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Growth monitoring is a determinant of stunting in toddlers aged 6-23 months in Tanjung Jabung Timur Regency, Jambi Province, Indonesia

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ABSTRAK

Latar Belakang: *Kabupaten Tanjung Jabung Timur merupakan salah satu kabupaten di Provinsi Jambi dengan angka prevalensi stunting yang masih tinggi berdasarkan hasil SSGI 2022 yaitu sebesar 22,5%. Penyebab stunting menjadi beberapa faktor baik dari faktor anak sendiri, maupun faktor orang tua dan faktor lingkungan rumah tangga.*
Tujuan: *Penelitian ini bertujuan untuk mengkaji determinan stunting pada balita usia 6-23 bulan di Kabupaten Tanjung Jabung Timur.*
Metode: *Penelitian ini menggunakan desain cross sectional dengan memanfaatkan data sekunder bersumber dari hasil Survei Status Gizi Indonesia tahun 2022 di Kabupaten Tanjung Jabung Timur Provinsi Jambi. Penelitian ini melibatkan 148 balita berusia 6 hingga 23 bulan sebagai sampel. Analisis menggunakan aplikasi SPSS dengan melakukan analisis distribusi frekuensi dan tabulasi silang menggunakan chi square. Variabel terikat pada penelitian ini adalah stunting dan variabel bebas yaitu pemantauan pertumbuhan, Inisiasi Menyusu Dini (IMD), Air Susu Ibu (ASI) eksklusif, berat badan lahir, dan imunisasi.*
Hasil: *Hasil penelitian menunjukkan pemantauan pertumbuhan sebagai variabel bebas yang berhubungan dengan kejadian stunting di Kabupaten Tanjung Jabung Timur usia 6-23 bulan (0R 2,34; p = 0,048; 95%CI 1,08 – 5,11), sedangkan IMD, ASI eksklusif, berat badan lahir,dan imunisasi tidak berhubungan dengan stunting.*
Kesimpulan: *Pemantauan pertumbuhan merupakan determinan stunting pada balita usia 6-23 bulan di Kabupaten Tanjung Jabung Timur. Penting untuk meningkatkan kunjungan masyarakat dalam melakukan pemantauan pertumbuhan secara rutin ke pelayanan kesehatan, karena pemantauan berperan dalam mendeteksi dini gangguan gizi, memastikan intervensi yang tepat, dan mendukung tumbuh kembang anak yang optimal.*

KATA KUNCI*: BBLR; IMD; pemantauan pertumbuhan; stunting*

ABSTRACT

Background: *Tanjung Jabung Timur Regency is one of the regencies in Jambi Province that has a high prevalence of stunting, recorded at 22,5% based on the 2022 SSGI results. Stunting has several causes, including the child's, parental, and household environmental factors.*

Objectives: *This study examined the risk factors for stunting in toddlers aged 6-23 months in Tanjung Jabung Timur Regency.*

Methods: *This study used a cross-sectional design by utilizing secondary data sourced from the results of the 2022 Indonesian Nutritional Status Survey (SSGI) in Tanjung Jabung Timur Regency, Jambi Province. This study included 148 toddlers between 6 and 23 months as its sample. The analysis used the SPPS application by conducting frequency distribution analysis and cross-tabulation using chi-square. The dependent variable in this study was stunting, and the independent variables were growth monitoring, early initiation of breastfeeding, exclusive breastfeeding, birth weight, and immunization.*

Results: *The results showed that growth monitoring was the independent variable related to stunting in Tanjung Jabung Timur Regency aged 6-23 months (0R 2.34; p = 0.048; 95% CI 1.08 – 5.11), while early initiation of breastfeeding, exclusive breastfeeding, birth weight, and immunization were not related to stunting.*

Conclusions: *Growth monitoring determines stunting in toddlers aged 6-23 months in Tanjung Jabung Timur Regency. Improving community participation in routine growth monitoring at health services is essential, as it contributes to the early detection of nutritional problems, ensures appropriate interventions, and promotes optimal child growth and development.*

KEYWORDS*: early initiation of breastfeeding; growth monitoring; low birth weight; stunting*

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INTRODUCTION

Stunting is one of the nutritional issues that is prioritized at the national level. Stunting refers to a chronic condition of malnutrition that disrupts a child's physical growth, resulting in a height that is inferior to that of peers of the same age. Children who are stunted are more susceptible to disease and are at risk of developing degenerative diseases as adults. Stunting is not only limited to health but also affects other aspects, such as the child's intelligence level (1). The government has designated stunting a national priority issue, as outlined in the 2020-2024 National Medium-Term Long-Term Plan (RPJMN), with a target prevalence of 14% by 2024.

The national prevalence of stunting has reduced. Based on the 2013 Basic Health Research (Riskesdas) survey, the prevalence of stunting in Indonesia was 37.6%, and in the 2018 Riskesdas, it decreased to 30.8% (2). Furthermore, the prevalence of stunting based on the results of the 2019 Indonesian Nutritional Status Survey (SSGI) was 27.7%, the 2021 SSGI was 24.4%, and the 2022 SSGI was 21.6% (3). Stunting prevalence in Jambi Province declined from 22,4% in 2021 to 18% in 2022 (SSGI). In Tanjung Jabung Timur Regency the rate decreased from 25,6% to 22,5% over the same period. Although the trend of stunting prevalence in Indonesia shows a decline, stunting is still a health problem in the high category based on the threshold for health problems according to WHO, which is ≥ 20% (1).

Toddlers who are stunted are those who experience chronic nutritional problems caused by many factors, direct or indirect (4). Direct causative factors are inadequate food intake and the presence of infectious diseases. Other causative factors of stunting include diseases experienced during infancy, unfulfilled nutritional intake in infants, the condition and nutritional status of the mother during pregnancy, and socio-economic conditions (5).

Exclusive breastfeeding is also one of the factors contributing to stunting. Currently,

breastfeeding is one of the government programs as a specific intervention to prevent stunting. Following WHO recommendations in the Global Strategy of Infant and Child Feeding about feeding babies and children, namely, early initiation of breastfeeding, which starts as soon as the infant is born and lasts for at least one hour, exclusive breastfeeding begins from birth and continues until the baby is six months of age, complementary feeding starts when the baby is six months old, and continues breastfeeding until the child is twenty-four months old or more. Breast milk is the best food with complete nutritional content and can be protected so that it is not easily sick and supports optimal growth and development of toddlers. Research indicates that toddlers breastfed for less than two years are 2.9 times more likely to experience stunting compared to those breastfed for two years or more (6).

Baby characteristics such as birth weight also affect stunting. Babies born weighing less than 2500 grams are susceptible to experiencing growth disorders, which can result in stunting. Low birth weight indicates that the infant has experienced growth restriction in utero. This condition can affect physiological and metabolic processes, increasing the child's vulnerability to infections and chronic disease (7). Research results show that low birth weight is one of the dominant risk factors for stunting (8). Other factors causing stunting are the limited health services in the community, including health services for toddlers and mothers during pregnancy, as well as quality early learning (9). In addition, it also includes the level of child attendance to get growth and development monitoring at the integrated health post, which has decreased, and children do not get adequate access to health services to obtain immunization. Health services are very important in the effort to overcome nutritional problems. One of the essential health services for a toddler is growth monitoring. This activity aims to ensure that children grow according to their age and serves as an early detection measure for growth-related issues, enabling timely and appropriate interventions to prevent nutritional problems. In Tanjung Jabung Timur, according to the 2018 Basic Health Research, only 27.8% of toddlers underwent weight monitoring in compliance with the standard. The coverage of complete basic immunization among children under five was 42.6%. The rate of exclusive breastfeeding in the regency in 2022 was 55.3%, which remained below the target of 60%. Moreover, the prevalence of low birth weight increased from 1.99% in 2021 to 3.1% in 2022 (10). Based on these problems, this study will further examine whether health services for toddlers, such as growth monitoring and immunization, and toddler characteristic factors, namely birth weight and breastfeeding, are risk factors for editing in Tanjung Jabung Timur Regency, Jambi Province, using SSGI in 2022).

MATERIALS AND METHODS

This study is an analytical observational study with a cross-sectional approach. The study utilized secondary data from the 2022 SSGI results for Tanjung Jabung Timur Regency, Jambi Province. The research sample was 148 toddlers aged 6-23 months. The sample selection framework was based on the Master Frame from the block list of regular population census results, which was then updated by the household list in each selected census block by the Nutrition Implementing Personnel (TPG) of the Health Center. This research has obtained ethical feasibility approval from the Health Research Ethics Commission of Dr. Moewardi Surakarta Hospital, Number: 428/II/HREC/2024, dated February 19, 2024.

The variables in this study were stunting as the dependent variable, and the independent variables were growth monitoring, exclusive breastfeeding, early initiation of breastfeeding, immunization, and infant birth weight. Stunting was determined based on anthropometric measurements by comparing it with standards based on the Length-for-Age Z-score (LAZ) of less than -2 SD. Growth monitoring was seen from the number of weighings and measurements carried out in the past year. Toddlers received growth monitoring if, in the past year, they received services in the form of weighing at least eight times and measuring length or height at least twice. In this study, the minimum number of weights and measurements carried out was adjusted to the toddler's age. Exclusive breastfeeding provides breast milk only to infants without additional food or drinks other than

medicine given for six months. In this study, exclusive breastfeeding was determined by the age at which food or drinks other than breast milk were introduced to the sample. The early initiation of the breastfeeding variable was determined based on skin contact between the mother and the baby who was born immediately after the baby was born. Immunization was determined based on the completeness of basic immunization according to the sample's age. Birth weight was categorized into Low Birth Weight (LBW) and normal birth weight. A toddler's birth weight is considered low if the baby's birth weight is less than 2500 grams. The analysis conducted was univariate and bivariate using SPSS. The bivariate test uses chi-square to ascertain how independent and dependent variables relate to one another. There is a substantial correlation between independent and dependent variables when the p-value is less than 0.05.

RESULTS AND DISCUSSIONS

The sample of this study was 148 toddlers aged 6-23 months. The percentage of toddlers aged 6-23 months in Tanjung Jabung Timur Regency who experienced stunting was 23 percent. Most toddlers who experience stunting are aged 12-23 months (73.5%). Based on the growth monitoring activities, more than half of the toddlers were monitored for their growth (60.1%). Meanwhile, in terms of exclusive breastfeeding, most toddlers were not exclusively breastfed (68.2%). The implementation of early initiation of breastfeeding was carried out on newborns at 66.9 percent. Almost all samples in this study were born weighing more than 2500 grams; this can be seen from the percentage of babies born with normal weight, which was 94 percent. **Table 1** displays the frequency distribution of sample characteristics.

Table 1. Sample Characteristics

Variables	Frequency (n)	Percentage (%)
Nutritional status		
Stunting	34	23.0
Normal	114	77.0
Age		
6-12 months	57	38.5
13-23 months	91	61.5
Growth Monitoring		
No	59	39.9
Yes	89	60.1
Early initiation of breastfeeding		
No	49	33.1
Yes	99	66.9
Exclusive Breastfeeding		
No	101	68.2
Yes	47	31.8
Baby birth weight		
LBW	8	5.4
Normal	140	94.6
Basic Immunization		
Incomplete	57	38.5
Complete	91	61.5

Table 2 shows the bivariate analysis results of the independent variables with dependent variables. The bivariate analysis results of risk factors influencing stunting are growth monitoring with a p-value < 0.05 (p-value = 0.048). Variables that do not affect stunting, indicated by a p-value exceeding 0.05, include early initiation of breastfeeding, exclusive breastfeeding, infant birth weight, and immunization.

Relationship between growth monitoring and stunting

The results of the chi-square indicated a correlation between growth monitoring variables and stunting (p-value = 0.048), with an OR value

of 2.34 (95% CI 1.08 – 5.11), which shows that toddlers whose growth is not monitored are 2.3 times more susceptible to stunting than toddlers whose growth is monitored. These results are relevant to the research of Fentiana et al., (2022) (11). It was reported that the dominant factor associated with stunting was growth monitoring, where toddlers whose growth was not monitored had a 1.32-fold greater risk of stunting

Table 2. Bivariate analysis of stunting risk factors

Variables	Stunting		Normal		*P-Value*	OR (95% CI)
	n	%	n	%		
Growth Monitoring						
No	19	55.9	40	35.1	0.048*	2.34 (1.08 – 5.11)
Yes	15	44.1	74	64.9		
Early Initiation of Breastfeeding						
No	15	44.1	34	29.8	0.178	1.86 (1.85 – 4.08)
Yes	19	55.9	80	70.2		
Exclusive Breastfeeding						
No	24	70.6	77	67.5	0.901	1.15 (0.50 – 2.66)
Yes	10	29.4	37	32.5		
Baby birth weight						
LBW	3	8.8	5	4.2	0.567	2.11 (0.48 – 9.32)
Normal	31	91.2	109	95.6		
Immunization						
Incomplete	16	47.1	41	36.0	0.334	1.58 (0.73 – 3.43)
Complete	18	52.9	73	64.0		

**Pearson chi square,* p<0.05 (significant)*

Growth monitoring is a health service that can be used as a tool to assess a child's nutritional status and development. Growth monitoring and promotion are among the priority health services for assessing and following up on growth patterns in children under two years. These services enable health workers to control or limit child deaths and stunted growth earlier (12). Monitoring toddler growth as a form of nutritional service is very important to determine whether there are any disorders in toddler growth (growth faltering) as early as possible so that follow-up can be carried out immediately on toddlers who experience these disorders. Monitoring the nutritional status of toddlers carried out through routine growth monitoring every month is expected to increase the knowledge and skills of mothers in understanding preventive efforts that can be implemented to avoid stunting.

The increased knowledge of mothers of toddlers is expected to contribute to the proper fulfillment of toddler intake, which will improve nutritional status and prevent stunting (13). Human growth begins at the time of conception and continues according to the stages of age. The first two years of life are important stages of human life because during this period, interventions carried out optimally can support optimal growth. Failure or suboptimal intervention during this period can result in growth failure. Growth failure can occur due to chronic diseases, hormonal disorders, malnutrition, genetic disorders, and genetic disorders (14). The presence of disorders or abnormalities in toddler growth can be immediately identified if this monitoring is routinely carried out. One is by weighing and measuring length/height, carried out monthly at the integrated health post. Integrated health posts can play an important role in reducing stunting. Several stunting prevention activities are carried out at integrated health posts, such as immunization, counseling on feeding infants and children, providing vitamin A and deworming drugs, etc. The role of integrated health posts in

monitoring toddler growth can be done by monitoring toddler weight using the Maternal and Child Health book (KIA book). If there are obstacles or disorders in toddler weight gain, they can be identified immediately, and follow-up action can be taken immediately (8). Early detection of growth problems in children can be achieved by evaluating whether their growth patterns align with age-appropriate standards. Growth delays, such as stagnant weight gain or height measurements that fall below age norms, may serve as early indicators of underlying nutritional or health issues. In such cases, children should be promptly referred to a primary health center for consultation with healthcare professionals to ensure timely intervention. Timely identification of nutritional problems and immediate intervention are critical in preventing the further decline in nutritional status (15).

The relationship between early initiation of breastfeeding and stunting

In this study, 44% of toddlers aged 6-23 months who did not have early initiation of breastfeeding experienced stunting (**Table 2**). This study showed no relationship between early initiation of breastfeeding and stunting variables, with p-value = 0.178 (p > 0.05). The findings of the prior research by Mariah & Sugianti (2023) similarly indicated that the history of early initiation of breastfeeding was not associated with stunting in toddlers (16). Contrary to findings from earlier research in Ethiopia (17) and stunting locus district in Indonesia (18), which indicated that toddlers without an early beginning of breastfeeding had a heightened risk of stunting compared to those who received early breastfeeding.

Early initiation of breastfeeding is skin contact between a newborn baby and its mother immediately after the baby is born, either by normal delivery or by cesarean delivery, provided that the condition of the mother and baby is healthy or stable. Skin contact is carried out without barriers by placing the baby on the mother's stomach or chest. Early initiation of breastfeeding can be considered an initial step that can support the success of subsequent breastfeeding. Early initiation of breastfeeding is beneficial for both newborns and mothers. By initiating breastfeeding early, babies get quality first food (19). Early initiation of breastfeeding creates a bond between the baby and the mother and can provide comfort and warmth for the baby.

Implementing early initiation of breastfeeding in mothers who have just given birth is certainly inseparable from the cooperation between healthcare professionals who assist in childbirth with the mother who is giving birth and who accompanies the mother during the labor process, if there is one. The mother should have known about the implementation of early initiation of breastfeeding before giving birth. The involvement of healthcare professionals is certainly important in providing information about the implementation of early initiation of breastfeeding and informing mothers since pregnancy so that they know the benefits and prepare themselves to breastfeed early initiation of breastfeeding after childbirth. Counseling and education at the integrated health post for pregnant women and pregnancy classes can be used to convey this information.

The relationship between exclusive breastfeeding and stunting incidence

Another variable unrelated to stunting from the bivariate analysis results is exclusive breastfeeding (p-value = 0.901) (**Table 2**). Exclusive breastfeeding in this study was assessed from the first age at which the baby was introduced to foods other than breast milk. This study's results show that 68% of toddlers aged 6-23 months in Tanjung Jabung Timur Regency had been introduced to foods and/or drinks other than breast milk before the baby was six months old (Table 1). Similar research by Rusmil et al., (2019), which shows that there is no difference between children who are exclusively breastfed and those who do not receive exclusive breastfeeding with stunting (20). This is in contrast with the research of Hina & Picauly (2021), who reported that the incidence of stunting was related to a history of exclusive breastfeeding (21).

Early initiation of breastfeeding, together with exclusive breastfeeding, provides benefits to babies, namely by protecting babies from infections, including digestive tract infections, which can cause malnutrition (22). In addition, nutritional problems such as malnutrition can be avoided by providing optimal breast milk (23). From the description of breastfeeding in this study,

the proportion of toddlers aged 6-23 months in Tanjung Jabung Timur Regency who received breast milk was only 31.8%, while the proportion of toddlers who received early initiation of breastfeeding was quite high (66.9%). This shows that in the journey of providing exclusive breastfeeding, mothers may experience problems, and of course, this needs attention so that breastfeeding mothers who experience problems in breastfeeding can get help from breastfeeding counselors and health workers. Help can be in the form of encouragement or support from family and partners or help from health workers to improve attachment and breastfeeding positions.

There is no significant relationship between exclusive breastfeeding and stunting in this study; it could be due to other factors that influence exclusive breastfeeding, for example, the baby has been given other foods or drinks besides breast milk, breastfeeding management, and the health conditions of the baby and mother. Giving food or drinks other than breast milk, such as fruit juice, formula milk, tea, or porridge, is done because the mother thinks her breast milk is not enough (24). Breastfeeding mothers who consume foods with sufficient nutrition can help improve the quality and quantity of their breast milk. Although in this study, exclusive breastfeeding was not associated with stunting in Tanjung Jabung Timur Regency, the proportion of toddlers who did not receive exclusive breastfeeding and experienced stunting was quite large (70.6%). The inability to exclusively breastfeed could be due to the mother’s reentry into the workforce, insufficient familial support, especially from husbands, and the mother's education and knowledge about providing breast milk that is lacking (25). Support for breastfeeding mothers is needed to ensure breastfeeding's success, whether from family, health workers, or the community. Mothers who make regular antenatal visits (ANC) should obtain knowledge or information related to breastfeeding as preparation for breastfeeding (26).

Relationship between birth weight and stunting

The results of this study showed no relationship between the birth weight variable and the stunting variable, with p-value = 0.567 (Table 2). According to the research from Haniarti et al. (2022), which concluded that a birth weight of less than 2500 grams did not show a significant relationship with stunting (27). This outcome contradicts the findings of the study by Woldeamanuel & Tesfaye (2019), which reported that toddlers with a birth weight below 2500 grams are more likely to suffer from nutritional problems, not only stunting but also underweight and wasting (28).

Toddlers under 2500 grams at birth are susceptible to growth disorders/inhibitions. In addition, they are also at risk of experiencing developmental disorders (29). When viewed from the proportion in this study, it is known that almost all toddlers aged 6-23 months who were sampled were born with a normal weight (≥ 2500 grams). This shows that conditions of birth with normal weight also need to be supported by optimal environmental conditions to grow and develop to their full potential. Paying attention to the intake of toddlers starts with providing appropriate food according to age, providing a living environment with adequate sanitation, and getting good health services.

The relationship between immunization and stunting

In this study's bivariate result, the immunization and stunting variables did not show a significant relationship (p-value = 0.334) (Table 2). Although the government has initiated efforts to combat stunting through several programs, one of which requires basic immunization for babies aged 0-11 months (30). Only 61.5 percent of toddlers aged 6-23 months in Tanjung Jabung Timur have received basic immunization (**Table 1**). Abdur-Rabb et al. (2024) also reported that complete basic immunization coverage in toddlers did not show a significant relationship with stunting (31). In contrast to Rusliani et al. (2022) which reported that incomplete basic immunization in toddlers aged 6-23 months was associated with stunting (32). The difference in the results of this study could be caused by immunization being able to help prevent diseases in toddlers, but it does not directly affect the growth of the toddler. Children who have been fully immunized but whose food intake is not according to their needs are still at risk of experiencing nutritional problems.

Basic immunization, according to the government program, plays a role in strengthening the immune system of toddlers, so it is expected to reduce the incidence of disease in children. Some diseases that can be prevented through basic immunization include tuberculosis, polio, pneumonia, diarrhea, measles, etc. Malnutrition and infectious illnesses have a reciprocal link. Poor nutritional status conditions will cause easy disease attacks, and vice versa. Conditions with repeated infectious diseases cause a decrease in nutritional status (33). According to the study's findings, growth monitoring is one of the health services for toddlers that significantly influences decreasing stunting rates. Following the policy direction of the 2020-2024 RPJMN, the Ministry of Health is transforming the health system by improving basic health services (Primary Health Care), one of which is by strengthening and expanding health services at integrated health posts (posyandu), by focusing on promotive and preventive efforts. Posyandu, as a forum for implementing growth monitoring and immunization routinely every month, should be able to provide benefits that can be felt by the community, so that it can increase community visits to integrated health posts.

This study has not identified other factors causing stunting, such as food intake, infectious diseases, the distance of health services to residence, and types of assistance from health workers related to information on breastfeeding and utilization of health services. Because this study is cross-sectional, researchers only identify the relationship between independent and dependent variables but have not explained the causal relationship.

CONCLUSION AND RECOMMENDATION

Growth monitoring is a variable related to stunting in toddlers aged 6-23 months in Tanjung Jabung Timur Regency. In contrast, variables that are not related are the early initiation of breastfeeding, exclusive breastfeeding, birth weight, and immunization. The implementation of growth monitoring at the integrated health post as a place for growth monitoring needs attention from the health sector and other related sectors. Cooperation between the community apparatus and health workers needs to be improved to increase visits by mothers of toddlers and pregnant women to the integrated health post.

The capacity of health and cadres also must be enhanced to improve their ability to provide information to the community, especially regarding toddler growth and development, so that the community, in this case, pregnant women and mothers of toddlers, are interested in coming to the integrated health post. Strengthening the capacity of health workers and cadres through structured training programs is crucial to maximizing the benefit of the integrated health post services and to ensure the smooth implementation of growth monitoring process. The benefits felt by the community with the integrated health post activities are expected to increase community participation in visiting the integrated health post so that growth retardation can be detected early and immediately followed up. In addition, information about breastfeeding needs to be provided during pregnancy so that mothers are expected to be more prepared to provide breast milk when their babies are born.

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