assessment of exclusive breastfeeding. Future research using longitudinal approaches is recommended to explore these relationships more robustly.

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